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

May 17, 1989

Docket Nos. 50-390, 50-391

APPLICANT: Tennessee Valley Authority (TVA)

FACILITY: Watts Bar Nuclear Plant, Units 1 and 2

SUBJECT: MEETING SUMMARY FOR THE APRIL 18, 1989 MEETING REGARDING WATTS BAR PRESTART TEST CORRECTIVE ACTION PROGRAM

On April 18, 1989, a meeting was held in Rockville, Maryland between the NRC staff and representatives of TVA. The purpose of the meeting was to discuss the Corrective Action Program (CAP) at Watts Bar Nuclear Plant (WBN) in the prestart testing area. Attachment 1 is the list of attendees and Attachment 2 is a copy of the handouts provided by TVA at the meeting.

TVA opened the meeting with an overview of the prestart test program and reasons for the performance of additional testing. The CAP addresses the differences between the prestart and the preoperational test programs and takes into account the lessons learned from the Sequoyah restart test program. TVA stated that the bases for the performance of additional testing are (1) the lengthy delay between the previously completed preoperational tests and fuel loading, (2) updating the operating organization's knowledge of plant equipment and procedures, (3) modifications to the plant equipment without post-modification testing, (4) degradation of plant equipment, and (5) NRC concerns.

TVA stated that the scope of the prestart test program would meet the requirements of Regulatory Guide 1.68 (Nov. 1973) with the identified exceptions. The exceptions are specified in Exhibit A of the CAP. Table 1 of the CAP lists the systems which are included in the scope of the program. The component, system and integrated system functions will be retested following completion of each system. The construction verification will be procedurally controlled to ensure that all required modifications on each system have been completed prior to the start of testing. TVA further stated that quality verification will be performed continuously on the program by the QA organization. As a result of discussion between TVA and the NRC staff, the following action items were agreed upon:

1. TVA will revise Exhibit A of the CAP to clearly define exceptions to Regulatory Guide 1.68 and will provide justification for the exceptions.

2. A detailed description of the Prestart Test Program similar to the Watts Bar Final Safety Analysis Report (FSAR) Chapter 14 detail on the Preoperational Testing Program will be submitted for NRC review.

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PDR ADOCK 05000390
A PDC

DF01 1/1 memo4

3. TVA will inform the NRC Resident Inspector of the availability of the applicable Prestart Test Program procedures when issued.

Original signed by

Rajender Auluck, Project Manager
TVA Projects Division
Office of Nuclear Reactor Regulation

Enclosure:
1. Attendance List
2. Handout provided by TVA

Distribution
Docket File
NRC PDR
Local PDR
Those on Attached List

OFC	:NRR:TVA/LA	:NRR:TVA/PM	:TVA:AD/P	:TVA:AD/V	:	:	:
NAME	:MSimms	:RAuluck	:SBlack	: AMarinos	:	:	:
DATE	:5/17/89	:5/17/89	:5/17/89	:5/17/89	:	:	:

OFFICIAL RECORD COPY

DISTRIBUTION FOR MEETING SUMMARY DATED: May 17, 1989

Facility: Watts Bar Nuclear Plant, Units 1 and 2*

Docket File
NRC PDR
Local PDR
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S. Black
T. Quay
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R. Auluck
M. Simms
B. Wilson
J. Rutberg
ACRS (10)
GPA/PA
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Enclosure 1

MEETING WITH TVA

April 18, 1989

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T. Rotella	NRC	301-492-0788
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Angelo Marinos	NRC	301-492-0768
K. P. Barr	NRC	404-331-0342
Hoyt C. Johnson	TVA	615-365-8667
John F. Cox	TVA	615-365-3307
B. D. Liaw	NRC	301-492-3288
G. T. Hubbard	NRC	301-492-0706
S. C. Black	NRC	301-492-0796
Richard R. Grau	TVA-WBN	615-365-3570
T. A. Ippolito	WBPT	301-770-6790
R. A. Pedde	WBJ-TVA	615-365-8767
J. P. Mulkey	TVA	615-365-8670
Walt Horn	TVA	615-365-3516
Dennis McCloud	TVA	615-365-8650

PRESTART TEST CAP
PRESENTATION TO NRC

April 18, 1989

Agenda

I	Introduction	T. A. Ippolito
II	Prestart Test CAP	M. K. Jones
III	QA Involvement	J. P. Mulkey
IV	Conclusions	R. A. Pedde

