50-498

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 7, 1995

LICENSEE: Houston Lighting and Power Company (HL&P), et al.

FACILITY: South Texas Project, Units 1 and 2 (STP)

SUBJECT: SUMMARY OF OCTOBER 3/4, 1995, MEETING ON GRADED QUALITY ASSURANCE

On October 3 and 4, 1995, the NRC staff met with the South Texas licensee for an update on the licensee's progress in their graded quality assurance (GQA) implementation methodology. Meeting attendees are listed in Attachment 1. The handouts provided by the licensee are in Attachment 2.

The licensee's presentation included a general overview of its GQA program, a draft comprehensive risk management procedure, draft procedures for the probabilistic safety assessment (PSA) program, configuration control of the PSA and related risk ranking, and a draft procedure for station performance data collection, reporting and categorization. The licensee defines GQA as the process by which risk-based methodology (PSA) and performance-based information analyses are combined to provide direction as to what levels of programmatic controls are needed for systems, components or activities, and as to the levels of first line and independent oversight needed to provide necessary assurance that safety functions will be properly performed.

The licensee plans on using three levels of GQA program controls. They are full, targeted and basic. Full program controls will be applied to plant equipment determined to be of high safety/risk significance, plus activities determined to be safety significant or those performed on high risk components. Full program controls are in compliance with 10 CFR 50 Appendix B and with the applicable STP Updated Final Safety Analysis (UFSAR) commitments relative to NRC Regulatory Guides and American National Standard Institute (ANSI) Standards which they endorse (other recognized industry standards may be applied, as appropriate).

Targeted program controls will be applied to plant equipment and activities which, while not being high risk, are nevertheless significant or important for other reasons. These controls are actually complete elements of full program controls and are applied to those attributes of items or activities which render them significant or important. This requires a detailed analysis by the expert panel and the subtier working group to determine those attributes. GQA is accomplished by applying minimal QA controls to attributes of minor significance.

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Basic program controls will be applied to plant equipment and activities which, while not being high risk or significant for other reasons, are nevertheless subject to the controls of 10 CFR 50, Appendix B because they are categorized as safety-related. Basic program 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 10 CFR 50, Appendix B. Basic controls do not reflect the strict controls as depicted in NRC regulatory guides and the ANSI standards they endorse. The basic program will be generally presented in the QA program description, with detailed implementation methods contained in plant procedures. A copy of these procedures will be made available to the staff.

The staff provided comments on the licensee's draft procedures. With regard to risk ranking, the staff suggested that additional consideration be given to the defense in depth philosophy by leaving at least one redundant path in each safe shutdown function under the full QA program. Also, better guidance and criteria is necessary for the expert panel to integrate PRA and deterministic considerations. In terms of the grouping of components, the staff suggested a change in the overall criteria so that if either the Risk Achievement Worth or the Fussell-Vesely criteria are exceeded, the component should be ranked high (full program controls). The NRC will provide additional feedback on the ranking process when more details are made available (in future meetings).

The licensee's plan to bring PSA under Appendix B quality controls, as they are using it for graded QA purposes, appears to be appropriate. The establishment of the working group and the expert panel appears to be a sound approach to provide the appropriate technical expertise. The three levels of GQA program controls appear to be adequate. Regarding the basic program controls, the staff will need to discuss this matter with NRC's GQA steering group and ultimately, the staff will need to consider the controls for amending the basic program. The staff will need further details on the deterministic attributes considered by the working group.

A general comment from the staff was that, as expected, the staff will need to see the details of the final GQA plan to satisfy the "deliverables" previously identified by the staff. These details should be provided in future interactions with the staff and in the formal GQA submittal.

The licensee plans to formally submit the GQA program for NRC review on January 1, 1996. Implementation is planned to begin 60 days after the submittal and full implementation is scheduled for July 1996.

Thomas W. Alexion

Thomas W. Alexion, Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket Nos. 50-498 and 50-499

Attachments: 1. List of Meeting Attendees
2. Meeting Handouts

cc w/atts: See next page

The licensee plans to formally submit the GQA program for NRC review on January 1, 1996. Implementation is planned to begin 60 days after the submittal and full implementation is scheduled for July 1996.

Original Signed By:

Thomas W. Alexion, Project Manager
Project Directorate IV-1
Division of Reactor Projects III/IV
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Docket Nos. 50-498 and 50-499

Attachments: 1. List of Meeting Attendees
2. Meeting Handouts

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Document Name: STPGQA.MTS

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MEETING BETWEEN HL&P AND NRC ON GRADED QUALITY ASSURANCE

October 3-4, 1995

Name	Organization
R. Rehkugler	HL&P
D. Daniels	HL&P
J. Petty	HL&P
R. Fincher	HL&P
R. Grantom	HL&P
L. Martin	HL&P
S. Rosen	HL&P
J. Savage	HL&P
M. McBurnett	HL&P
T. Jordan	HL&P
L. Myers	HL&P
W. Wagner	NRC
J. Peralta	NRC
T. Alexion	NRC
R. Gramm	NRC
S. Black	NRC
M. Rubin	NRC
M. Cheok	NRC
W. Reckley	NRC
W. Haass	NRC

Attachment 1

DISTRIBUTION: Summary of October 3-4, 1995, Meeting on GQA
Docket File (w/atts)
Public (w/atts)
PDIV-1 (w/atts)
W. Russell/F. Miraglia
R. Zimmerman
J. Roe
E. Adensam
W. Beckner
W. Wagner, RIV
J. Peralta (O-10-A-19)
R. Gramm (O-10-A-19)
M. Rubin (O-10-E-4)
M. Cheok (O-10-E-4)
W. Reckley (O-10-A-19)
W. Haass (O-10-A-19)
T. Alexion
E. Jordan
ACRS (4)
OGC
J. Mitchell (O-17-G-21)
J. Dyer, RIV (w/atts)

COMPREHENSIVE RISK MANAGEMENT

1.0 PURPOSE AND SCOPE

1.1 To establish and provide guidance to the Expert Panel and associated Working Group on the implementation of risk informed, performance based comprehensive risk management program at STP. This process applies to all plant equipment, processes, and activities.

2.0 DEFINITIONS

2.1 COMPREHENSIVE RISK MANAGEMENT (CRM)

The process by which station requirements, commitments, processes, activities and human/equipment performance are identified and evaluated relative to their contribution to risk and/or consequences, plus their resulting benefits relative to station health, economic ability and personnel/public health and safety.

2.2 GRADED QUALITY ASSURANCE

The process by which risk-based methodology [i.e., Probabalistic Safety Assessment (PSA)] and performance-based information analyses are combined to provide direction as to what levels of programmatic controls are needed for systems, components or activities, and as to the levels of first line and independent oversight needed to provide necessary assurance that items will operate safety and activities are accomplished as prescribed.

2.3 EXPERT PANEL

A multi-disciplinary group of individuals whose purpose is to guide the implementation of Comprehensive Risk Management activities at STP.

2.4 WORKING GROUP

A multi-disciplinary group of individuals who provide risk-informed, performance-based recommendations to the Expert Panel.

3.0 RESPONSIBILITIES

3.1 EXPERT PANEL

3.1.1 Approve the criteria for categorization of systems, components, items and activities.

3 1.2 Validate the categorization of systems, components, items and activities.

3.0 RESPONSIBILITIES (Con't)

3.1 EXPERT PANEL (Con't)

3.1.3 Approve the criteria for assignment of Quality Assurance (QA) measures for systems, components, items and activities.

3.1.4 Validate the assignment of QA measures for systems, components, items and activities.

3.1.5 Maintain cognizance for the implementation of the CRM Program and adjust criteria, as appropriate.

3.2 WORKING GROUPS

3.2.1 Analyze performance information.

3.2.2 Consider risk ranking of systems and components.

3.2.3 Consider the application of processes/work activities/work organizations to systems, components and items.

3.2.4 Inject deterministic knowledge/insight.

3.2.5 Develop recommendations, as prescribed in Addenda to this procedure, and provide them to the Expert Panel.

3.3 STATION MANAGEMENT

3.3.1 Implement the decisions of the Expert Panel.

3.4 SENIOR MANAGEMENT TEAM

3.4.1 Maintain strategic level oversight of CRM Program activities.

3.4.2 Provide resolution of any Expert Panel dissenting opinions.

3.5 CHANGE MANAGEMENT TEAM

3.5.1 Ensure that Expert Panel decisions are implemented in a timely and effective manner.

4.0 REQUIREMENTS

4.1 The Expert Panel is composed of the Managers of Design and Systems Engineering, Nuclear Licensing, Industry Relations, the Supervising Engineer-Risk and Reliability Analysis, the Director of Quality and the Unit #1 Plant Manager. The Manager of Industry Relations is appointed chairman of the Expert Panel.

4.2 Working Groups shall be comprised of individuals as listed on the appropriate addenda to this procedure.

4.3 Expert Panel and Working Group personnel shall be trained to this procedure, associated PSA procedures and station performance reporting procedures. They shall additionally receive (or have received) training to the requirements of 10CFR50.59 and Root Cause Analysis.

5.0 PROCESS

5.1 Working Groups shall convene at frequencies as established in addenda to this procedure.

5.2 Minimum quorum requirements for Working Group meetings are the chairman and at least three regular members.

5.3 Recommendations shall be arrived at by consensus. Dissenting opinions shall be documented for Expert Panel resolution.

5.4 Using the criteria established in the addenda, the Working Groups shall analyze performance data, consider available risk information and their own deterministic insight, and shall develop recommendations.

5.4.1 Recommendations shall be documented, and shall include rationale and risk ranking/performance information that forms the bases for the recommendations.

5.4.2 Recommendations shall be forwarded to the Expert Panel.

5.5 The Expert Panel shall convene, at a minimum, at the same frequencies as established for Working Groups in addenda to this procedure.

5.6 Minimum quorum requirements for Expert Panel meetings are the chairman and at least three regular members. There shall be no short term designee representation.

5.7 Decisions shall be arrived at by consensus. Dissenting opinions shall be documented. Any dissenting opinions shall be forwarded to the Senior Management Team (SMT) for resolution.

5.0 PROCESS (Con't)

5.8 The Expert Panel shall use the same criteria as the Working Groups in reviewing recommendations and shall inject their own deterministic insight as appropriate. Dissenting opinions from the Working Groups shall be resolved.

5.9 The Expert Panel shall accomplish those tasks as depicted in 3.1 of this procedure and shall document its decisions. These shall be disseminated to the SMT and STP Change Management Team (CMT).

5.10 The SMT shall resolve any dissenting opinions which require resolution.

5.11 The CMT shall ensure that Expert Panel decisions are implemented in a timely and effective manner.

6.0 RECORDS

6.1 Records of Expert Panel decisions shall be retained as Quality Assurance records in STP-RMS, and shall consist of:

6.1.1 Expert Panel decisions.

6.1.2 Working Group recommendations/analyses.

6.1.3 PSA inputs.

6.1.4 Performance information/analyses.

6.1.5 Other deterministic insight/rationale not covered by 6.1.3 or 6.1.4.

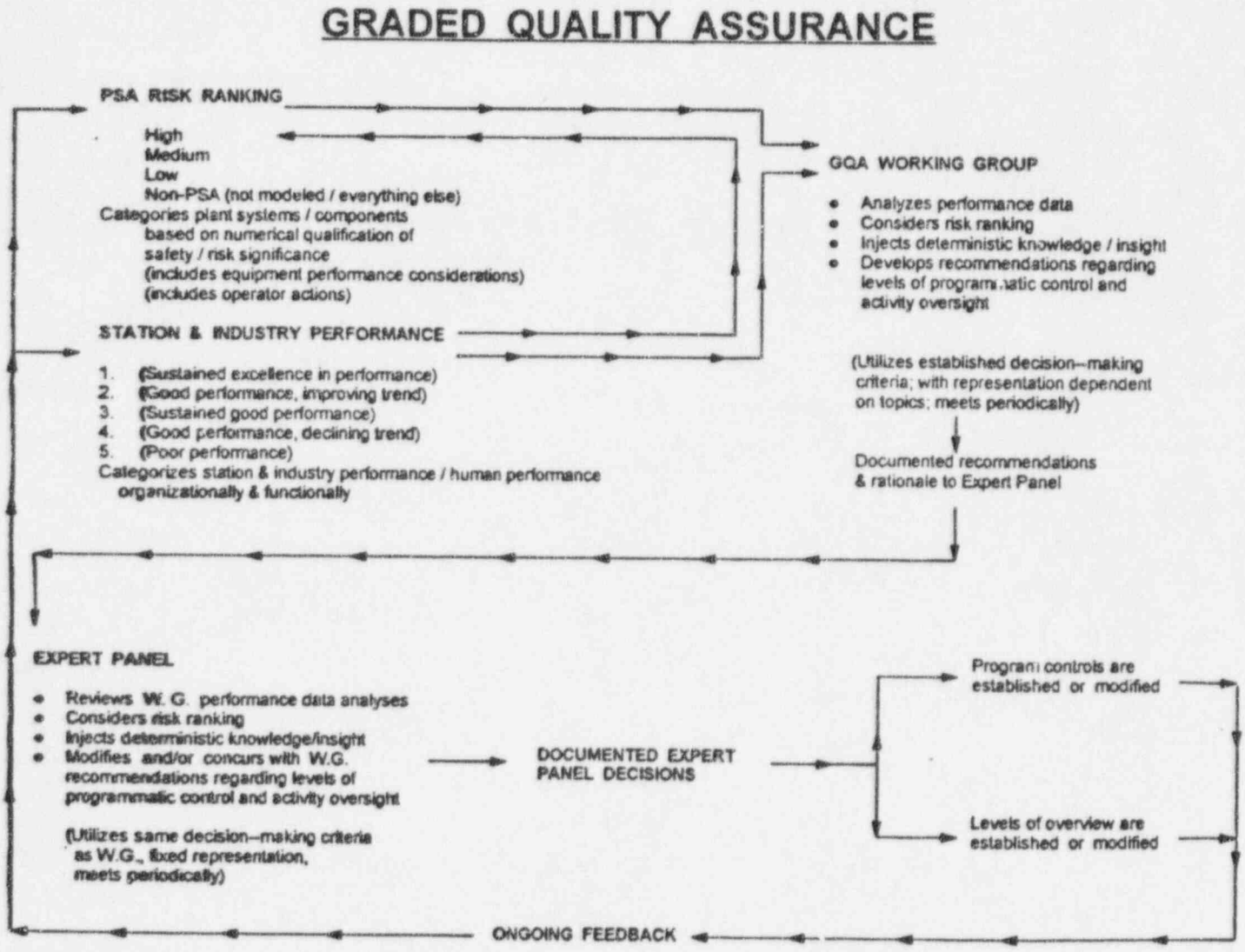
6.1.6 Dissenting opinions and resolutions.

ADDENDUM 1
GRADED QUALITY ASSURANCE

This addendum describes the Graded Quality Assurance (GQA) process, prescribes the performance reporting of the Operating Experience Group (OEG), and prescribes the activities of the GQA Working Group. It also prescribes the thought processes/criteria to be applied in formulating recommendations to the Expert Panel. The Expert Panel shall use these same processes/criteria in considering Working Group recommendations when arriving at decisions.

Figure 1 for this Addendum depicts a high level process flow chart for GQA.

FIGURE 1



GRADED QUALITY ASSURANCE:

Attachment 1 to this addendum describes the two different programs that shall be applied as appropriate for plant items and activities.

Attachment 2 and 3 to this addendum prescribe the thought processes and criteria the Working Group and Expert Panel shall use in determining the appropriate level of program controls to be applied to plant equipment and activities. There are two different programs to be applied in three different manners--"Full", "Targeted", and "Basic" levels of program control.

"Full" program controls shall be applied to plant equipment determined to be high safety/risk significance, plus activities determined to be safety significant or those performed on high risk components. These controls represent the highest levels of program controls and line/independent oversight to be afforded to items or activities and are designed to provide a high degree of assurance that items perform safely and activities are accomplished as expected.

"Targeted" program controls shall be applied to plant equipment and activities which, while not being "high risk", are nevertheless significant or important for other reasons (Attachments 2 and 3 delineate those criteria). These controls are actually elements of "full" program controls and are applied to those attributes of items or activities which render them significant or important. These controls are designed to provide a high degree of assurance that the items will perform their specific significant function and activities' important elements are accomplished, as expected.

"Basic" program controls shall be applied to plant equipment and activities which, while not being "high risk" or significant/important for other reasons, are nevertheless subject to the controls of 10CFR50 Appendix B. These controls represent fundamental good business practices which comply with applicable Appendix B requirements, and are designed to provide assurance that items perform, and activities are accomplished, as expected.

