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

November 26, 1996

MEMORANDUM TO: David B. Matthews, Chief
Generic Issues and Environmental
Projects Branch
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

FROM: Claudia M. Craig, Senior Project Manager Claudia M. Craig
Generic Issues and Environmental
Projects Branch
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF MEETING WITH THE WESTINGHOUSE OWNERS GROUP (WOG) TO DISCUSS PRA METHODS TO EXTEND CERTAIN SURVEILLANCE TEST INTERVALS AND ALLOWED OUTAGE ITEMS

The subject meeting was held at the Nuclear Regulatory Commission (NRC) office in Rockville, Maryland on October 15, 1996, between representatives of Westinghouse, the WOG, and the NRC staff. The purpose of the meeting was to discuss WOG risk-informed program initiatives regarding accumulator allowed outage time (AOT) relaxations and reactor trip breaker (RTB) AOT and surveillance test interval (STI) relaxations. Attachment 1 is the list of meeting participants. Attachment 2 is a copy of the non-proprietary presentation material that was discussed at the meeting and provided in a letter dated October 21, 1996.

For the accumulator AOT relaxation initiative, Westinghouse is planning to develop a technical approach for justifying extensions of AOTs, and would like the first extension to be applied to accumulators. The overall technical approach is similar to the Combustion Engineering Owners Group (CEOG) approach, which is currently under review by the staff. Westinghouse plans to develop a general methodology for assessing AOT increases and each utility would then apply the methodology using their plant specific PRA models. Westinghouse discussed their process for assessing the impact of changes to AOTs on plant safety. Discussions were held on the NRC experience with the CEOG submittal. It was suggested by the staff that the WOG obtain a copy of the staff's request for additional information (RAI) that was sent to the CEOG and the CEOG response to that request. The staff felt that this would provide the WOG some insights into the staff review and then the WOG could address those issues in their submittal.

The WOG also discussed their plans for providing a technical justification for extending the RTB STI, extending the master relay and logic cabinet STI, and extending the RTB AOT consistent with the logic cabinet AOT. This methodology would apply to both relay and solid state protection system plants. The

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methodology uses portions of WCAP-14333, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," which is currently under NRC staff review. Westinghouse discussed the overall approach and the technical approach for extending the STIs and AOT.

Also discussed at the meeting was staff question number 18 on WCAP-14333, which was outlined in an RAI dated June 28, 1996. The question had two parts and requested a discussion of the type of analysis performed to identify risk significant configurations for which changes are proposed and the procedures that are to be followed to avoid or restrict risk significant occurrences. The staff also requested a discussion of programs for configuration management, consistent with the maintenance rule, to assess risk impacts prior to entry into the AOTs that are being proposed for extension. The WOG was concerned that the question was asking the WOG to generically commit to a configuration risk management program, which the WOG felt it could not do on a generic basis. The issue was discussed and the staff suggested the WOG review the CEOG response to the staff's RAI in that the same question was asked of the CEOG.

Project No. 694

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WOG / NRC MEETING

OCTOBER 15, 1996 AT ROCKVILLE, MD

MEETING PARTICIPANTS

NAME	ORGANIZATION
Claudia Craig	NRC/NRR/PGEB
Hukam Garg	NRC/NRR/DRCH
Ian Jung	NRC/NRR/DSSA
Eric Weiss	NRC/NRR/SRXB
Nanette Gilles	NRC/NRR/TSB
Millard Wohl	NRC/NRR/SPSB
Sarita Brewer	NRC/NRR/SRXB
Chu-yu Liang	NRC/NRR/SRXB
Ray Schneider	ABB/CE
Jim Andrachek	Westinghouse
Jack Stringfellow	Southern Nuclear/WOG
Adrian Heymer	NEI
Gary Merka	TU Electric (CPSES)
Bob Howard	Westinghouse
P.J. Fulfor	LIS
Bennett M. Brady	NRC/AEOD/SPD
Jerry Andre	Westinghouse
John Flack	NRC/NRR/SPSB

ATTACHMENT 1

Westinghouse
Electric Corporation

Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

SMPD-RAS-96-140

October 21, 1996

Claudia Craig
U.S. Nuclear Regulatory Commission
Mail Stop O-10H5
Washington , DC 20555

Dear Claudia:

Attached is a copy of the presentation material used in the meeting between the NRC and the Westinghouse Owners Group Licensing Subcommittee held on October 15. This material was determined to be Westinghouse Non-Proprietary Class 3.

Please contact me if any additional information is necessary.

Best regards,

G.R. Andre'
Risk Assessment Services
Westinghouse Electric Corporation

Attachment

cc: B. Monty w/o attachment

0047CG:JRA/102196

ATTACHMENT 2

NRC/WOG Meeting

RISK-BASED PROGRAM INITIATIVES

WOG Licensing Subcommittee

October 15, 1996

WESTIGNHOUSE ELECTRIC CORPORATION
Energy Systems Business Unit
P.O. Box 355
Pittsburgh, PA 15230

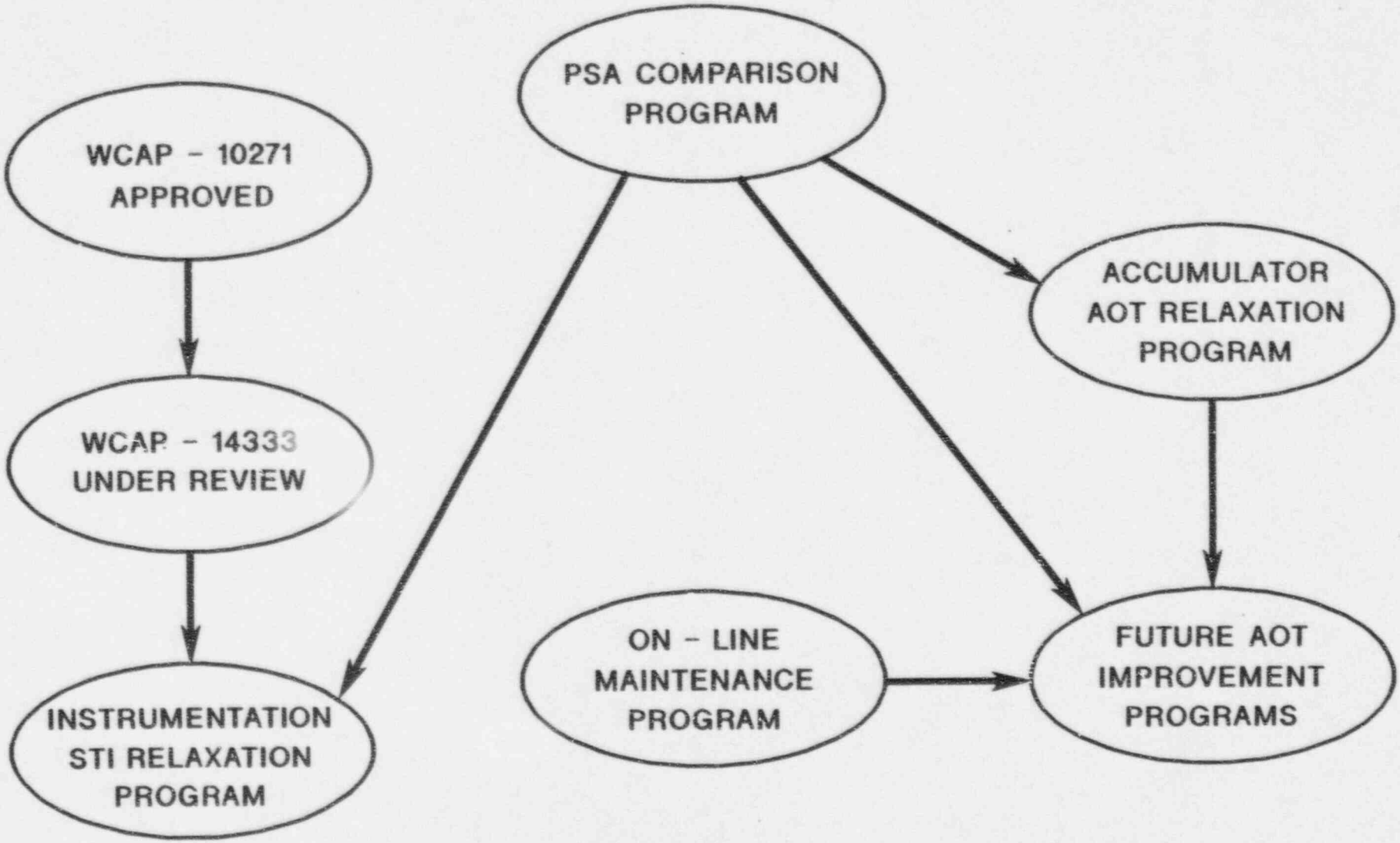
AGENDA

1:00	Introduction	Jack Stringfellow, SNC Licensing Subcommittee Chair
1:15	Accumulator Allowed Outage Time Relaxations	
	- Program Objective and Technical Approach	Jerry Andre', Westinghouse
	- Status of CEOG AOT Improvement Program	NRC
	- Discussion and NRC Comments	All
2:45	Tech Spec RTS and ESF Logic and Reactor Trip Breaker AOT and STI Relaxations	
	- Program Objective and Technical Approach	Bob Howard, Westinghouse Jerry Andre', Westinghouse
	- Discussion and NRC Comments	All
3:45	Discuss NRC RAI #18 on WCAP-14333	
4:30	Meeting Summary	Jack Stringfellow, SNC

MEETING OBJECTIVES

- Discuss technical approach and regulatory requirements with the NRC for the following risk-based programs:
  - Accumulator Allowed Outage Time Relaxations
  - Tech Spec RTS and ESF Logic and Reactor Trip Breaker AOT and STI Relaxations
- Discuss NRC RAI #18 on WCAP-14333 ("Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times")

WOG PROGRAM INTERACTIONS



Accumulator Allowed Outage Time Relaxations

Program Objective:

- Develop the technical approach for justifying extensions to AOTs (not accumulator specific)
- Apply this approach to the accumulators (increase AOT to 72 hours)

Current Accumulator Tech Spec Requirements (NUREG-1431)

- 72 hour completion time for boron concentration
- 1 hour completion time for all other reasons

Accumulator Allowed Outage Time Relaxations (Cont'd)

Overall Technical Approach

- Similar to CEOG approach to AOT changes
- Develop a general methodology to be applied for assessing other AOT increases
- Develop accumulator specific methodology from the general methodology
- Each utility applies this methodology using their plant specific PRA model(s)
- The technical approach and each plant's results are provided to the NRC in one document (WCAP)