OPERATING EXPERIENCE GROUP REPORTING:

The OEG compiles and analyzes performance of plant equipment and activities in accordance with 0PGP03-XX-XXXX. On a biannual basis, in coordination with Working Group schedules. The OEG shall provide performance reports to the Working Group. These reports shall provide performance information for the current and two prior six months periods, by organization and attributes.

These reports include both positive and negative indicators that are graded on a scale of one to five using the following criteria:

1) Sustained excellence

2) Good with an improving trend

OPERATING EXPERIENCE GROUP REPORTING (Con't):

3) Good performance

4) Good with a declining trend

5) Poor performance

For any performance attribute with a rating of four or five, the OEG shall provide accompanying backup information along with the report, for Working Group and Expert Panel analysis purposes.

GQA WORKING GROUP:

The GQA Working Group shall consist of representatives from Systems Engineering, Design Engineering, Quality, Reliability and Risk, and Maintenance.

It shall be chaired by the representative from Systems Engineering. This membership may be augmented as needed, depending on the topics under consideration.

The Working Group members shall be senior level personnel with backgrounds that enable them to render logical recommendations. Working Group membership shall be endorsed by the Expert Panel.

The Working Group shall meet, as a minimum, biannually, to establish and/or adjust levels of programmatic control and oversight.

The Working Group shall consider plant systems/components/items in accordance with Attachment 2 of this addendum. They shall consider plant activities in accordance with Attachment 3 to this addendum. They shall consider plant and activities performance provided by the OEG, as applicable, per those attachments. Specific attention shall be afforded to areas of poor or declining performance, with special attention to activities which have or can have direct effect on plant systems and components. These considerations, as they may be augmented by group members' deterministic insights, form the bases for recommendations regarding the levels of programmatic controls to be imposed on systems, components, items and activities. They also form the basis for recommending the levels of oversight (both line and independent) that should be afforded to station activities.

Recommendations developed by the Working Group shall be documented and shall be forwarded to the Expert Panel for their consideration and concurrence. Documentation shall include, as a minimum, the following:

- Detailed recommendations for systems/component/item categorization (i.e., full, targeted or basic levels of control).

GQA WORKING GROUP (Con't):

- Detailed recommendations for activities categorization (i.e., full, targeted or basic levels of control).

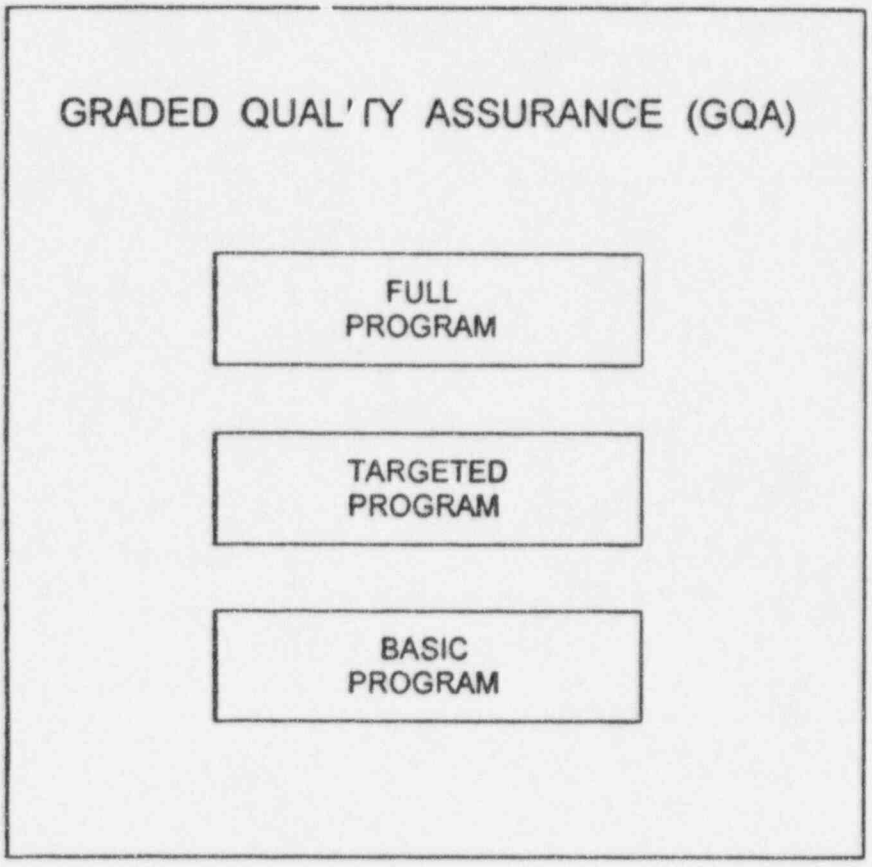
- The bases for making those recommendations (i.e., include PSA inputs, performance analysis results, details regarding any other deterministic inputs).

- Any dissenting opinions.

Any changes deemed necessary after Expert Panel deliberations shall be implemented by the Working Group and returned to the Expert Panel.

ATTACHMENT 1
QUALITY ASSURANCE PROGRAM LEVELS AND DESCRIPTION

Two separate and distinct programs exist in the GQA Program - "Full" and "Basic". For items and activities determined to be safety significant/important, "Full" program controls are applied. For items and activities determined to be NOT risk significant/important, yet determined to be significant/important for other reasons, "Full" program controls will be applied at a selected manner, specifically targeted at those attributes of the item or activity which render its significance or importance. For items and activities determined to be NOT significant/important, yet subject to the controls of 10CFR50, Appendix B, "Basic" program controls are applied.



GRADED QA PROGRAM CONTROLS:

FULL:

Full Program Controls are defined as the highest levels of program controls and oversight that are to be afforded to items and activities. These are in full compliance with the requirements of 10CFR50 Appendix B, and additionally represent compliance with the applicable STP UFSAR commitments relative to USNRC Regulatory Guides and ANSI Standards which they endorse. Other recognized industry standards are applied, as appropriate. These controls shall be prescribed in implementing procedures specific to the item or activity.

Items and activities categorized to receive across-the-board full program controls are afforded multi-tiered levels of oversight consisting of independent/dual line verification as appropriate plus focused independent oversight in the form of audits, performance monitoring, assessment, evaluation, inspection, and/or testing, as appropriate to the item or activity. These items and activities shall remain in this category, regardless of performance, due to their high level of risk significance/importance.

In the event that OEG performance reports indicate a declining trend in performance of these items or activities for two consecutive reporting periods, a "CAQ-S" Condition Report shall be initiated in accordance with 0PGP03-ZX-0002, to determine the apparent cause and initiate appropriate corrective actions. If poor performance is indicated, a "S-CAQ" Condition Report shall be initiated (if one has not already been) to effect a root cause investigation and appropriate corrective actions.

TARGETED:

Activities categorized to receive targeted Full Program Controls are subjected to the same levels of program controls applied to those attributes of the item or activity which placed it into that category. This requires a detailed analysis by the Working Group of the item or activity to determine what those attributes are. This analysis shall be documented, along with the basis for selection of the full program attributes determined to be appropriate to that item or activity. Until such time as this analysis is completed, across-the-board program controls shall be maintained. These items and activities shall also be afforded multi-tiered levels of line and independent oversight targeted to those attributes which placed them into this category.

Targeted items and activities shall have the same level of Corrective Action Program thresholds as those items and activities categorized for across-the-board Full Program applicability. Any time performance reports indicate declining or poor performance, the Working Group shall additionally revisit the program attributes and oversight applied to those items or activities to confirm that the decisions made were appropriate. Adjustments shall be made, as necessary. These considerations shall be documented and included in the recommendations to the Expert Panel.

GRADED QA PROGRAM CONTROLS (Con't):

BASIC:

Basic Program 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. They do not reflect the strict controls as depicted in USNRC Regulatory Guides and the ANSI standards they endorse. Other industry standards are applied, as appropriate. These controls shall be prescribed in implementing procedures specific to the item or activity.

Items and activities categorized to receive basic levels of program controls shall be afforded minimal levels of oversight. The primary means of verification shall be by the line organization, with periodic selected independent oversight in the form of audits, performance monitoring; assessments; evaluations; inspection; and/or testing as appropriate to the item or activity.

In the event that OEG performance reports indicate declining or poor performance of these items or activities, the Working Group shall revisit the categorization to confirm that it was appropriate. If not (e.g., it should have been categorized as targeted or higher), the item or activity shall be recategorized and a "CAQ-S" Condition Report shall be initiated to determine the apparent cause of the mis-categorization and effect appropriate corrective actions.

If the Working Group concludes that the categorization is appropriate, the declining or poor performance of the item or activity, by definition, cannot constitute a Significant Condition Adverse to Quality; however, remediation of declining or poor performance is desirable. If performance declines for two consecutive reporting periods or is poor, a "CAQ-S" Condition Report shall be initiated to determine the apparent cause and effect the appropriate corrective actions.

ATTACHMENT 2
CATEGORIZATION OF PLANT SYSTEMS/COMPONENTS/ITEMS

Systems/components shall be evaluated/categorized using the following:

1) What is the item's PSA risk ranking?

H -
M -
L -
NM (Not Modeled) -

2) Is the item Maintenance Rule significant?

Yes ___
No ___

Specify: _____

_____

3) Has the item caused, or could it directly cause, an initiating event?

Yes ___
No ___

Specify: _____

_____

4) Is the item deterministically important?

Yes ___
No ___

Specify: _____

_____

5) Is the item important related to ALARA, environmental, industrial safety, etc.?

Yes ___
No ___

Specify: _____

_____

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6) What are the requirements/commitments applicable to this item?

Specify: _____

_____

_____

7) Is the item "safety-related"?

Yes ___
No ___

In answering these questions, use the following logic (See Figure 2 for depiction):

- If the answer to No. 1 is "H", Full Program Control shall be applied. No further consideration is needed.

- If the answer to No. 1 is not "H", proceed and answer remaining questions.

  (NOTE: If any answer to No. 2 through 6 is in the affirmative, no further consideration is needed. Targeted program controls will be applied to those characteristics/elements of the item which cause the affirmative answer)

- If the answer to No. 1 is not "H" and the answers to No. 2 through 6 are in the negative, answer No. 7.

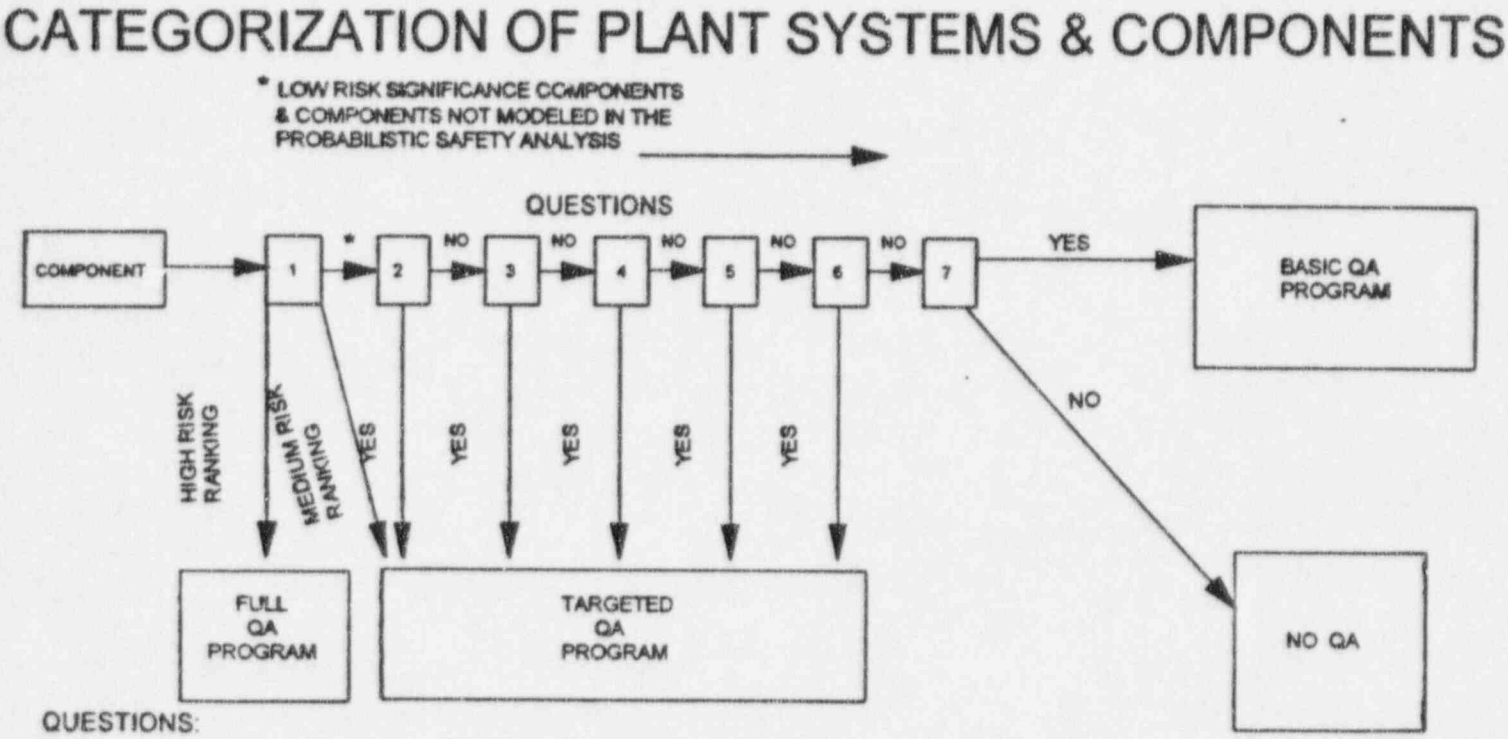
- If the answer to No. 7 is yes, Basic Program Control will be applied.

- If the answer to No. 7 is no, no further consideration is needed.

- In determining the extent of program controls to be applied to items which were categorized by any means other than a high risk ranking, performance of the item and associated work activities shall be considered.

Figure 2

Categorization of Plant Systems and Components



QUESTIONS:

1. WHAT IS THE RISK RANKING OF THIS COMPONENT? HIGH___ MEDIUM____ LOW____ NOT MODELED____
2. IS IT MAINTENANCE RULE SIGNIFICANT?
3. HAS IT CAUSED, OR COULD IT CAUSE AN INITIATING EVENT?
4. IS IT DETERMINISTICALLY IMPORTANT?
5. IS IT IMPORTANT FOR AN ALARA, ENVIRONMENTAL OR INDUSTRIAL SAFETY REASON?
6. ARE WE COMMITTED/REQUIRED TO APPLY QA TO THIS COMPONENT?
7. IS IT "SAFETY-RELATED"?

ATTACHMENT 3
CATEGORIZATION OF PLANT ACTIVITIES

Plant activities shall be evaluated/categorized using the following:

1) Is this a PSA modeled, or otherwise, safety significant activity?

Yes ___
No ___

Specify: _____

_____

2) Is this activity performed on high risk components?

Yes ___
No ___

Specify: _____

_____

3) Has this activity caused, or could it directly cause, an initiating event?

Yes ___
No ___

Specify: _____

_____

4) Is this activity important for an ALARA, environmental or industrial safety reason?

Yes ___
No ___

Specify: _____

_____

5) Are we required/committed to apply some type of QA to this activity (e.g., Security, Fire Protection, Emergency Preparedness, etc.)?

Yes ___
No ___

Specify: _____

_____

6) Is this a 10CFR50 Appendix B activity?

Yes ___
No ___

Specify: _____

_____

In answering these questions use the following logic (See Figure 3 for depiction):

- If answer to questions No. 1 or 2 is yes, Full Program Control shall be applied. No further consideration is needed.

- If answer to questions No. 1 and 2 is no, proceed and answer remaining questions.

  (NOTE: If any answer to questions No. 3 through 5 is in the affirmative, no further consideration is needed. Targeted Program Controls will be applied to those attributes of the activity which caused the affirmative answer)

- If the answers to No. 1 and 2 are no, and the answers to 3 through 5 are in the negative, answer No. 6.