FIGURE 1
PROCESS FOR ASSESSING THE IMPACT OF CHANGES TO TECHNICAL SPECIFICATION AOTS ON PLANT SAFETY

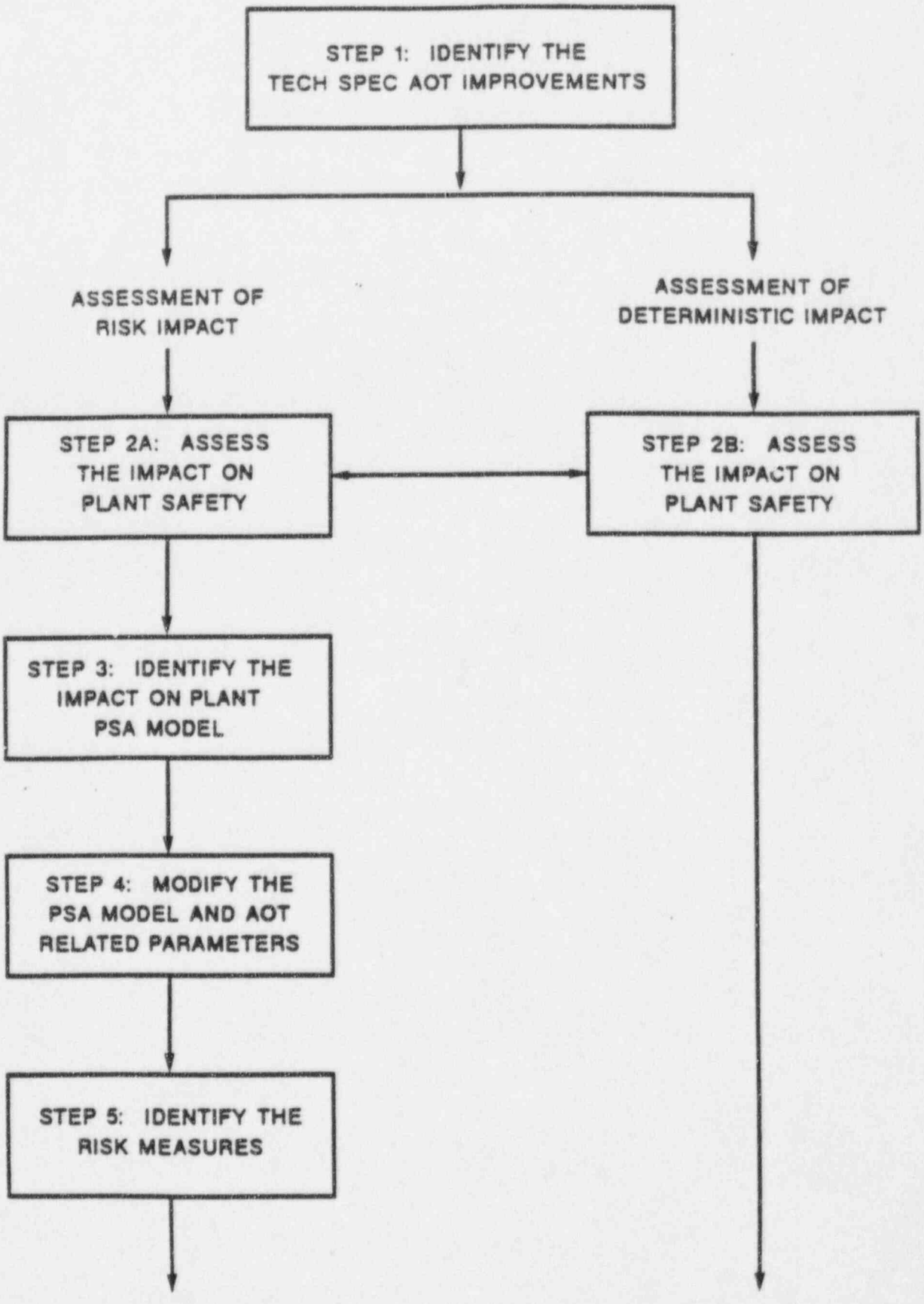
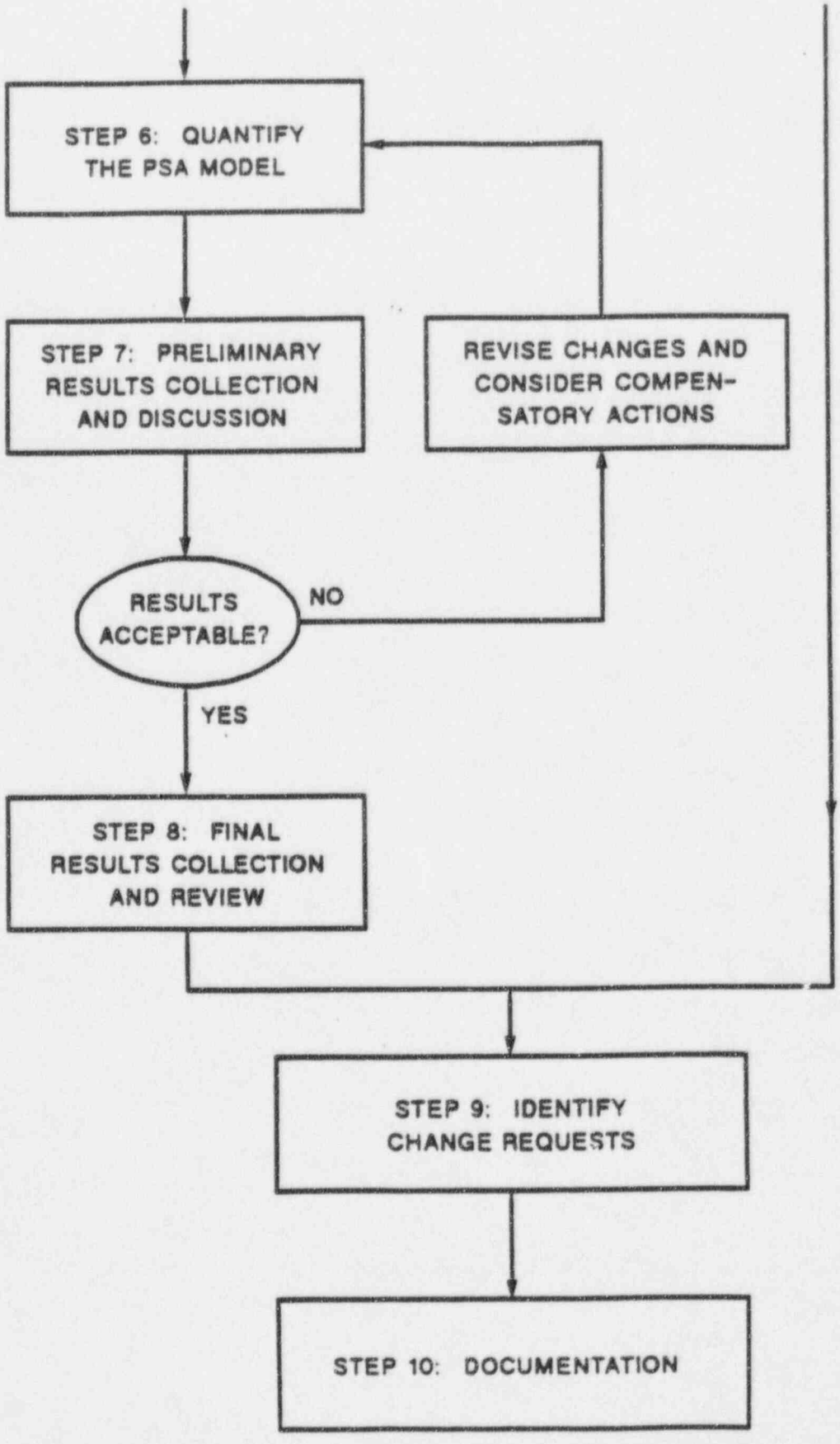


FIGURE 1 (CONT.)
PROCESS FOR ASSESSING THE IMPACT OF CHANGES TO TECHNICAL SPECIFICATION AOTS ON PLANT SAFETY



Accumulator Allowed Outage Time Relaxations (Cont'd)

Issues to be Resolved

Step 3: Identify the Impact on the Plant PSA Model

Accumulator success criteria varies between plant PSA models.

- FSAR success criteria to no accumulators required
- Only modeled for large LOCA event mitigation

Accumulator failure modes

- Typically modeled failure modes are check valves fail to open and tank rupture
- Use current accumulator model in PRAs with addition of T and M unavailability

Accumulator Allowed Outage Time Relaxations (Cont'd)

Issues to be Resolved (Cont'd)

Step 4: Modify the PSA Model and AOT Related Parameters

- How is the impact of the extended AOTs factored into the PSA model?
- Use realistic test and maintenance times (do not assume the full AOT will be used)
- Test activities, corrective and preventive maintenance activities
- See following Tables for recommended approach

Step 5: Identify the Risk Measures

- Risk measures to be provided
- Yearly average CDF
- Yearly average LERF
- Conditional core damage frequencies

Table 2
Worksheet for Determining the Impact of Increased AOTs on Mean Test Downtimes

Test Activity	Current (C) or New (N) Activity	Test Frequency	With Current AOT		Impact of AOT Change on Test Downtime (2)	With Extended AOT (3)	
			Downtime per Test Activity (hr)	Test Activity Unavail (1)		Downtime per Test Activity (hr)	Test Activity Unavail (1)
Total	---	---	---		---	---	

Notes:

1. Test Activity Unavailability = Test Frequency x Downtime per Test Activity
2. This should be given as a factor increase, such as 2X. Justification for this factor will need to documented.
3. Downtime per Test Activity (with extended AOT) = Impact of AOT Change on Test Downtime x Downtime per Test Activity (with current AOT)

Table 3
Worksheet for Determining the Impact of Increased AOTs on Mean Maintenance Downtimes

Maintenance Activity (Scheduled (S) or Repair (R))	Current (C) or New (N) Activity	Maint. Frequency	With Current AOT		Impact of AOT Change on Maint. Downtime (2)	With Extended AOT (3)	
			Downtime per Maint. Activity (hr)	Maint. Activity Unavail (1)		Downtime per Maint. Activity (hr)	Maint. Activity Unavail (1)
Total	---	---	---		---	---	

Notes:

1. Maint. Activity Unavailability = Maint. Frequency x Downtime per Maint. Activity
2. This should be given as a factor increase, such as 2X. Justification for this factor will need to documented.
3. Downtime per Maint. Activity (with extended AOT) = Impact of AOT Change on Maint. Downtime x Downtime per Maint. Activity (with current AOT)

Accumulator Allowed Outage Time Relaxations (Cont'd)

Issues to be Resolved (Cont'd)

Step 6: Quantify the PSA Model

- What, if any, sensitivity cases are expected (CEOG experience)?
- NRC review of PSA models necessary?