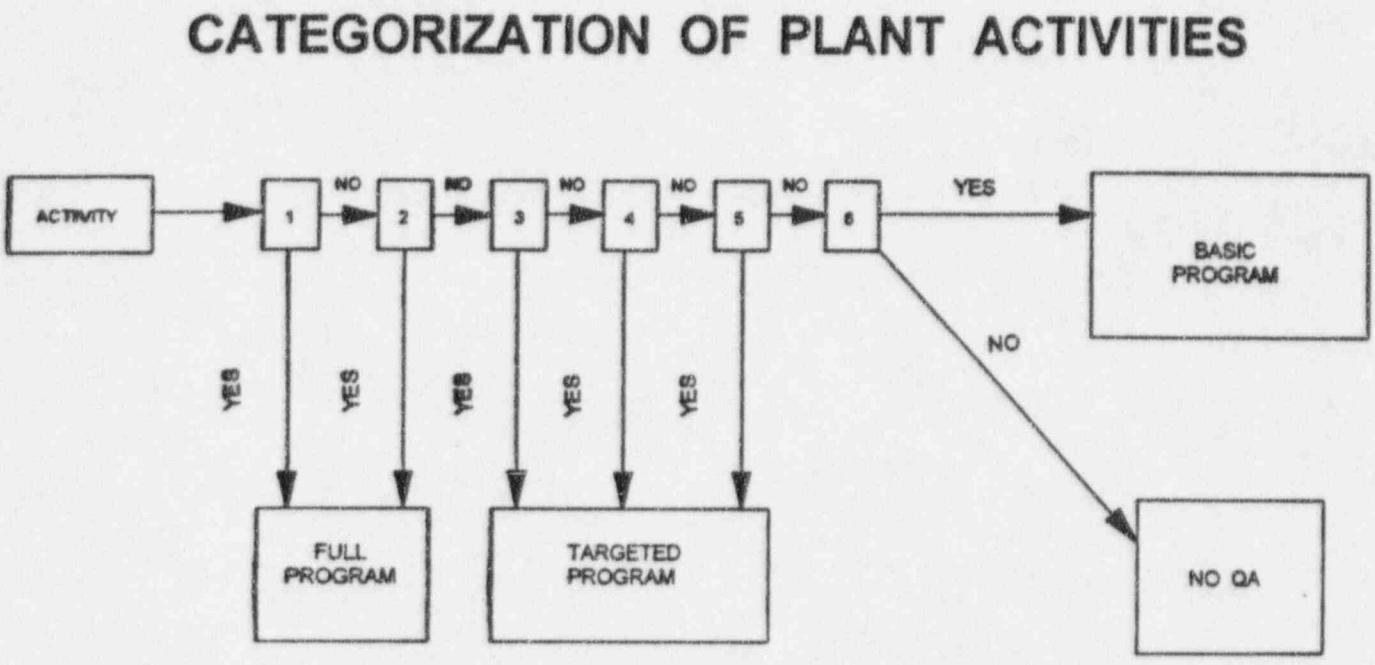
- If the answer to No. 6 is yes, Basic Program Controls will be applied.

- If the answer to No. 6 is no, no further consideration is needed.

- In determining the extent of program controls to be applied to activities which were categorized by any means other than "Yes" answers to No. 1 and No. 2, performance of the activity shall be considered.

Figure 3

Categorization of Plant Activities



QUESTIONS:

1. IS THIS A PSA-MODELED, OR OTHERWISE, SAFETY SIGNIFICANT ACTIVITY?
2. IS THIS ACTIVITY PERFORMED ON HIGH RISK COMPONENTS?
3. HAS THIS ACTIVITY CAUSED, OR COULD IT DIRECTLY CAUSE, AN INITIATING EVENT?
4. IS THIS ACTIVITY IMPORTANT FOR AN ALARA, ENVIRONMENTAL OR INDUSTRIAL SAFETY REASON?
5. ARE WE REQUIRED/COMMITTED TO APPLY QA TO THIS ACTIVITY (e.g., SEC., FP, EP, etc.)?
6. IS THIS A 10CFR50 APPENDIX B ACTIVITY?

h:\wp\ Effective date: 00/00/00 Print: 10/3/95	0AAA00-AA-0000	Rev. 0 General	Page 1 of 11
PSA PROGRAM			
Quality	Safety-Related	Usage: **DRAFT**	Effective Date: 10/??/95

C. R. Grantom	(name)	(name)	Nuclear Fuel & Analysis
PREPARER	TECHNICAL	USER	COGNIZANT ORGANIZATION

Table of Contents

1.0 Purpose and Scope

The structure, functions, controls, and applications of the South Texas Project (STP) Probabilistic Safety Assessment (PSA) program are defined within this procedure. Structures, systems, components, and human actions within the scope of the PSA for all plant operating modes and configurations are applicable to this procedure. The PSA program includes the STP Level 1 PSA (Reference 1), the Level 2 PSA/IPE (Reference 2), updates to these models, and analyses performed using these models.

The control elements associated with the STP PSA program are:

- Configuration Control;
- Software Control; and
- Application Control.

These elements provide the necessary controls to establish risk-based analyses performed at STP and to ensure that they contain appropriate technical bases and are documented with respect to plant design, procedural processes, and plant performance. The relationship between these control elements is show in Figure 1.

2.0 Configuration Control of the PSA

The STP PSA Program provides a snapshot of the STP units. Date and time stamps are used to establish the status of plant design and processes at the time of any analysis applicable to the PSA Program. The date and time stamps provide traceability of the results of a PSA analysis to the plant configuration at the time the analysis was performed.

PSA configuration control is comprised of the following areas:

- Risk Models and Documentation;
- Data Analysis;
- Methodology; and
- Assumptions.

A discussion of each of these areas is given below.

2.1 Risk Models and Documentation

Risk model documentation includes identification of references and other materials used to establish and model the response of the plant to various initiating events, operator actions, and recovery actions. Key components of risk model documentation include:

- Plant Models;
- System Models;

- Spatial Interactions Analysis; and
- System Success Criteria.

2.1.1 Plant Models

At the plant level, event trees are used to model the response of the plant to an initiating event (e.g., plant trip). Event trees include important systems and operator actions necessary to prevent core damage. Quantification of event trees provides the likelihood of core damage given an initiating event. The STP PSA event trees and their relationships are shown in Figure 2. Event tree notebook are maintained, and generally contains the following information:

- *Introduction* - describes event tree purpose and scope;
- *Assumptions/References* - lists assumptions and references from which they are derived;
- *Event Sequence Diagram* - (Front-line System Event Trees only) outlines equipment and operator actions required to mitigate/prevent a core damage event;
- *Event Sequence Block Descriptions* - (Front-line System Event Trees only) describes functional blocks contained in the event sequence diagrams;
- *Event Tree* - outlines succession of individual events which identify all possible sequences of events leading to a predefined failure event (e.g., core damage);
- *Fault Tree* - outlines top events which illustrate the logical relationship of the events leading to a particular event;
- *Macros* - defines split fraction logic rules used to link event trees;
- *Event Tree Top Event Descriptions* - defines systems, equipment, and operator actions included in the event tree structure;
- *Event Tree Binning Rules* - defines logic rules to group event tree sequences into common impacts for linking the next stage of event trees; and
- *Split Fraction Rules* - describes logic rules used to determine which split fractions should be assigned to a unique point in the event tree.

2.1.2 System Models

On a system level, analyses are used to quantify the availability/reliability of plant equipment important to safety. Top events are defined for each system or function in terms of that system's success criteria. Fault trees are used to develop cutsets which lead to failure of a top event. The generated cutsets are modified to account for common cause failures, test and maintenance alignments, and unique boundary conditions.

System notebooks are developed to document the system models and their associated fault trees. Systems with components modeled in the PSA are shown in Figure 3 along with their respective system notebooks. The system notebooks generally contain the following information:

- *Introduction* - describes fault tree purpose and scope;
- *System Function* - describes the process or purpose of the system;
- *Top Event Definitions* - defines the events for which system analysis provides quantification information;
- *System Success Criteria* - defines the minimum level of performance that will result in the system successfully performing its intended safety function as required by the event trees;
- *Support Systems* - defines systems and equipment which are required to successfully perform their function so that the analyzed system is capable of performing its intended safety function;
- *Systems Supported* - defines systems and equipment which depend on the analyzed system to perform its function so that they can perform their intended safety functions;
- *System Operations and Special Features* - defines pertinent information for normal operations and other characteristics which impact the analysis;
- *Potential for Initiating Event* - provides screening for the systems ability to cause an initiating event (e.g., reactor trip, turbine-generator trip);
- *Technical Specification Requirements* - provides information for success criteria and frequency of testing alignments;
- *Plant Procedures* - lists procedures used to define system alignments;
- *Assumptions* - lists items necessary to document areas not analyzed in part or in whole;
- *System Boundary* - defines the limit of the analysis relative to a physical of programmatic boundary;
- *Event Trees and Event Tree Split Fractions* - lists cross-references of the analyzed system to the associated event trees and split fractions;
- *Basic Event Cross Reference* - translates fault tree basic events to equipment descriptions and identification numbers;
- *Common Cause Modeling* - describes modeled common cause groups;
- *Maintenance Alignments* - describes the system configuration (including frequency and duration) when certain maintenance or testing activities are performed;
- *Recovery Factors Based on System Split Fractions* - lists operator actions necessary to restore the system or functions following failure of the analyzed system;
- *Modeling Notes* - provides other information relative to the system analysis;

- *Fault Tree* - outlines the graphical fault tree; and
- *References* - documents materials used in the system analysis.

2.1.3 Spatial Interactions Analysis

Internal plant hazards (e.g., internal floods, plant fire, or seismic response) are highly dependent on the location of risk-significant equipment relative to the hazard. Due to this dependence on plant geometry, the identification and screening of scenarios caused by internal plant hazards is referred to as Spatial Interactions Analysis. To perform this analysis, the sources of hazards within the plant and the available hazard mitigative features are tabulated. Then, by starting with the hazard sources and taking the potential propagation paths and mitigative feature into account, environmental hazard scenarios are constructed for each location[1]. Computerized methods are used to analyze this data and to determine the frequencies of the scenarios occurring. Finally, a list is generated of scenarios ranked by their contribution to the occurrence of various impact vectors[2]. The STP spatial interactions analysis is documented in the Level 1 PSA (Reference 1), the Level 2 PSA/IPE (Reference 2), and in the Fire PSA update (Reference 3).

2.1.4 System Success Criteria

System success criteria are generally based on analyses performed to determine plant response to a UFSAR Chapter 15 accident (e.g., Large LOCA, with single failure assumed) or a scenario defined in the Fire Safe Shutdown Report. Any analyses which modify the system success criteria are documented in a system success criteria notebook.

2.2 Data Analysis

Data used in the PSA consists of generic data and plant-specific data. The generic data used in the Level 1 STP PSA quantifications performed in 1988 and 1989 was provided by PLG. Inc. Since then, selected plant-specific data has been incorporated into the PSA. In 1993, a successful comprehensive effort was made to perform a full scope update of plant-specific failure data. Future updates are planned for each Unit 1 refueling outage, and these updates will also be used as an input for Maintenance Rule (10CFR50.65) compliance. The types of data which can be updated include:

- equipment failure rates;
- human performance assumptions;
- initiating event frequencies (internal and external events);

---

[1] A "location" means a well-defined volume in the plant that does not overlap another location. In general, fire zones as defined in a Fire Hazards Analysis are a good starting point for locations used in Spatial Interaction Analysis.

[2] Impact vectors are combinations of system success/failure, initiating events, and event tree top events.

- planned and unplanned maintenance frequencies;
- planned and unplanned maintenance durations;
- testing frequencies and durations;
- common cause failure rates; and
- other performance data (e.g., fraction of time supplemental purge valves are open; fraction of time PORV block valves are closed, etc.)

2.3 Methodology

Probabilistic methods and techniques used in the original STP PSA are documented in the Level 1 PSA, the Level 2 PSA/IPE, and the Risk Based Evaluation of Technical Specifications (Reference 4). New PSA methodology will be incorporated on a case-by-case basis depending upon its applicability to STP.

2.4 Assumptions

Assumptions made in the Level 1 PSA and Level 2 PSA/IPE range from those concerning construction of plant systems/equipment to those associated with plant transient and accident response. Documentation of assumptions made in the PSA are individually documented in the Level 1 PSA, Level 2 PSA/IPE, event tree notebooks, plant system notebooks, or other documents, as appropriate.

3.0 Software Control

The at-power (Mode 1) risk analysis performed at STP uses RISKMAN, a proprietary software program developed by PLG, Inc. A site license is maintained for RISKMAN in order to perform plant level event tree and system level fault tree quantifications. Configuration control of RISKMAN and verification and validation (V&V) requirements are maintained by PLG, Inc., pursuant to 10CFR50, Appendix B. The STP PSA program takes credit for PLG's Appendix B program with respect to software configuration control and V&V (Reference 5). To ensure that RISKMAN properly performs risk-based calculations at STP, a test case with a known input and output is run to document the accurate installation and performance of RISKMAN on STP PC workstations. Performance of the test case is documented per ***0PXP99-XX-9999, "RISKMAN V&V Program."***

STP is also a member of the RISKMAN Technology Group (RTG), which is a user group comprised of utilities and national laboratories who use RISKMAN. Further development and application of RISKMAN and RISKMAN code maintenance are directed by the RTG. By participating in the RTG, STP is involved in the identification and correction of software errors as well as other RISKMAN enhancements.

The probabilistic safe shutdown analysis (PSSA) at STP uses the EPRI code ORAM (**O**utage **R**isk **A**ssessment **M**odule). ORAM is used for PSA analyses when the STP units are in Modes 2, 3, 4, 5, 6, or defueled. Plant conditions during shutdown configurations are evaluated by ORAM using

qualitative and quantitative analyses. Documentation of STP's PSSA models is contained in Reference 6. ORAM software control is provided by EPRI and Erin Engineering, Inc.

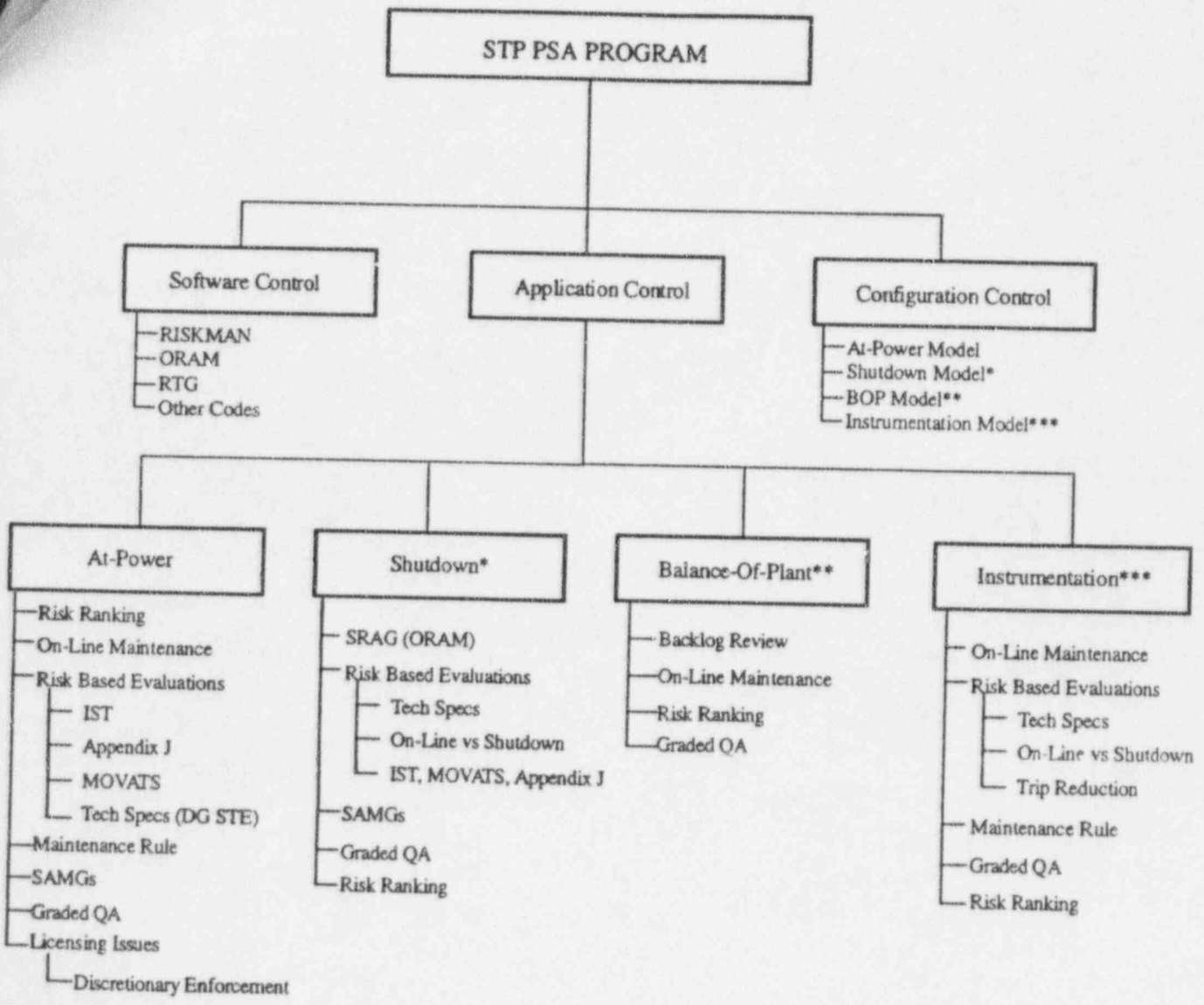
4.0 Application Control

Control of PSA applications at STP is accomplished by ensuring that the PSA model and required changes used for the application are appropriate. The technical basis and changes required by the analysis are reviewed, approved, and documented. This provides adequate traceability and control.

5.0 References

5.1 Level 1 PSA
5.2 Level 2 PSA/IPE
5.3 Fire PSA Update
5.4 Risk-Based Evaluation of Tech Specs
5.5 PLG's Appendix B Software QA Program
5.6 ORAM Model Documentation.

FIGURE 1
PSA CONTROL ELEMENTS



* Presently Underway
** Part of Graded QA
***Business Plan Initiative

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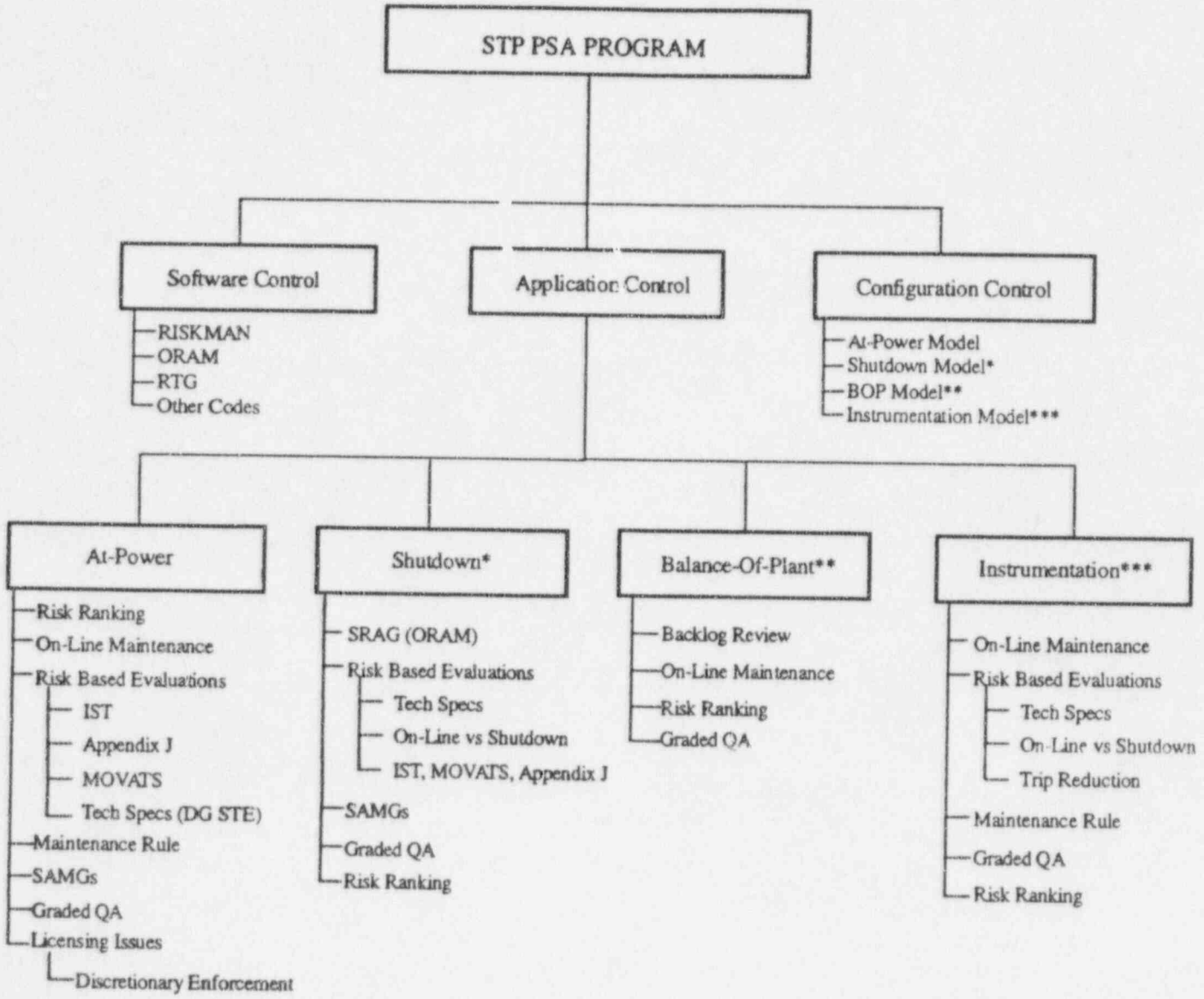
FIGURE 1
PSA CONTROL ELEMENTS



* Presently Underway
** Part of Graded QA
***Business Plan Initiative

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FIGURE 2
PSA EVENT TREES

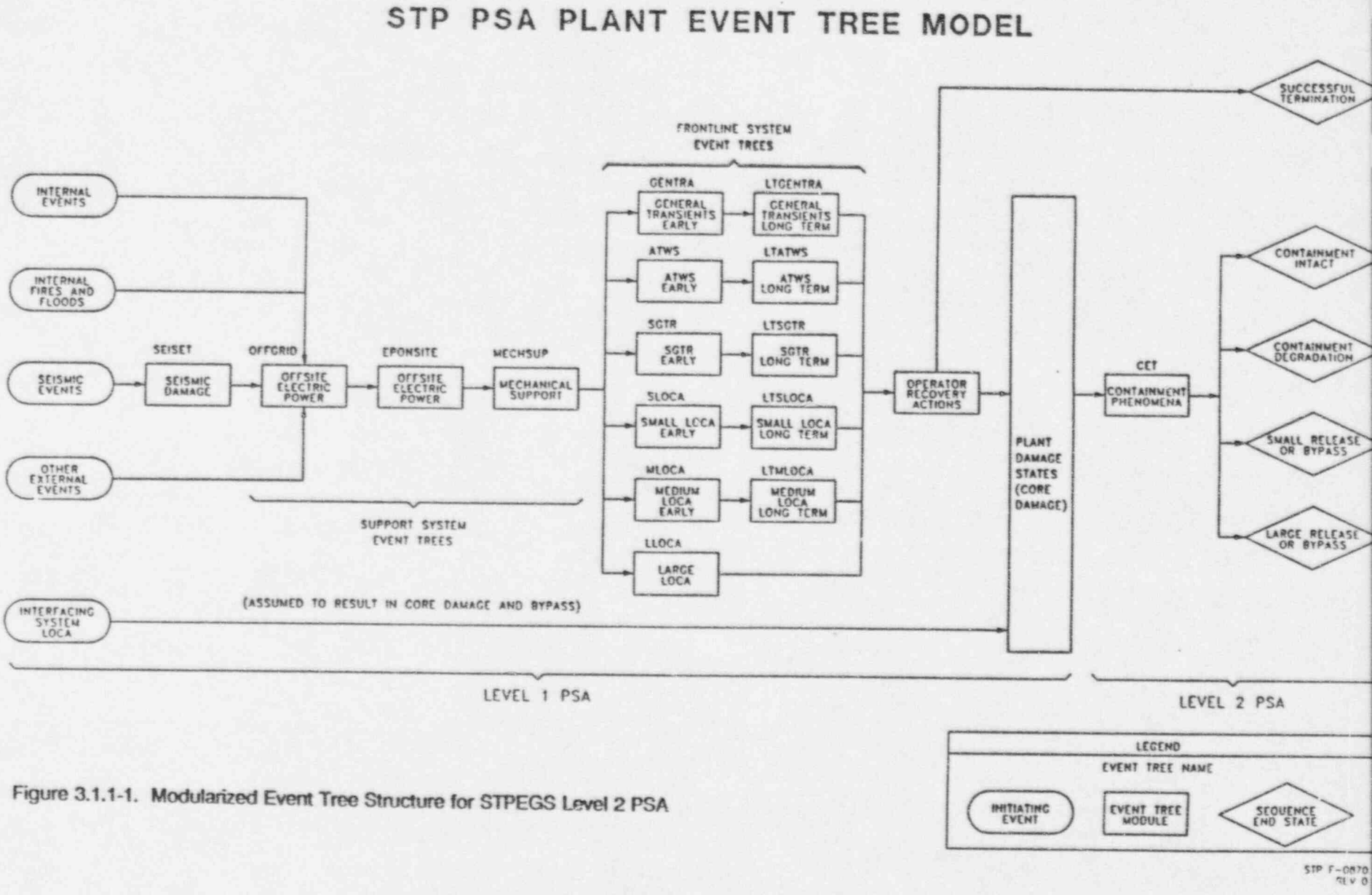

Figure 3.1.1-1. Modularized Event Tree Structure for STPEGS Level 2 PSA

FIGURE 3
SYSTEMS MODELED IN THE PSA

AC	Closed Loop Auxiliary Cooling Water	Select components modeled
AF	Auxiliary Feedwater System	Explicitly modeled
AM03	QDPS	Select components modeled
CC	Component Cooling Water	Explicitly modeled
CH	Essential Chilled Water System	Explicitly modeled
CS	Containment Spray	Explicitly modeled
CT	Condensate Stroage & Transfer	Select components modeled
CV	Chemical Volume and Control System	Explicitly modeled
DB	Diesel Generator (BOP, TSC, & EOF)	Select components modeled
DC	250V DC Non-class 1E	Select components modeled
DG	Diesel Generator System	Explicitly modeled
DI	Standby Diesel Combustion Air Intake	Implicitly modeled in DG
DJ	125V DC Class 1E	Explicitly modeled
DO	Standby DG Fuel Oil Storage & Transfer	Implicitly modeled in DG
DX	Standby Diesel Generator Exhaust	Implicitly modeled in DG
ED	Radioactive Vents & Drains	Containment Isolation only
EH	Electro-Hydraulic Controls	Select components modeled
EW	Essential Cooling Water	Explicitly modeled
HC	HVAC - Containment Building	Explicitly modeled
HE	HVAC - Electrical Auxiliary Building	Explicitly modeled
HG	HVAC - Standby DG Bldg	Select components modeled
HM	HVAC - MAB	Select components modeled
HZ	HVAC - Miscellaneous	Select components modeled
IA	Instrument Air	Select components modeled
JW	Standby DG Jacket Water	Implicitly modeled in DG
LU	Standby DG Lube Oil	Implicitly modeled in DG
MS	Main Steam System	Explicitly modeled
PA	Standby Transformer	Explicitly modeled
PB	Main & Auxiliary Transformers	Explicitly modeled
PC	13.8 kV AC Auxiliary	Explicitly modeled
PE	480 V AC Non-class 1E Load Centers	Select components modeled
PF	480 V AC Non-class 1E	Select components modeled
PG	13.8 KV Emergency Power	Explicitly modeled
PK	4 kV AC Class 1E Power	Explicitly modeled
PL	480 V AC Class 1E Load Center	Explicitly modeled
PM	480 V AC Class 1E MCC & Distribution Panels	Explicitly modeled
RA	Radiation Monitoring	Containment Isolation only
RC	Reactor Coolant System	Explicitly modeled
RH	Residual Heat Removal System	Explicitly modeled

FIGURE 3
SYSTEMS MODELED IN THE PSA

SB	Steam Generator Blowdown	Select components modeled
SD	Standby DG Starting Air	Implicitly modeled in DG
SF	Engineered Safety Features Actuation	Explicitly modeled
SI	Safety Injection System	Explicitly modeled
SP	Solid State Protection System	Explicitly modeled
VA	120 V AC Class 1E Vital Power	Explicitly modeled
WL	Liquid Waste Processing	Containment Isolation only
XS	Switchyard	Select components modeled

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CONFIGURATION CONTROL OF THE PSA

Quality	Safety-Related	Usage: **DRAFT**	Effective Date: 10/??/95

C. R. Grantom	(name)	(name)	Nuclear Fuel & Analysis
PREPARER	TECHNICAL	USER	COGNIZANT ORGANIZATION

Table of Contents Page

1.0 Purpose and Scope

1.1 To define, disposition, implement, and maintain the data inputs to the PSA risk models.

1.2 This procedure is applicable to all components and human actions contained in the STP PSA risk models.

2.0 Definitions

2.1 Event Tree: graphical representations of succession of individual events which in combination identifies all possible sequences of events leading to a predefined failure event of interest (e.g., core damage).

2.2 Fault Tree: graphical representation of a failure event of interest or "top event" which illustrates the logical relationship all of the subevents contributing to that event.

2.3 PSA Inputs: The set of data and information required by the PSA to accurately reflect the design, procedural processes, and human interaction of the facility to be analyzed and to quantify the probability and uncertainty of selected events.

2.4 Basic Event: the lowest level of subevents that contribute to a fault tree top event.

2.5 Initiating Event: (GET FROM LEVEL 1 PSA!!!)

2.6 Recovery Factor: a numerical value used to determine the likelihood that human actions (i.e.,operator actions) successfully "recover" a component or function that has initially failed.

2.7 Success Criteria: the minimum level of system or equipment performance that must be achieved in order to satisfy a selected function of interest.

2.8 PSA Applications: analyses performed using the results of the PSA. These analyses are generally performed to support a specific activity (e.g., 50.59 review) or program (technical specification optimization/relaxation). A list of active applications is maintained by Risk and Reliability Analysis. Active applications support current STP operations.

3.0 Responsibilities

3.1 Supervisor, Risk and Reliability Analysis ensures that requirements of this procedure are effectively implemented and identifies required PSA information contained in Addendum 1.

3.2 Station Management is responsible for providing the information depicted in Addendum 1 as identified by the Supervisor, Risk and Reliability Analysis.

4.0 Requirements

4.1 Appropriate Department Managers shall forward the identified information in Addendum 1 to Supervisor, Risk and Reliability Analysis.

4.2 Risk & Reliability Analysis shall develop and maintain Event Tree and System Notebooks containing the information in Addendum 2 as applicable.

4.3 The Event Tree/System Notebooks are approved by the Supervisor, Risk and Reliability Analysis.

4.4 On an 18 month cycle basis, the notebooks will be updated to reflect changes resulting from the data collected in accordance with Addendum 1 to this procedure, as applicable.

4.5 The changes are reviewed and incorporated into the PSA models if appropriate, as defined in Addendum 3 or other Desktop Instructions.

4.6 Once updated, the PSA is requantified, evaluated, and approved for use. Evaluation consists of reviewing the current results against the previous results and changes in input. PSA Risk Ranking (0PGP03-XX-0000) may be used to assist in the evaluation.

4.7 PSA applications will be updated and distributed to customer organizations.

ADDENDUM 1
PSA INPUT DATA

The data listed below is necessary only for systems and components within the scope of the PSA program.

- Failure/success data for PSA components (Plant Specific Data);
  - Equipment history
  - Number of equipment demands
  - Corrective Action program data
  - Control Room Logs
  - Operability Tracking
  - Condition Reports

- Actual planned and unplanned maintenance frequencies/durations for PSA components
  - Work Control information
  - Scheduling data and information
  - Equipment Clearance Order (ECO) data
  - Control Room Logs
  - Operability Tracking

- Actual testing frequencies/durations for PSA components
  - Scheduling data and information
  - Equipment Clearance Order (ECO) data
  - Control Room Logs

- Occurrences of initiating events
  - Condition Reports

- Significant industry events
  - INPO Significant Operating Event Reports
  - NRC Information (e.g., Information Notices, Generic Letters)
  - Nuclear Network

- Technical Specifications

- Design Related Information
  - Updated Final Safety Analysis Report
  - Safety Evaluation Report
  - Design Basis Documents

ADDENDUM 1
PSA INPUT DATA

- Design drawings (P&IDs, Elementary Diagrams, Single Line Diagrams, Logic Drawings, etc.)
- Design change information

- Thermohydraulic analyses and other selected Engineering Analyses;

- Selected procedures and revision notification
  - Plant Surveillance Procedures (testing alignments)
  - Plant Maintenance Procedures (maintenance alignments)
  - Plant Engineering Procedures (maintenance alignments)
  - Plant Operating Procedures 02 Series (normal alignments)
  - Plant Operating Procedures 04 Series (abnormal alignments and conditions)
  - Plant Operating Procedures 05 Series (emergency operations)

- Other pertinent data (i.e., time supplemental purge valves are open, PORV block valves are closed)

ADDENDUM 2
PSA NOTEBOOK CONTENTS

Event Tree Notebooks

- *Introduction* - describes event tree purpose and scope;
- *Assumptions/References* - lists assumptions and references from which they are derived;
- *Event Sequence Diagram* - (Front-line System Event Trees only) outlines equipment and operator actions required to mitigate/prevent a core damage event;
- *Event Sequence Block Descriptions* - (Front-line System Event Trees only) describes functional blocks contained in the event sequence diagrams;
- *Event Tree* - outlines succession of individual events which identify all possible sequences of events leading to a predefined failure event (e.g., core damage);
- *Fault Tree* - outlines top events which illustrate the logical relationship of the events leading to a particular event;
- *Macros* - defines split fraction logic rules used to link event trees;
- *Event Tree Top Event Descriptions* - defines systems, equipment, and operator actions included in the event tree structure;
- *Event Tree Binning Rules* - defines logic rules to group event tree sequences into common impacts for linking the next stage of event trees; and
- *Split Fraction Rules* - describes logic rules used to determine which split fractions should be assigned to a unique point in the event tree.