Step 7: Preliminary Results Collection and Discussion

- Follow the EPRI PSA Applications Guide for acceptable risk changes

Step 10: Documentation

- Quantification results
- Worksheets for determining impact of AOT increase on T and M times
- Success criteria
- Events requiring the system for mitigation
- Typical system fault tree models

Tech Spec RTS and ESF Logic and RTB AOT and STI Relaxations

Program Objective

- Provide the technical justification for:
  - Extending the reactor trip breakers STI from 2 to 6 months
  - Extending the master relay and logic cabinet STI from 2 to 18/24 months
  - Extend the RTB AOT consistent with the logic cabinet AOT (24 hours)
- Applicable to relay and solid state protection system plants

Tech Spec RTS and ESF Logic and RTB AOT and STI Relaxations (Cont'd)

Background

- WCAP-10271 with Supplements 1 and 2 analyzed STI and AOT changes to the analog channels, logic cabinets, master and slave relays, and trip breakers
- NRC approved changes to analog channel STIs and AOTs and logic cabinet, master relay, and slave relay AOTs
- Changes to logic cabinet, master relay, and slave relay STIs not requested
- Changes to reactor trip breaker STIs and AOTs withdrawn
- WCAP-14333 requested changes to AOTs for analog channels, logic cabinets, master and slave relays
- WCAP-14333 analysis currently under review
- Detailed reactor trip and engineered safety features actuation signal fault trees developed
- Conservative assumptions used regarding relation between component failure probability and test interval
- Generic component failure rate data used

Tech Spec RTS and ESF Logic and RTB AOT and STI Relaxations (Cont'd)

Overall Program Approach

- Meet with the NRC to discuss conceptual approach and expectations
- Use of PSA to assess impact of STI and AOT changes on plant safety
- Application of instrumentation unavailability models and plant PSA model used in WCAP-14333
- Remove conservative assumptions
  - Replace generic data with industry specific data
  - Improved assessment of impact of STI extensions on component failure probability
- Impact of reduced testing on spurious reactor trips and SIs

Tech Spec RTS and ESF Logic and RTB AOT and STI Relaxations (Cont'd)

Technical Approach

- Phase 1: Meet with the NRC to discuss conceptual approach and expectations
- Phase 2: Analysis
  - Data collection/utility survey/WOG-TRAP database review
    i. Reactor trip breaker performance
    ii. Master relay performance
    iii. Logic cabinet card level performance
  - Calculation of new failure rates (assume linear relation between P_f and STI)
  - RT and ESF actuation signal unavailability assessment (WCAP-10271 and WCAP-14333 models)
  - Risk analysis (WCAP-14333 model)
  - WCAP