System Notebooks

- *Introduction* - describes fault tree purpose and scope;
- *System Function* - describes the process or purpose of the system;
- *Top Event Definitions* - defines the events for which system analysis provides quantification information;
- *System Success Criteria* - defines the minimum level of performance that will result in the system successfully performing its intended safety function as required by the event trees;
- *Support Systems* - defines systems and equipment which are required to successfully perform their function so that the analyzed system is capable of performing its intended safety function;
- *Systems Supported* - defines systems and equipment which depend on the analyzed system to perform its function so that they can perform their intended safety functions;
- *System Operations and Special Features* - defines pertinent information for normal operations and other characteristics which impact the analysis;
- *Potential for Initiating Event* - provides screening for the systems ability to cause an initiating event (e.g., reactor trip, turbine-generator trip);
- *Technical Specification Requirements* - provides information for success criteria and frequency of testing alignments;
- *Plant Procedures* - lists procedures used to define system alignments;
- *Assumptions* - lists items necessary to document areas not analyzed in part or in whole;
- *System Boundary* - defines the limit of the analysis relative to a physical of programmatic boundary;

ADDENDUM 2
PSA NOTEBOOK CONTENTS

- *Event Trees and Event Tree Split Fractions* - lists cross-references of the analyzed system to the associated event trees and split fractions;
- *Basic Event Cross Reference* - translates fault tree basic events to equipment descriptions and identification numbers;
- *Common Cause Modeling* - describes modeled common cause groups;
- *Maintenance Alignments* - describes the system configuration (including frequency and duration) when certain maintenance or testing activities are performed;
- *Recovery Factors Based on System Split Fractions* - lists operator actions necessary to restore the system or functions following failure of the analyzed system;
- *Modeling Notes* - provides other information relative to the system analysis;
- *Fault Tree* - outlines the graphical fault tree; and
- *References* - documents materials used in the system analysis.

ADDENDUM 3
PLANT CHANGE SCREENING & NOTEBOOK UPDATE METHODOLOGY

INITIAL SCREENING CRITERIA

1. Is the change associated with a system modeled in the PSA? Yes____ No____

2. If yes, is it associated with a component modeled in the PSA? Yes____ No____

3. Could the change affect a system or event sequence modeled in the PSA? Yes____ No____

If the answer to Questions 1, 2, or 3 is "Yes" then proceed to "PSA CHANGE EVALUATION"

PSA CHANGE EVALUATION:

1. Does the change affect the items or attributes listed in Addendum 2? Yes____ No____

   1a) If "No," then document results.

   1b) If "Yes," then proceed to Question 2 below.

2. Does the change require a revision to the PSA Risk Model? Yes____ No____

   2a) If "No," then document results.

   2b) If "Yes," then proceed to Question 3 below.

3. Does the change require immediate update? Yes____ No____

   3a) If "No," then place change in "Pending PSA Changes" Notebook for next periodic PSA update.

   3b) If "Yes," then proceed to Question 4 below.

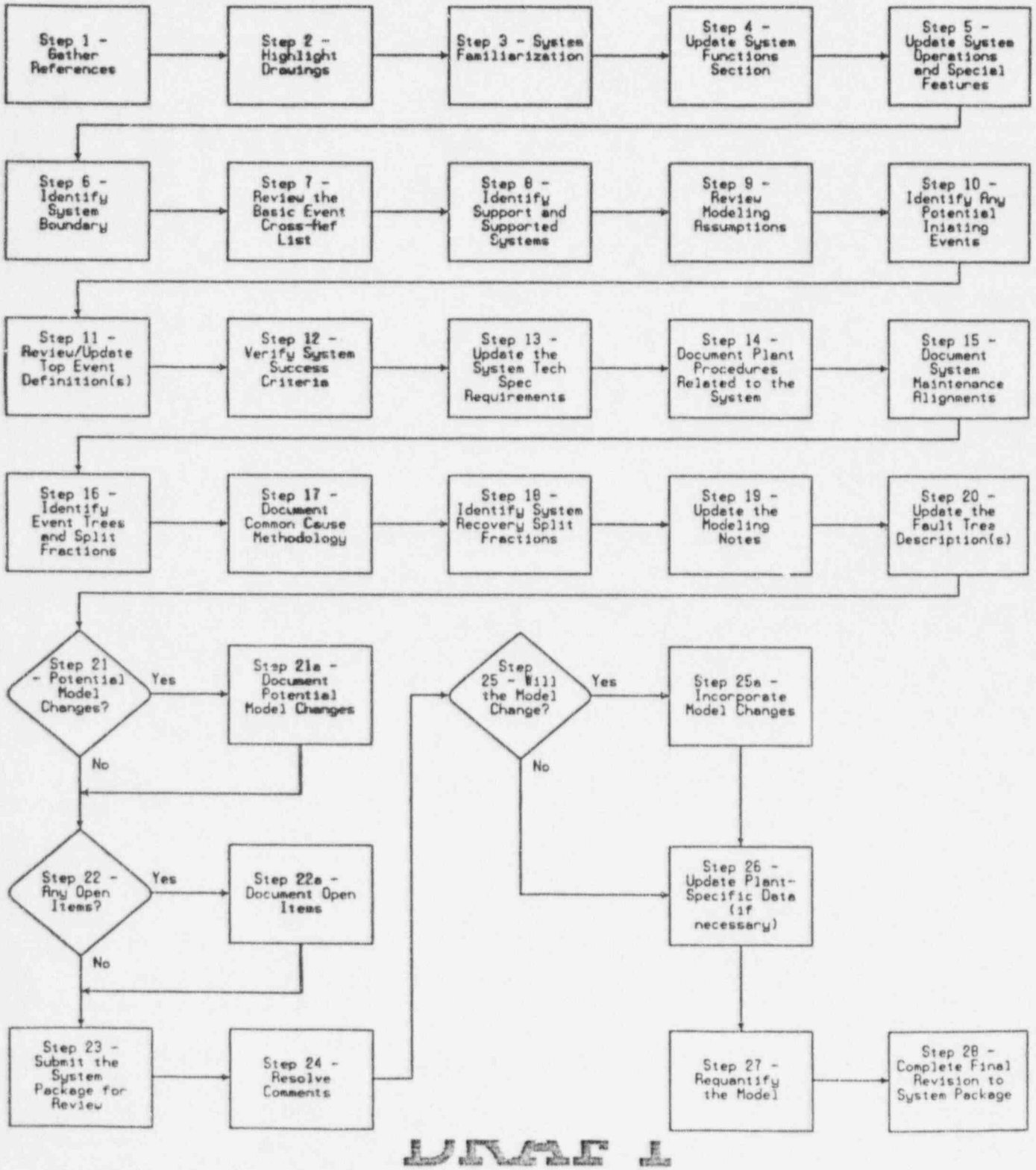
4. Does the change require requantification of the PSA model(s)? Yes____ No____

   4a) If "No," then place change in "Pending PSA Changes" Notebook for next periodic PSA update.

   4b) If "Yes," then update, requantify, and document PSA risk model change.

ADDENDUM 3
PLANT CHANGE SCREENING & NOTEBOOK UPDATE METHODOLOGY

SCREENING FLOW CHART



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ADDENDUM 3
PLANT CHANGE SCREENING & NOTEBOOK UPDATE METHODOLOGY

PSA NOTEBOOK UPDATE METHODOLOGY

Step 1 - Gather References
Review the reference list contained in the Event Tree or System Notebook from the most recent system package and gather the latest revision to the referenced documents. Some references may not be listed in the system package and must be located in the library. Based on the gathered references, update the system package reference list.

Step 2 - Highlight Drawings
[This step is only applicable to System Notebooks.] Using the Fault Tree(s), highlight the applicable drawings (i.e., P&IDs, Logic Diagrams, Elementaries, etc.) for the modeled components in order to verify system components with the PSA model.

Step 3 - Become Familiar with the System
For System Notebooks: Use the referenced drawings, procedures, and applicable UFSAR and DBD sections to verify the operation of the system and any special features related to the PSA model. Also, review the RISKMAN system notebook(s) for the system top event(s) to verify the PSA modeling of the system.
For Event Tree Notebooks: Verify that event tree top events are consistent with system top events.

Step 4 - Update System Function Section
Review and, if required, update the System Function section by briefly describing the system and how the function(s) relate to the PSA.

Step 5 - Update System Operations and Special Features
Update the System Operations and Special Features section by describing the design basis of the system and defining any deviation from the design basis that was modeled in the PSA.

Step 6 - Identify System Boundary
Based on the design drawings and the system model, identify the physical boundary of the system. The physical boundary is defined as the system components analyzed in the PSA.

Step 7 - Review the Basic Event Cross-Reference List
Compare the Basic Event Cross-Reference List to the Fault Tree(s) to ensure that the correct components and failure modes are listed. Modify the Basic Event Cross-Reference as necessary.

ADDENDUM 3
PLANT CHANGE SCREENING & NOTEBOOK UPDATE METHODOLOGY

Step 8 - Identify Support and Supported Systems
Identify support and supported systems, as applicable, and define the analyzed boundary conditions. Support systems are those systems upon which the subject system relies for effective operation. Supported systems are those systems that rely on operation of the subject system for effective operation. The analyzed boundary conditions are the states of the support systems for which the subject system is analyzed.

Step 9 - Review Modeling Assumptions
Review the PSA modeling assumptions and modify as necessary.

Step 10 - Identify Any Potential Initiating Events
Identify the potential for any initiating events (e.g., LOCA, Transients, etc.) based on the system configuration.

Step 11 - Update Top Event Definitions
Based on the PSA model and the system description, review the top event definitions and update if necessary.

Step 12 - Verify System Success Criteria
Verify the system success criteria based on the UFSAR, Technical Specifications, DBDs, or procedures. The system success criteria are the minimum system operating requirements to satisfy the top event.

Step 13 - Update the System Technical Specification Requirements
Update the system Tech Spec requirements by obtaining a copy of the applicable Tech Spec section(s).

Step 14 - Document Plant Procedures Related to System
Using the procedures, document the Plant Procedures Related to the System, noting any special alignments and/or testing produced by the procedure. This section should include any additional testing and test frequencies specified by the Technical Specifications. Document specific procedural steps that provide key modeling assumptions, operational features, or system alignments.

Step 15 - Document System Maintenance Alignments
Based on the Plant Procedures and the RISKMAN report, document the system maintenance alignments, providing specific documentation as to the composition of each alignment and the procedure steps where the alignments were found. For example, does an alignment include a human error term for failure to return to normal alignment or is it simply comprised of unavailability due to maintenance?

ADDENDUM 3
PLANT CHANGE SCREENING & NOTEBOOK UPDATE METHODOLOGY

Step 16 - Identify Event Trees and Split Fractions
Identify the event trees in which the top events are questioned and document the event tree split fractions based on the RISKMAN system notebook.

Step 17 - Document Common Cause Modeling Methodology
Document the Common Cause modeling methodology. Define common cause groups and provide information relative to why certain components are not included in Common Cause models.

Step 18 - Identify System Recovery Split Fractions
Identify any system split fractions used in the operator recovery analyses.

Step 19 - Update the Modeling Notes
Update the Modeling Notes section by providing a brief overview of the model.

Step 20 - Update the Fault Tree Description(s)
Briefly describe the fault tree(s) included in the system package.

Step 21 - Any Potential Modeling Changes?
Determine if any of the above changes will potentially affect the system model.

Step 21a - Document Potential Modeling Changes
Document any potential changes to the model arising as the result of the system package update.

Step 22 - Any Open Items?
Determine if the system package contains any outstanding issues which cannot be resolved without further guidance.

Step 22a - Document Open Items
Document the open items.

Step 23 - Submit the Package for Review
Submit the system package for review to the PSA project team.

Step 24 - Resolve Comments
Resolve any resulting comments on the package.

Step 25 - Any Changes to the Model?
Identify if any of the potential PSA changes will, in fact, change the model.

ADDENDUM 3
PLANT CHANGE SCREENING & NOTEBOOK UPDATE METHODOLOGY

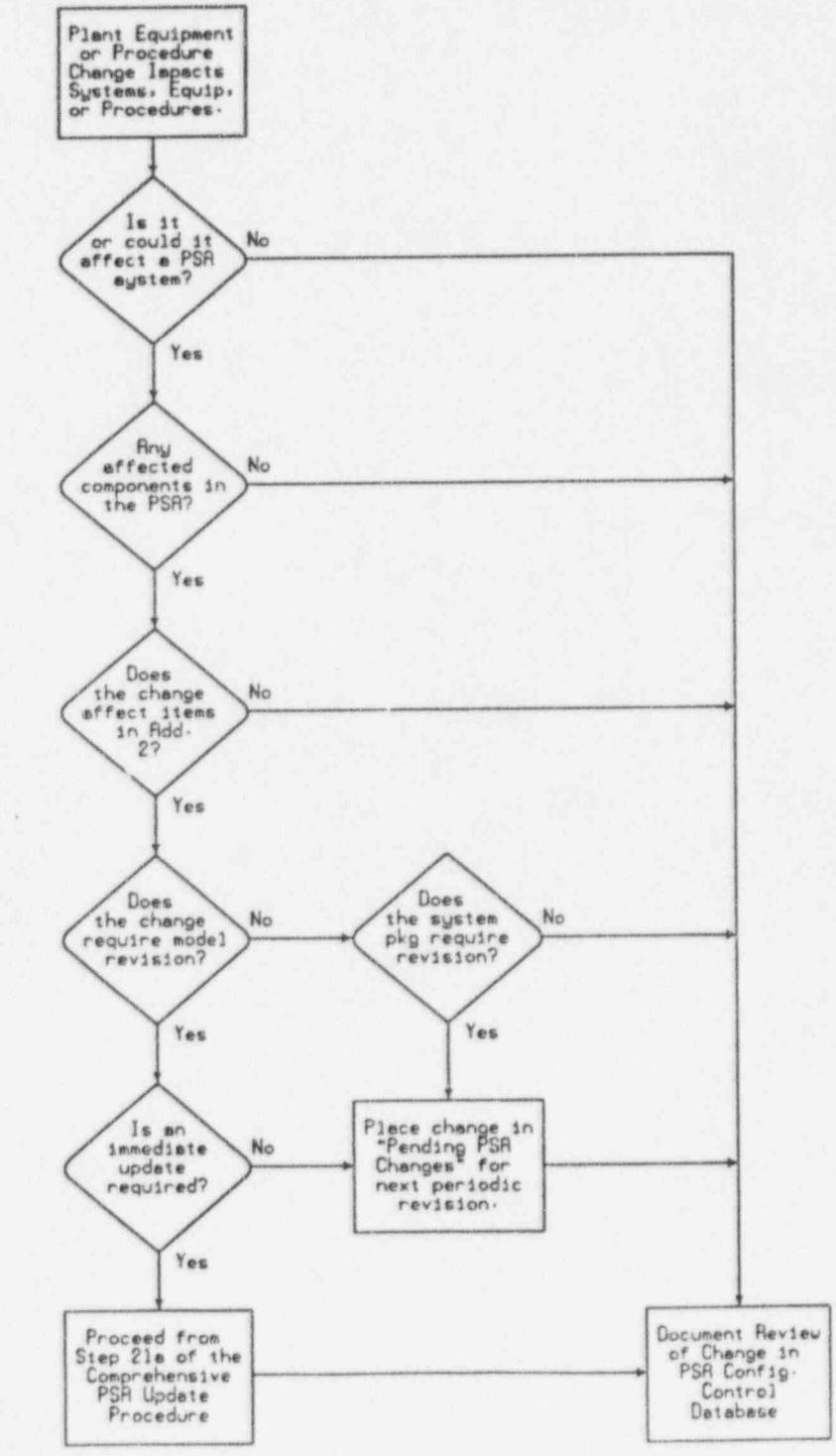
Step 25a - Incorporate Model Changes
Incorporate any final model changes, including fault tree changes, rule modifications, maintenance alignment revisions, etc.

Step 25b - Requantify the Model
Requantify the model for the incorporated model changes.

Step 26 - Complete the Final Revision
Complete the final revision to the package based on the changes to the model and/or resolution of comments.

ADDENDUM 3
PLANT CHANGE SCREENING & NOTEBOOK UPDATE METHODOLOGY

NOTEBOOK UPDATE FLOW CHART



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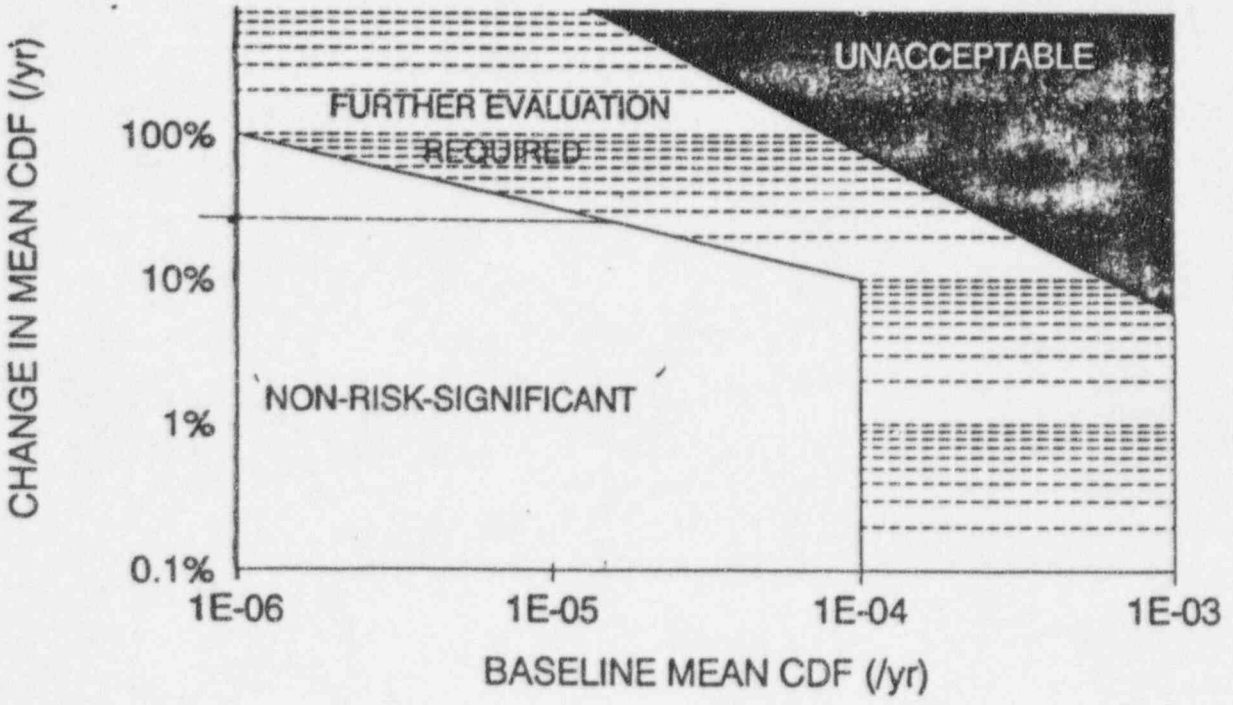


Figure 4–1: Quantitive Screening Criteria for Permanent Changes Impacting CDF

required. The review of out-of-service equipment should also consider plant activities which could cause a PSA initiating event to be more likely. Additionally, other factors such as alternate end states/figures of merit (e.g., need for emergency depressurization or feed-and-bleed cooling) may offer additional insight into the risk of activities being considered. While a full discussion of the other factors is beyond the scope of this guide, users should be aware that these other factors exist.

4.2.4 Relative Risk Significance

For some applications, the baseline PSA results can be used to assess the degree of risk significance (importance) of components, system or structures independent of any changes to the plant. Examples include Maintenance Rule risk-significance determination, optimization of MOV testing requirements, grading of quality assurance, identifying key human actions for training or procedure improvements or surveillance requirements. For these purposes, the criteria from NUMARC 93-01 are recommended. Table 4-2 provides a summary of these criteria. These criteria should be applied on a component, train, or system level, as described.

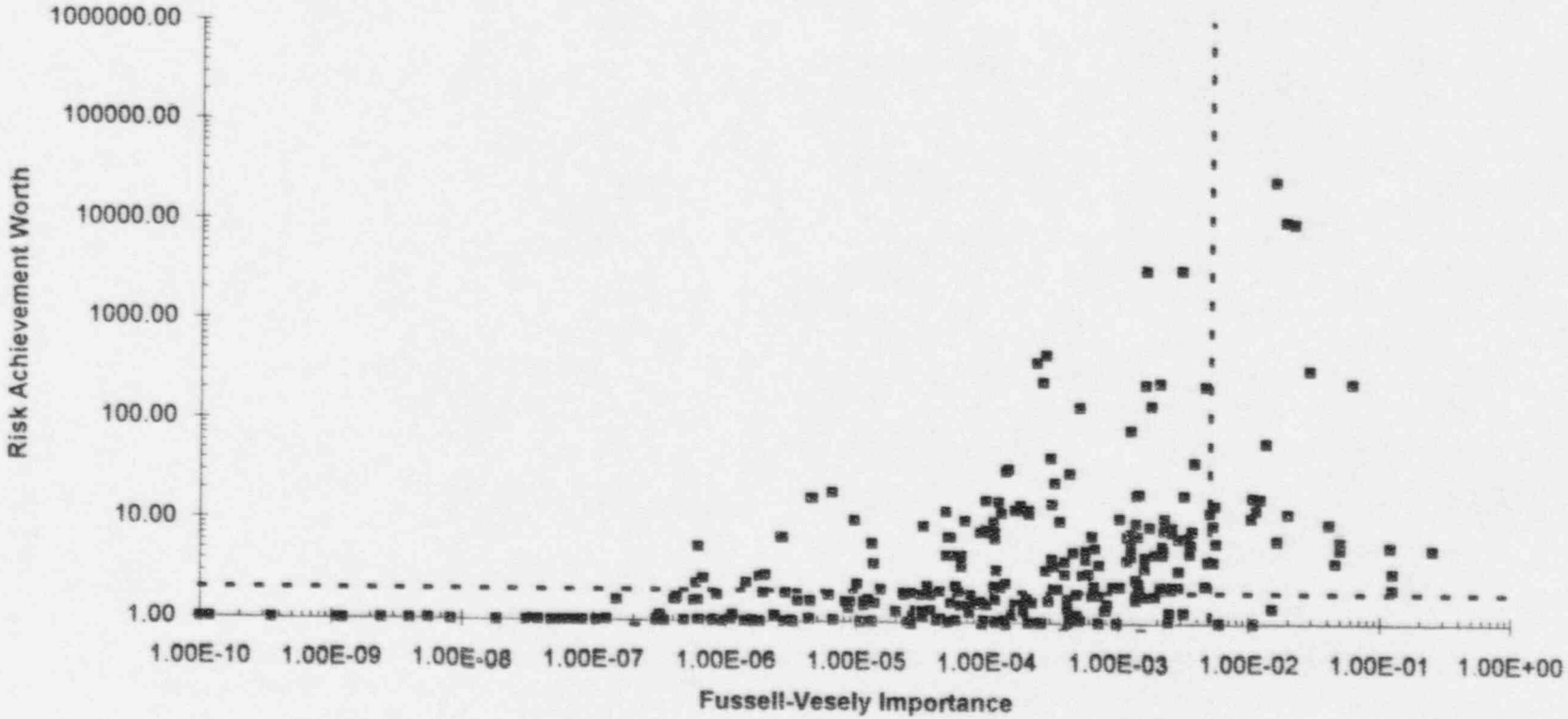
Table 4-2: General Approach to Overall Risk Significance Determination

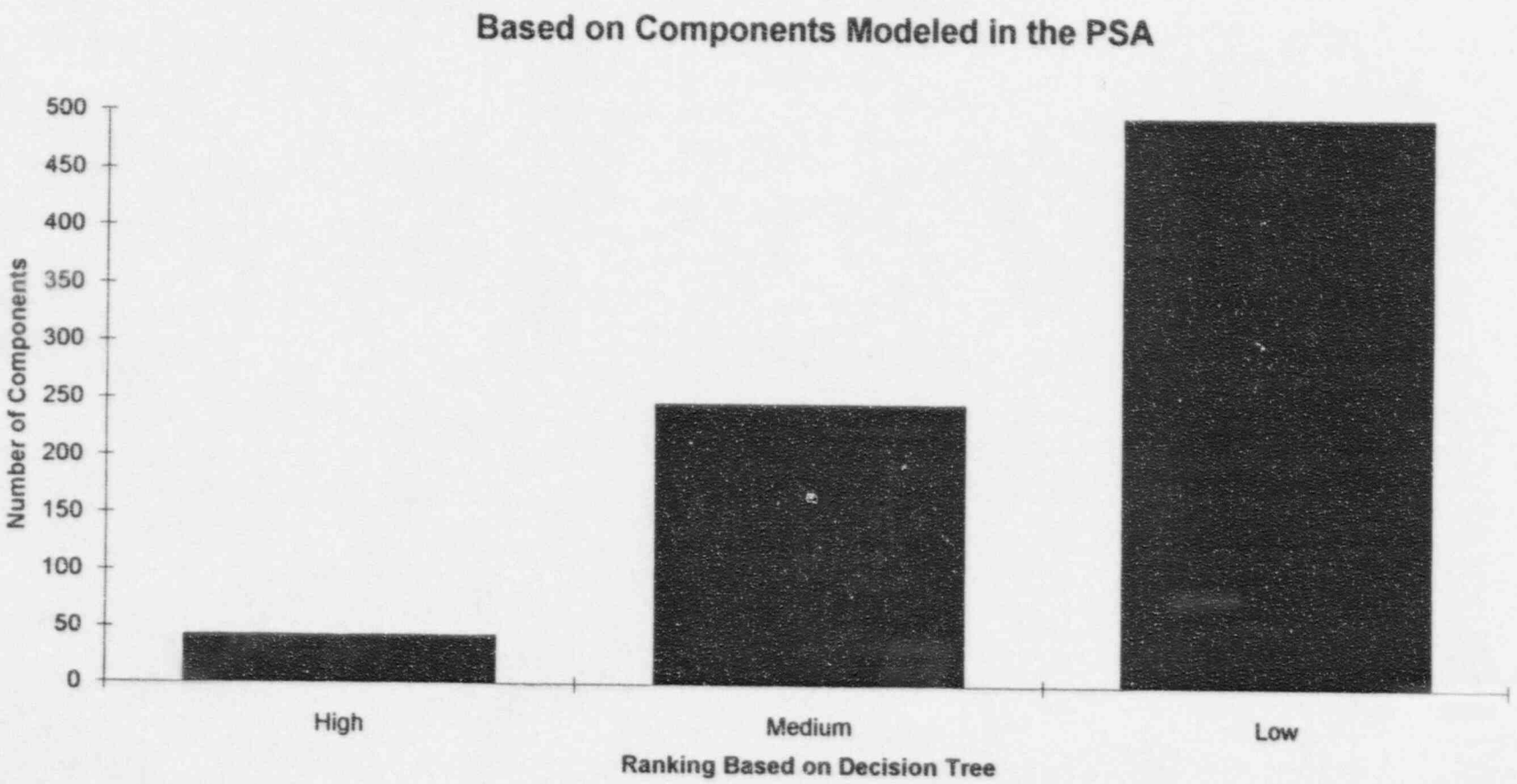
RISK IMPORTANCE MEASURE	CRITERIA
Risk Reduction Worth (RRW) – System Level – Component Level	 > 1.05 > 1.005
Fussell-Vesely Importance (FV) – System Level – Component Level	 >0.05 >0.005
Risk Achievement Worth (RAW) (Component/Train Level)	> 2

4.2.5 Prioritization and Ranking

Prioritization and ranking applications utilize the PSA for the relative ranking or prioritization of activities, changes or model elements. The focus of these applications is on the relative role of an issue, within the baseline results. As such, these applications generally are focused on interpretation and understanding of the baseline results, rather than development or modification of the PSA model. The two primary ranking criteria are risk achievement worth (RAW) and Risk Reduction Worth (RRW) importance. It is important, however, to account for the fact that the RAW and RRW values calculated in

Risk Ranking of All PSA Components without Common Cause





High FV > 0.005 and RAW > 2
Medium (FV > 0.005 and RAW < 2) or (FV < 0.005 and RAW > 2)
Low FV < 0.005 and RAW < 2

STATUS OF
NRC-PROVIDED "DELIVERABLES"
FOR STP GRADED QUALITY ASSURANCE PROGRAM

The following details the status of "deliverables" for STP Graded Quality Assurance as provided by the NRC.

1. Submit on the docket a full description of the structured process that will be used to identify relative risk/safety importance.

(How addressed)

The STP Reliability & Risk organization has been involved in ongoing dialogue with the NRC regarding the risk ranking process, to establish a process "model" which represents a suitable methodology that can be followed industry wide. Mr. C.R. Grantom will discuss the status of these efforts.

The draft procedure on STP Comprehensive Risk Management (CRM) addresses the process by which Probabalistic Safety Assessment (PSA) risk ranking results are factored into the GQA Working Group and CRM Expert Panel thought processes, in Attachments 2 and 3 to that procedure.

Details regarding specifically what will and what will not be entered into the NRC docket for STP will be discussed in the meetings of October 3 and 4, 1995.

2. Submittal describing how PSA importance measures will be applied to provide input to the expert panel on system/component importance.

(How addressed)

PSA importance measures are factored into the risk ranking process, which Mr. Grantom will address. The aggregate results of that process are the input to the Working Group and Expert Panel.

3. Submit guidance and process that will be used for the Expert Panel. Should outline the panel role, composition, qualifications, and criteria for high/low safety significance determination. Include delineation of deterministic criteria to be considered by panel to augment PSA limitations.

(How addressed)

All of these are attributes covered in the CRM procedure.

STATUS OF
NRC-PROVIDED "DELIVERABLES"
FOR STP GRADED QUALITY ASSURANCE PROGRAM

4. Submit methodology on how performance data will be evaluated to assist in the grading process. Describe the qualitative and quantitative performance parameters that will lead to grading of QA controls.

(How addressed)

An essential element of the GQA process is the STP Corrective Action Program (CAP) which is prescribed in implementing procedure OPGP03-ZX-0002. This process provides information regarding both human and equipment performance. Another source of information is STP equipment history, a process which is administered by STP Systems Engineering.

STP is in the process of prescribing and procuring a computer program which will enable the compilation of this performance information (mostly negative in nature), plus positive information regarding both equipment and human performance. This information will be categorized according to organizational affiliation, performance attributes, weighting factors, and performance "grading". Thresholds will be established and incorporated into the database, enabling reporting of graded performance information. These reports will be provided to the GQA Working Group and CRM Expert Panel for consideration.

These processes are prescribed in already-established STP procedures, the CRM procedure and the procedure on Station Performance Data Collection, Categorization and Reporting.

The specific quantitative parameters which will result in automated, graded reporting capability have not yet been established. This effort will require evaluation of already-developed departmental threshold values for compatibility with the GQA process, significant interorganizational interface, establishment of global threshold values and incorporation into the database, yet to be procured.

5. NRC review of PSA/IPE model to degree necessary to support utilization as part of safety significance determination.

(How addressed)

This is directly related to items 1 and 2, which are being addressed, and will be discussed by Mr. Grantom.

STATUS OF
NRC-PROVIDED "DELIVERABLES"
FOR STP GRADED QUALITY ASSURANCE PROGRAM

6. On-site NRC observation of licensee verification and validation expert panel efforts for ranking some systems in Graded QA project scope. Lessons learned feedback into expert panel guidance/process by licensee. Resubmit modified panel guidance to the NRC.

(How addressed)

At such time as GQA Working Group and CRM Expert Panel activities are ready to commence in this vein, the NRC will be notified/invited to observe.

Lessons learned feedback is addressed in the CRM procedure, and actual incorporation of any lessons learned will not be possible until such time as there are any. The NRC is welcome to evaluate implementation of this program attribute as it becomes possible.

Working Group and Expert Panel guidance, which is established in the CRM procedure, may or may not require adjustment from time to time. Submittal of this procedural guidance will be discussed during the October 3 and 4, 1995 meeting.

7. Submit output from expert panel of final lists for both high and low safety significant systems and components (should be based on both PSA and deterministic criteria).