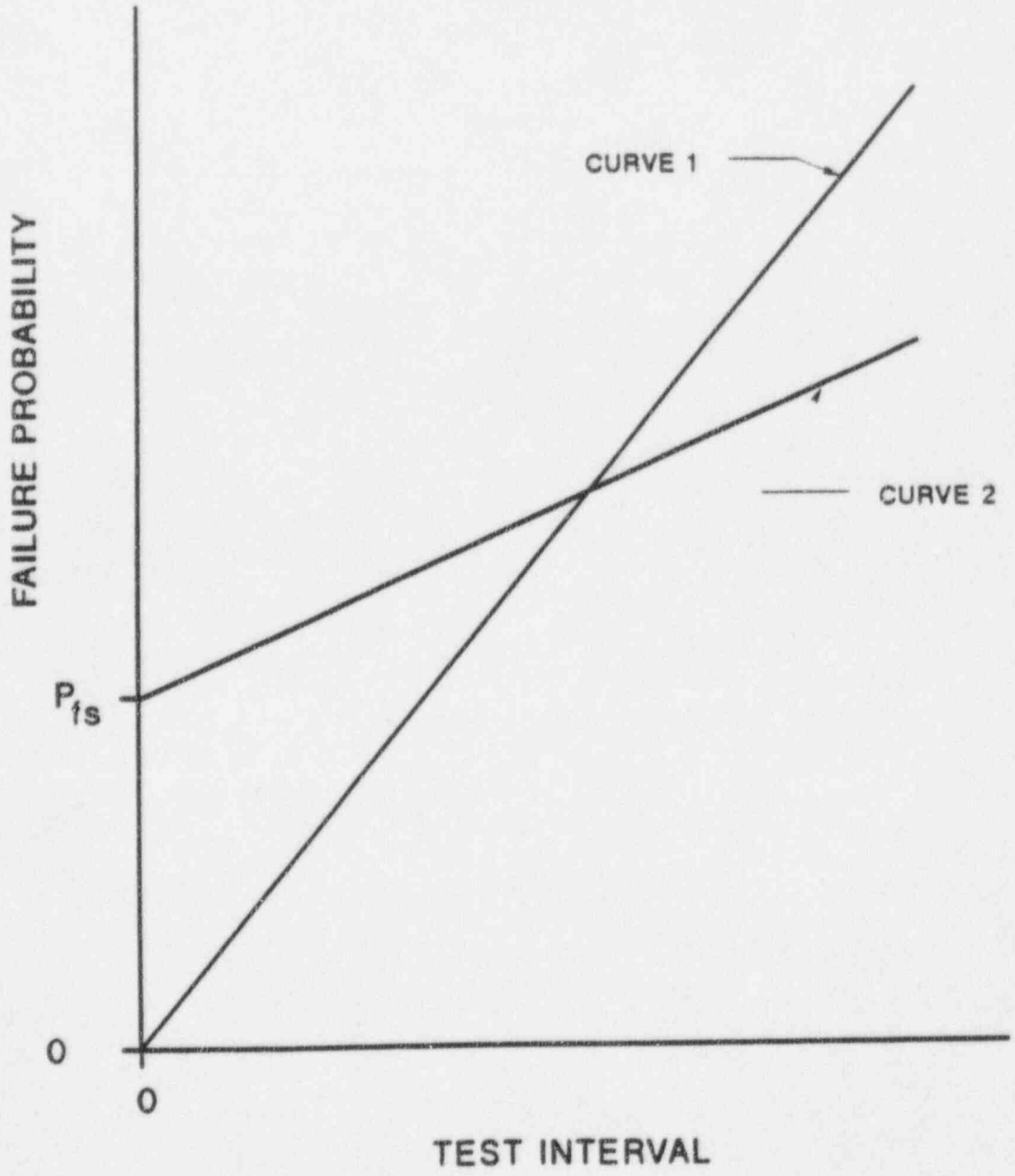
Tech Spec RTS and ESF Logic and RTB AOT and STI Relaxations (Cont'd)

Technical Approach (Cont'd)

- Phase 3 (if necessary)
  - FMECAs to improve P_t/STI linear assumption
  - RT and ESF actuation signal unavailability assessment (WCAP-10271 and WCAP-14333 models)
  - Risk analysis (WCAP-14333 model)
  - WCAP

Figure 1

Component Failure Probability as a Function of Test Interval



Key: Curve 1 - Assumes there is a linear relationship between the test interval and the failure probability. Immediately following the test, the component is perfect.
Curve 2 - Divides the failure probability into time-independent and time-dependent components. P_{fs} represents the time-independent (or shock) component of the failure probability.

Tech Spec RTS and ESF Logic and RTB AOT and STI Relaxations (Cont'd)

Issues to be Resolved

- Program STIs and AOTs are acceptable to change?
- Use of RT and ESF actuation signal fault trees from WCAP-10271 and WCAP-14333
- Use of risk model from WCAP-14333
- Reference the results back to Pre-TOP and TOP (WCAP-10271) AOT and STI conditions
- Risk measures to be reported
  - AOT changes (yearly average CDF, yearly average LERF, conditional CDF)
  - STI changes (yearly average CDF, yearly average LERF)
- Acceptable changes in the risk measures - follow the EPRI PSA Applications Guide
- What, if any, sensitivity cases are expected?

Discuss NRC RAI #18 on WCAP-14333 ("Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times")

RAI #18.

a. (Second area) Given the proposed T/M plant configuration, what are the other risk-significant systems or equipment? Please discuss the analysis performed to identify risk-significant configurations for which changes are proposed and the procedures followed, or will be followed, to avoid/restrict such occurrences.

b. (Third area) Explain how you are going to address the issue of configuration and control, consistent with the Maintenance Rule, i.e., evaluate the impact of maintenance activities on plant configurations. Please discuss the programs for configuration management in Westinghouse plants to address assessment of risk impacts prior to entry into the RPS and ESFAS bypass time or AOT, being proposed for extension.

DISTRIBUTION w/attachments: Summary of October 15, 1996, with Westinghouse dated November 26, 1996

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