(How addressed)

GQA Working Group and Expert Panel work results will be available for review as they are produced. Submittal of this information will be discussed during the October 3 and 4, 1995 meeting.

8. Submit QAP change to support Graded QA effort. Reference industry guidance documents used (NUMARC 93-01, 93-02, PSA Applications Guide, Graded QA guide, etc.). High level description of program including delineation of safety significance, PSA utilization, QA controls grading philosophy, operating experience feedback, corrective action. Suggest inclusion as Appendix to QA program as stand alone description of effort as it covers all 18 criteria.

STATUS OF
NRC-PROVIDED "DELIVERABLES"
FOR STP GRADED QUALITY ASSURANCE PROGRAM

(How addressed)

Formal submittal of a revised STP Operations Quality Assurance Plan (OQAP) is currently scheduled to occur in January 1996.

Industry documents used as a reference in developing the OQAP, but to which STP is not officially committed, are typically not referenced in this overall program-level document. They may or may not be referenced in implementing procedures. Currently, the STP GQA program (in development) does not utilize, to any great extent, industry documents.

The exact format of the OQAP revision has not yet been decided upon, but the initial intent is to provide a high level description of the GQA process in OQAP Section 2 (covers the general program description), with further descriptive text as appropriate in other sections. A separate Appendix specific to GQA is not anticipated, as GQA is intended to be an inherent way of doing business at STP and, as such, should not be depicted as a stand-alone process.

9. Submit elaboration on how QA controls will be graded for low safety significant SSCs. Provide sample working level procedures for functional areas such as design control, procurement (both Appendix B and Commercial Grade Dedication), inspection, maintenance, testing, and operational activities.

(How addressed)

The process to be used for deciding what level of program/procedural controls are appropriate for low safety significant items and activities is described in the procedure for Development of GQA Basic Program Attributes. Submittal of this procedure will be discussed during the October 3 and 4, 1995 meeting.
As this process is implemented and sample procedures are available, they will be made available for NRC review.

STATUS OF
NRC-PROVIDED "DELIVERABLES"
FOR STP GRADED QUALITY ASSURANCE PROGRAM

10. On-site NRC review of GQA control implementation for functional areas of interest.

(How addressed)

As implementation of GQA occurs in NRC areas of interest, the NRC will be notified/invited to review implementation and results.

11. Submit FSAR changes to support GQA, exceptions to commitments and regulatory guides (while done under 50.59, NRC should be kept aware of these changes as they occur).

(How addressed)

Submittal of any changes to the STP UFSAR, which are evaluated under the auspices of 10CFR50.59, will occur in accordance with established UFSAR update requirements.

The NRC will be kept appraised of any changes made, as they occur, to support GQA.

PROCEDURE TITLE: DEVELOPMENT OF GQA BASIC PROGRAM ATTRIBUTES

1.0 PURPOSE AND SCOPE

1.1 This procedure prescribes the process used to evaluate STP program/procedural controls against STP commitments and regulatory requirements, and to identify those program attributes necessary to reflect good business practices and comply with applicable 10CFR50 Appendix B requirements. This procedure applies to those items and activities categorized to receive "basic" program controls as prescribed in OPGP03-XX-XXXX, Comprehensive Risk Management.

2.0 DEFINITIONS

None - applicable definitions are as found in OPGP03-XX-XXXX.

3.0 RESPONSIBILITIES

3.1 The STP Graded Quality Assurance (GQA) Working Group, with input from associated station organizations, is responsible for coordinating station efforts associated with identification of commitments and evaluation of work processes in accordance with guidance provided in this procedure. It is, additionally, responsible for consideration/analysis of station organization input, formulation or recommendations and submittal to the STP Comprehensive Risk Management (CRM) Expert Panel.

3.2 The STP Quality Department is responsible for support of other station organizations in accomplishing their identification and analysis activities as prescribed in this procedure.

3.3 STP organizations are responsible for compiling needed information, performing GQA Working Group-requested analyses, and providing this information to the Working Group for consideration. They are, additionally, responsible for effecting procedural changes in accordance with CRM Expert Panel decisions.

3.4 The STP Senior Management Team (SMT) is responsible for maintaining strategic level oversight of all CRM activities, and for resolving Expert Panel dissenting opinions.

3.5 The STP Change Management Team (CMT) is responsible for ensuring that Expert Panel decisions are effectively implemented, in a timely manner.

PROCEDURE TITLE: DEVELOPMENT OF GQA BASIC PROGRAM ATTRIBUTES

4.0 REQUIREMENTS

4.1 As requested by the Working Group, station organizations, with support from the STP Quality Department, shall develop and document listings of station commitments relative to identified work processes, plus a corresponding listing of basic program requirements as found in 10CFR50 Appendix B (see Attachment 1 for an example related to design control activities).

4.2 Responsible station organizations, with support from the Quality Department, shall identify and document the programmatic/procedural attributes in place to satisfy applicable commitments.

4.3 Responsible station organizations, with support from the Quality Department, shall then identify those process attributes which are, required to comply with basic 10CFR50 Appendix B requirements. These represent the minimum mandatory attributes which must be retained in the basic process.

4.4 The results of these actions shall be provided to the GQA Working Group for consideration.

4.5 The Working Group, with support from the Quality Department and responsible station organization, shall confirm the input for accuracy, and shall evaluate remaining (non-mandatory) process attributes and determine those which, while not being necessary for Appendix B compliance, represent good business practices and should be retained.

4.6 The Working Group shall develop a set of process change recommendations and submit them to the CRM Expert Panel.

4.7 Minimum quorum requirements for the Working Group, consensus methodology and documentation requirements for dissenting opinions shall be applied as prescribed in OPGP03-XX-XXXX.

4.8 The Expert Panel shall confirm the Working Group input for accuracy, and shall render decisions as to process changes that should occur. Any Working Group dissenting opinions shall be resolved and documented.

4.9 Minimum quorum requirements for the Expert Panel, consensus methodology and documentation requirements for dissenting opinions shall be applied as prescribed in OPGP03-XX-XXXX.

4.10 Expert Panel decisions shall be disseminated to the SMT, CMT and responsible station organizations.

4.11 The SMT shall resolve any dissenting Expert Panel opinions.

4.12 The CMT shall ensure that responsible stations organizations effectively implement Expert Panel decisions, in a timely manner.

5.0 RECORDS

5.1 Expert Panel decisions shall be retained in STP-RMS as Quality records, and shall include, as a minimum:

5.1.1 Expert Panel decisions

5.1.2 Working Group recommendations

5.1.3 Results of commitments and requirements identification

5.1.4 Identification of process attributes related to commitment satisfaction and regulatory compliance

5.1.5 Resolution of any dissenting opinions

HIGH SIGNIFICANT COMPONENT

Design Control

1) Document selection of design inputs.

2) Identify and document changes to design inputs.

3) During design process, perform 50.59 evaluations.

4) Assure design inputs accurately translated into specifications, drawings, procedures, or instuctions.

5) Design activities performed to approved procedures by qualified personnel.

6) Analyses results verified and documented.

7) Design documents include quality standards. Deviations from quality standards shall be identified and controlled.

8) Alternate quality standards documented and approved.

9) Desing analyses detailed so technically qualified personnel can review and verify without recourse to originator.

10) Review for suitability of materials, parts, equipment, and processes essential to function is part of design document preparation and review process.

11) Procedures for preparation and review of design documents require industry standards and specifications be used for the review in number 10 above.

LOW SIGNIFICANT COMPONENT

Design Control

1) Applicable regulatory requirements and design bases are accurately translated into specifications, drawings, procedures, and instructions.

2) Appropriate quality standards are specified and included in design documents and any deviations are controlled.

3) Materials, parts, equipment, and processes essential to the safety-related functions shall be selected and reviewed.

4) Design interface among participating organizations (internal and external) will be identified and controlled.

5) Procedures shall control the review, approval, release, distribution, and revisions of documents involving design interfaces.

6) Design adequacy shall be verified by either design review, alternate calculation, qualification testing, or combination.

7) Verification shall be performed by individuals or groups other than those who performed the original design, but may be from the same organization.

8) Verification by testing program shall include suitable qualifications testing of a prototype unit under the most adverse design conditions.

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HIGH SAFETY
SIGNIFICANT COMPONENT

12) Review of off-the-shelf commercial materials, parts, and equipment for application with quality related structures, systems, and components will be conducted before selection.

13) Design interface among participating organizations (internal and external) will be identified and controlled.

14) Adequacy of design and design changes will be verified.

14a) Design verification will be performed by qualified personnel to assure adequacy and conformance to specified design input.

14b) Design control procedures specify requirements for selection and performance of design verification.

14c) Design shall be verified by either design review, alternate calculation, qualification testing, or combination.

14d) Depth of verification commensurate with importance to plant safety, complexity of design, and similarity of design to previous designs.

14e) Verification by qualification testing requires:

Procedures shall provide criteria specifying verification by test

9) Design changes, including field changes, shall be subject to design control commensurate with those applied to the original design and be approved by the same organization that performed the original design. (An alternate organization may be designated)

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Prototype, component, or feature testing shall be performed as early as possible before installation of plant equipment or before the installation becomes irreversible.

Testing shall be performed under conditions that simulate most adverse design conditions determined by analysis.

14f) Design verification shall be performed by competent individuals or groups other than those who performed the original design.

14g) Design verification should not be performed by individuals that have immediate supervisory responsibility for individual performing the design; have specified a singular design approach; have ruled out certain design considerations; or have established the design inputs for the design. The supervisor may perform the verification if the supervisor is the only technically qualified individual and the need is approved and documented by the supervisor's management.

14h) Design verification will normally be performed prior to release for procurement, manufacture, installation, or use by another design organization. Exceptions shall be justified and documented.

Procedures shall control the justification of exceptions and verification completion of all affected design outputs prior to relying on the structure, system, or component to perform its function.

15) The approval, issuance, and changes to design documents shall be controlled to prevent inadvertent use of superseded design information.

16) Changes to design documents are reviewed and approved by the same groups or organizations which reviewed and approved the original design. If unavailable, another organization may be designated is competent in the specific design area, has access to pertinent background information, and has an adequate understanding of the requirements and intent of the original design.

17) Errors and deficiencies found in approved design documents, including methods, shall be documented and action taken to correct and prevent recurrence.

18) Maintenance and modification activities shall be performed to ensure quality at least equivalent to that specified in the UFSAR or other design bases and requirements.

19) A list of quality related structures, systems, and components shall be maintained.

20) Only verified, qualified and controlled computer codes may be authorized for use.

21) Modifications will be checked against the design change documentation for satisfactory implementation prior to closing out the design change process.

PROCEDURE TITLE: STATION PERFORMANCE DATA COLLECTION, REPORTING AND CATEGORIZATION

1.0 PURPOSE and SCOPE

1.1 This procedure prescribes the methods for identifying, collecting, categorizing and reporting performance data for use in STP Comprehensive Risk Management activities. This procedure applies to all STP personnel.

2.0 DEFINITIONS

2.1 Administrative Activity: Any action performed would not directly affect systems, structures or components (SSC) to perform its intended function. Example: Documenting landing an electrical conductor on a terminal point.

2.2 Attribute/Organizational Code: Predetermined encoding is assigned to specific activities. Encoding the identifies the attribute as technical or administrative in nature, and as a human or equipment measurable.

2.3 Grades: A numerical value that indicates positive and negative performance.

2.4 Technical Activity: Any action performed that would a directly affect a SSC ability to perform its intended function. Example: Landing an electrical conductor on a terminal point, designing modification.

2.5 Weight Factor: A numerical value applied to specific activities/topics based on its importance.

3.0 RESPONSIBILITIES

3.1 Station Management is responsible for providing performance information to the Operations Experience Group (OEG).

3.2 The OEG is responsible for reviewing and analyzing performance information, assignment of attribute and organization codes, weighting factors, grades, data input, and providing periodic performance reports in a format and frequency as prescribed by 0PGP03-xx-xxxx.

4.0 REQUIREMENTS

4.1 OEG personnel who implement this procedure shall receive (or have received) Root Cause Analysis training.

5.0 PROCESS

5.1 Collection of performance information.

5.1.1 Station Management shall, on an ongoing basis, provide performance information for their areas of responsibility to the OEG for their input.

5.2 Grading of Performance Information

5.2.1 The OEG will grade and input performance data (listed in Addendum 2) in the Graded Quality Assurance (GQA) database.

5.2.2 Performance information input to the GQA database shall be graded 1 through 4 in accordance with the following criteria:

1) Strength: Exemplary performance that exceeds goals/expectations.

2) Satisfactory performance: Meets requirements.

3) Improvement needed: A condition that resulted in a Condition Adverse to Quality (CAQ-D, CAQ-S).

4) Weakness: A condition that resulted in a Significant Condition Adverse to Quality (SCAQ)

5.2.3 OEG shall compile performance information and categorize by organization/attribute code(s) using Addendum 2 and 3.

5.2.4 Compiled performance data output shall be graded 1 through 5 in accordance with the following criteria:

1) Sustained excellence

2) Good with an improving trend

3) Good performance

4) Good with a declining trend

5) Poor performance

5.3 Reporting

5.3.1 OEG shall, as established by 0PGP03-xx-xxxx, provide performance reports to the appropriate Working Group(s).

6.0 RECORDS

6.1 Performance Information Reports shall be maintained in accordance with 0PGP03-xx-xxxx.

ADDENDUM 1
Departmental Performance Information
(Typical)

Performance information includes, but is not limited to:

- Corrective Action Program (CAP) database
- Independent Oversight Results
- Self-assessment reports
- Equipment History (successes/failures)
- System Health reports
- NRC Inspection Reports
- Corporative Management Audit Program (CMAP) reports
- SALP assessments
- INPO reports

ADDENDUM 2
Organization/Attribute Codes
(Typical)

Organization Codes:
Organization codes shall be those established by Human Resources.

Attribute Codes:

001	50.59 evaluation complete
002	acceptance testing
003	access control maintained
004	activity area has adequate lighting
005	activity area has adequate ventilation
006	activity began as scheduled
007	activity duration within scheduled time
008	activity expectations are clear to workers
009	adverse trend identification
010	ALARA practices
011	alignment (coupling)
012	alignment (pipe)
013	ambient conditions
014	ambiguous activities, procedure, instructions, and/or problems are questioned and resolved prior to start/resumption of activit
015	amperage
016	animal and bird control maintained in warehouse
017	approved vendor list
018	arrangement of stored items to prevent damage
019	availability of parts, materials, test equipment
020	barriers/signs are respected
021	bead width and travel speed
022	blocking/bracing
023	cable installation
024	calibration
025	cleanliness
026	clearance boundaries are respected
027	clearances are ready
028	CMTR (COC, code data documentation present for ASME XI items)
029	coatings and preservatives
030	communications between participants in activity is apparent and clear
031	communications equipment/methods are used
032	completed work package meets administrative requirements
033	conditions/problems are reported in accordance with the Corrective Action Program (CAP)
034	configuration control is maintained
035	configuration/orientation/location
036	confined spaces are properly controlled
037	contamination controls are exercised
038	contractor compliance with purchase orders or contract documents
039	contractor condition reporting
040	contractor is approved to supply parts and material for the contracted work
041	contractor on the approved vendor list
042	contractor overview

ADDENDUM 2
Organization/Attribute Codes
(Typical)

043	contractor performance
044	coordination between work groups established
045	correct tools are used
046	corrective action effectiveness
047	crack
048	CTC oversight and involvement
049	desiccant
050	design change technical review
051	design verification
052	designated smoking/eating areas maintained
053	dimensions
054	documentation
055	documents used are up-to-date
056	dressing/undressing techniques
057	dual/independent verification
058	EMI (electro-magnetic interference) controls implemented
059	engineering evaluations are documented and justifiable
060	Engineering interface
061	Engineering personnel are available for assistance/information
062	Engineering support is timely/effective
063	environmental/seismic qualification program
064	EQ equipment is maintained/returned to original condition (all bolting, vents, covers, etc., replaced)
065	EQ program
066	EQ replacement parts are not placed in proximity to a radioactive source prior to installation
067	equipment storage level and protection
068	expedient communications of needs, expectations and/or possible problems to appropriate personnel
069	expendable material usage
070	fire barrier boundary breach is approved
071	fire protection is proper/not compromised
072	fire watches are posted as required
073	fluid levels/pressures
074	fraudulent material
075	frisking techniques
076	fusion
077	gap
078	hardware (none missing)
079	heat number
080	heater for stored equipment energized
081	hot work permits are ready
082	housekeeping
083	identification (eg TAG/TPNS, item #, HIC #)
084	inclusion
085	inert gas blankets correctly maintained
086	information/instructions are obtained prior to starting the job
087	installation/reinstallation
088	interdisciplinary review adequacy
089	interpass temperature

ADDENDUM 2
Organization/Attribute Codes
(Typical)

090	ISLT
091	JCO evaluation complete
092	labeling
093	laminations
094	lap
095	leakage (absence of)
096	lifting/landing of leads
097	linear indications
098	lubricants used meet the EQ requirement
099	lubrication
100	M&TE installed/used correctly and calibration is current
101	maintenance of stored items scheduled/performed
102	management/supervision at activity is actively involved
103	marking
104	material issue is controlled
105	material substitution authorized
106	material supplied by the contractor are received through NPM and accepted for use by Quality receiving or warehouse inspectio
107	material testing
108	material types to be welded are identified in the work package by design document
109	material verification
110	modification package complete
111	needed tools, materials, and/or equipment are obtained before starting the activity
112	no removal of insulation in the area of EQ equipment without evaluation
113	number of qualified personnel assigned to the task
114	operability/reportability determination
115	operating experience utilized
116	other
117	overtime control (individual/personnel)
118	package type
119	part/item physical integrity
120	penetration
121	personnel performed the task competently
122	personnel qualifications/certifications verified
123	personnel safety equipment usage
124	personnel/equipment are mutually protected
125	physical properties
126	placarding
127	porosity
128	post activity/job meeting
129	post maintenance test
130	post modification testing
131	pre activity/job meeting
132	preheat
133	procedure compliance
134	procedures, drawings, and/or manuals are used
135	program adherence
136	program/procedures for contractor activities

ADDENDUM 2
Organization/Attribute Codes
(Typical)

137	protective covers maintained and not deteriorated
138	purge
139	raceway installation
140	radwaste volume reduction is exercised
141	Raychem installation
142	ready access to stored items
143	reassembly
144	RIDR hold tags correctly attached to stored items
145	rigging practices
146	rigging techniques
147	root cause analysis
148	RWP followed as written
149	RWPs are ready
150	safe work practices
151	security seals
152	seismic program
153	self-checking applied to ensure correct unit/train/component (STAR process)
154	separation (electrical wiring)
155	separation (hot pipe)
156	separation (sample lines to signal/sensing lines)
157	separation (seismic)
158	shelf life
159	shrink
160	shutdown risk assessment
161	site specific training is identified/obtained
162	slag
163	soldering
164	staging areas are controlled
165	storage of hazardous materials maintained
166	subdividing of material
167	supports
168	surface condition
169	surface finish
170	surveys
171	system cleanliness controlled and maintained
172	system tag-out is verified
173	tags (danger, caution, do not operate, etc.) are hung on the correct equipment, and are legible
174	teamwork is apparent (personnel work together to complete the task)
175	temperature/humidity controlled and maintained
176	temporary modification adequacy
177	temporary modification implementation
178	terminations
179	test results
180	time allotted for personnel to prepare for activity/performance of prerequisites
181	time allotted for task
182	TLD, ALNOR, etc., are correctly controlled and worn
183	torquing

ADDENDUM 2
Organization/Attribute Codes
(Typical)

184	tungsten
185	undercut
186	USQE evaluation complete
187	verbal instructions are adequate, and do not conflict with other instructions
188	verification that condition of the unit can support the activity
189	wall thickness
190	weld filler material issue slip review
191	weld filler material size and type used for fill pass
192	weld filler material size and type used for root pass
193	weld prep
194	weld size
195	welder qualifications verified
196	welding procedure specification is correctly identified and correctly implemented
197	work documents/procedures followed correctly as written and instructions adhered to
198	work package preparation is adequate/complete, including all required permits and documentatio
199	work start permission was obtained
200	workmanship
201	written instructions were effective, and do not conflict with other instructions or requirement

ADDENDUM 3
Weight Factors Input Sheet
(Typical)

Identify each weight factor which applies to the potential issue. Allocate the indicated weigh for each factor. Total the sum of the weighing factors.

WEIGHT FACTOR	POTENTIAL ISSUE	SCORE
100	Industrial/Personnel Safety	_____
100	Management Concern (Director or Above)	_____
100	Operability Impact (For Restart/Continued Operations)	_____
100	Radiological Safety Items	_____
80	High Potential for a Plant Trip or Transient	_____
80	High Potential for Unintentional Tech Spec Action	_____
35	PSA High Risk Component Repeat Occurrence/Maintenance (TAG/TPNS)	_____
20	High Potential for Affect on System Operation	_____
20	High potential for Reduced Unit Efficiency or Capacity	_____
15	Supports System Operation Pre-Outage	_____
15	Component Failure Due to Manufacture's Defect	_____
10	PSA High Risk Component Repeat Occurrence/Maintenance (System)	_____
10	Plant Generic Implication	_____
10	Regulatory Interest	_____
1	Positive Comment on a SALP Report	_____
1	Positive Comment on an INPO Report	_____

lc\wp\ Effective date: 00/00/00 Print: 10/3/95	0AAA00-AA-0000	Rev. 0 General	Page 1 of 6

PSA RISK RANKING

Quality	Safety-Related	Usage: **DRAFT**	Effective Date: 10/??/95

C. R. Grantom	(name)	(name)	Nuclear Fuel & Analysis
PREPARER	TECHNICAL	USER	COGNIZANT ORGANIZATION

Table of Contents Page

DRAFT

1.0 Purpose and Scope

Describe the methods and criteria used to rank systems, components and operator actions within the scope of the PSA.

2.0 Definitions

2.1 Risk Ranking: the process by which systems, structures, and components within the scope of the PSA analysis are grouped based on their importance.

2.2 Importance Measures: standard calculations which quantify the significance of systems, structures, and components within the scope of the PSA analyses.

2.3 Fussell-Vesely: an importance measure which is defined as the ratio of the difference of the core damage frequency (or other figure of merit) with the component failed from the core damage frequency with the component successful over the average core damage frequency.

2.4 Risk Achievement Worth: an importance measure which is defined as the ratio of the core damage frequency (or other figure of merit) given the component is failed to the average core damage frequency.

2.5 Common Cause: a portion of the system analysis that evaluates components to determine their vulnerability to multiple component failures due to a common, shared event and not a dependent event.

2.6 Risk Reduction Worth: an importance measure which is defined as the ratio of the core damage frequency (or other figure of merit) given the component is successful to the average core damage frequency.

3.0 Responsibilities

3.1 Supervisor, Risk and Reliability Analysis ensures that the requirements of this procedure are effectively implemented.

3.2 Expert Panel is responsible for approving the risk ranking criteria.

4.0 Requirements

4.1 PSA inputs shall be defined and incorporated in the PSA Configuration Control Procedure (0aaann-aa-0000).

4.2 The PSA risk models shall be quantified and sensitivity studies performed as described in Addendum 1.

4.3 The quantification results shall be compiled to reflect key importance measures including, as a minimum, core damage frequency and large early release frequency.

4.4 The contribution of the systems, equipment, operator actions, and initiating events shall be listed in order of their importance measures.

4.5 Thresholds defining high, medium, and low risk significance for average core damage frequency and average large early release frequency shall be developed.

4.6 Technical bases for establishing the threshold values shall be documented.

4.7 On a periodic basis, as established in "Configuration Control of the PSA" (0aaa00-aa0000), the risk ranking of components shall be be generated, reviewed, approved, and submitted to the Working Groups/Expert Panel.

ADDENDUM 1
RISK RANKING PROCESS

RISK RANKING CRITERIA

Risk Ranking Tasks:

- Quantify all risk models based on the average figures of merit (i.e., core damage frequency, large early release). Perform top event importance, split fraction importance, and basic event importance quantifications with all standard importance measures.
  Purpose: Average quantification establishes level for overall risk ranking and level of plant performance.

- Quantify all risk models based on the removal of all maintenance unavailability contributions. Perform top event importance, split fraction importance, and basic event importance quantifications with all standard importance measures.
  Purpose: Quantifies optimum level of defense-in-depth.

- Quantify all risk models based on the removal of all operator recovery actions. Perform top event importance, split fraction importance, and basic event importance quantifications with all standard importance measures.
  Purpose: Provides risk ranking with primary emphasis on equipment reliability.

- Quantify all risk models based on the removal of all common cause contributions. Perform top event importance, split fraction importance, and basic event importance quantifications with all standard importance measures.
  Purpose: Provides focus of risk ranking based equipment combinations outside the scope of common cause failures.

- Quantify selected risk models and vary failure rates of common equipment. Selection should based on active components that appear in a majority of system level analyses such as relays, check valves, motor operated valves, etc.
  Purpose: To determine if non-linear impacts to key figures of merit can occur.

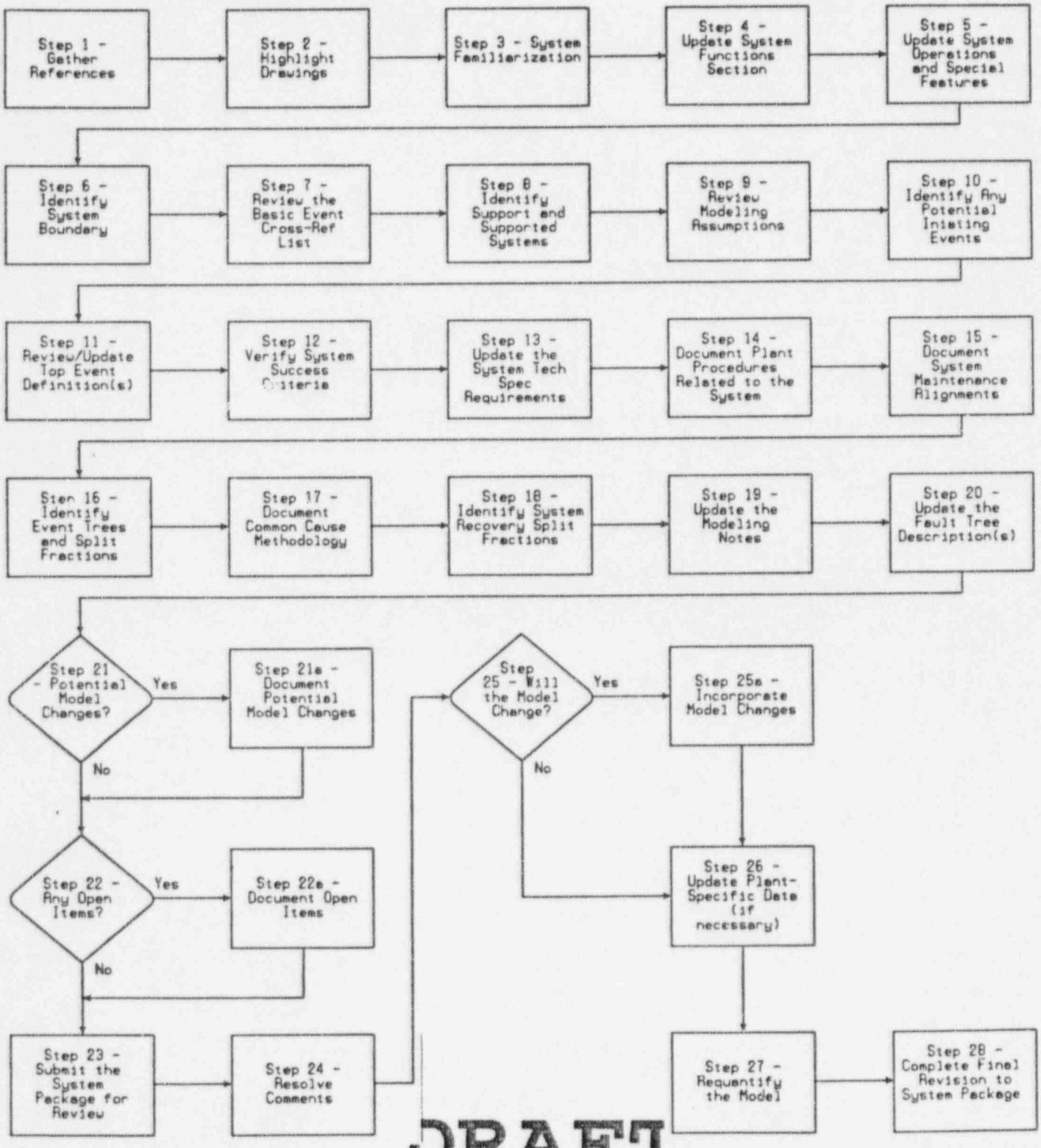
- Compare the risk rankings from the above quantifications and note variance in importance measures for like and similar components.

- Identify boundaries between levels of importance (See Addendum 2 for the technical basis for risk significance thresholds).

- Classify equipment based on the above results and document for Expert Panel.

ADDENDUM 1
RISK RANKING PROCESS

RISK RANKING FLOW CHART



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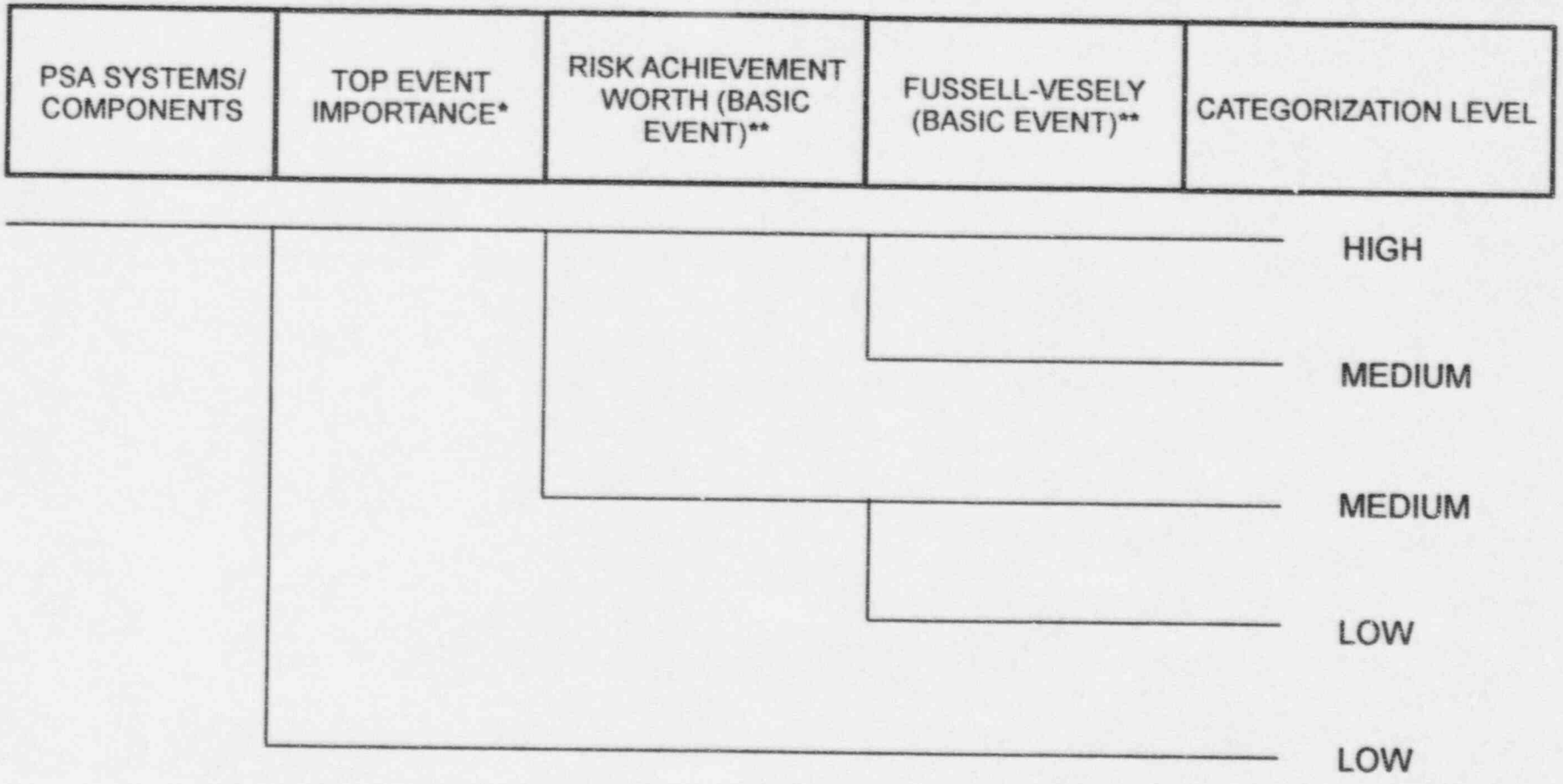
ADDENDUM 2
RISK SIGNIFICANCE THRESHOLDS

RISK SIGNIFICANCE DECISION TREE



* - From PSA Applications Guide, Figure 4-1.
** - From PSA Applications Guide, Figure 4-2.