WATTS BAR NUCLEAR PLANT

PRESTART TEST PROGRAM

M. K. Jones
Technical Support Organization Superintendent

WATTS BAR NUCLEAR PLANT
PRESTART TEST PROGRAM

- Reasons for Performance of an Additional Testing Program
- Comparison Between Prestart and Preoperational Test Programs
- Sequoyah Restart Test Program Lessons Learned
- Prestart Test Program Description
- Self-Assessment

REASONS FOR PERFORMANCE OF AN ADDITIONAL TESTING PROGRAM

- Lengthy delay between completed Preop Tests & fuel loading
- NRC concerns
- Operating organizations' knowledge of plant equipment & procedures may have been affected
- Plant equipment has been modified, some without adequate testing
- Plant equipment performance may have degraded

COMPARISON BETWEEN THE SCOPE OF THE PREOPERATIONAL AND PRESTART TEST PROGRAMS

PREOP TEST PROGRAM (Reg Guide 1.68 full compliance)	PRESTART TEST PROGRAM (Reg Guide 1.68 with identified exceptions)
- Safe shutdown and cooldown - Accident mitigation - Challenges to RPS & ESF - Safety related normal operation	- Safe shutdown and cooldown - Accident mitigation - Challenges to RPS & ESF - Safety related normal operation
- All BOP systems	- BOP systems presenting challenges to safe shutdown & accident mitigation
- BFL & AFL	- BFL only

PRESTART TEST PROGRAM PROVIDES SIGNIFICANT BENEFITS

- Identifies functions not currently in a periodic test program
- Packages all required test results in easily auditable system packages

BASIS FOR EXCLUSION OF SOME BALANCE OF PLANT SYSTEMS

> Adequately tested following system turnover

> Maintained under operational control:
- Post Maintenance testing
- Review of changes for adequate Post Modification testing
  - Review of all pre-1985 workplans for adequate Post Modification Testing (NRC viol 50-390/86-21-01)
  - Strengthened post-1985 workplan review for Post Modification Testing

> Less complex systems - problems readily identifiable through system operation

PREOP TEST SYSTEMS NOT INCLUDED IN THE PRESTART TEST PROGRAM

AFTER FUEL LOAD TESTED SYSTEMS

005 Extraction Steam System
085 Control Rod Drive System
094 Incore Flux Detector System

PRESTART EXCEPTIONS

* 012 Auxiliary Boiler System
* 020 Central Lubricating Oil System
* 028 Water Treatment System
* 029 Potable Water Distribution System
* 038 Insulating Oil System
* 040 Station Drainage System
* 044 Building Heating System
* 200 161/6.9kV Common Power System
* 201 6.9kV Unit Power System
* 205 480V Turbine Building Common Power System
* 206 480V Auxiliary Building Common Power System
* 221 480V Service Building Power System
* 226 Intake Pump Station Power System
* 233 Yard Lighting System
* 238 120V AC Preferred Power System
* 239 250V DC Power System
* 241 120V AC Computer Power System
* 245 500kV Switchyard Equipment and Cable Tunnel Cable Trays System
* 248 Electrical Control and Recording Instrument System
* 261 Plant Process Computer System
* 270 Turbine Building Cranes and Miscellaneous

027 Condenser Circulating Water System
035 Generator Cooling System
036 Feedwater Secondary Treatment System
059 Demineralized Water and Cask Decontamination System
202 6.9kV Reactor Coolant Pump Power System
203 480V Unit Power System
225 Condenser Circulating Water Pumping Station Power System
244 24kV Power System (Includes Main Transformers)
263 Status Monitoring Computer System
264 Technical Support Center

SYSTEM COUNT

87 Preop Test Systems
53 Prestart Test Systems
34 Excepted Systems (21 in service *)

FOR SYSTEMS INCLUDED IN THE PRESTART TEST PROGRAM, IT WILL BE DEMONSTRATED

- Plant equipment and systems are capable of performing design requirements
- Plant equipment that has been modified has been adeqately tested
- Any plant equipment performance degredation will be identified and resolved
- Operating organizations are knowledgable of plant equipment and procedures

THE TESTING IS SCHEDULED TO PROVIDE NECESSARY CONFIDENCE TO LOAD FUEL

- Design functions requiring testing are identified through revised Scoping Documents (DBVP)
- Required modification and construction work completed after design completion
- Testing conducted following system completion milestones

LESSONS LEARNED FROM SEQUOYAH'S RESTART TEST PROGRAM

- NE provides design function requirements and acceptance criteria
- System review to develop Function Test Matrix
- Review of program contents and deliverables by Joint Test Group
- Develops system oriented packages of test results
- Identification of System Interfaces

ADDITIONS INCORPORATED DUE TO WATTS BAR'S STATUS

> Functions will be tested after Function Test Matrix approval by JTG

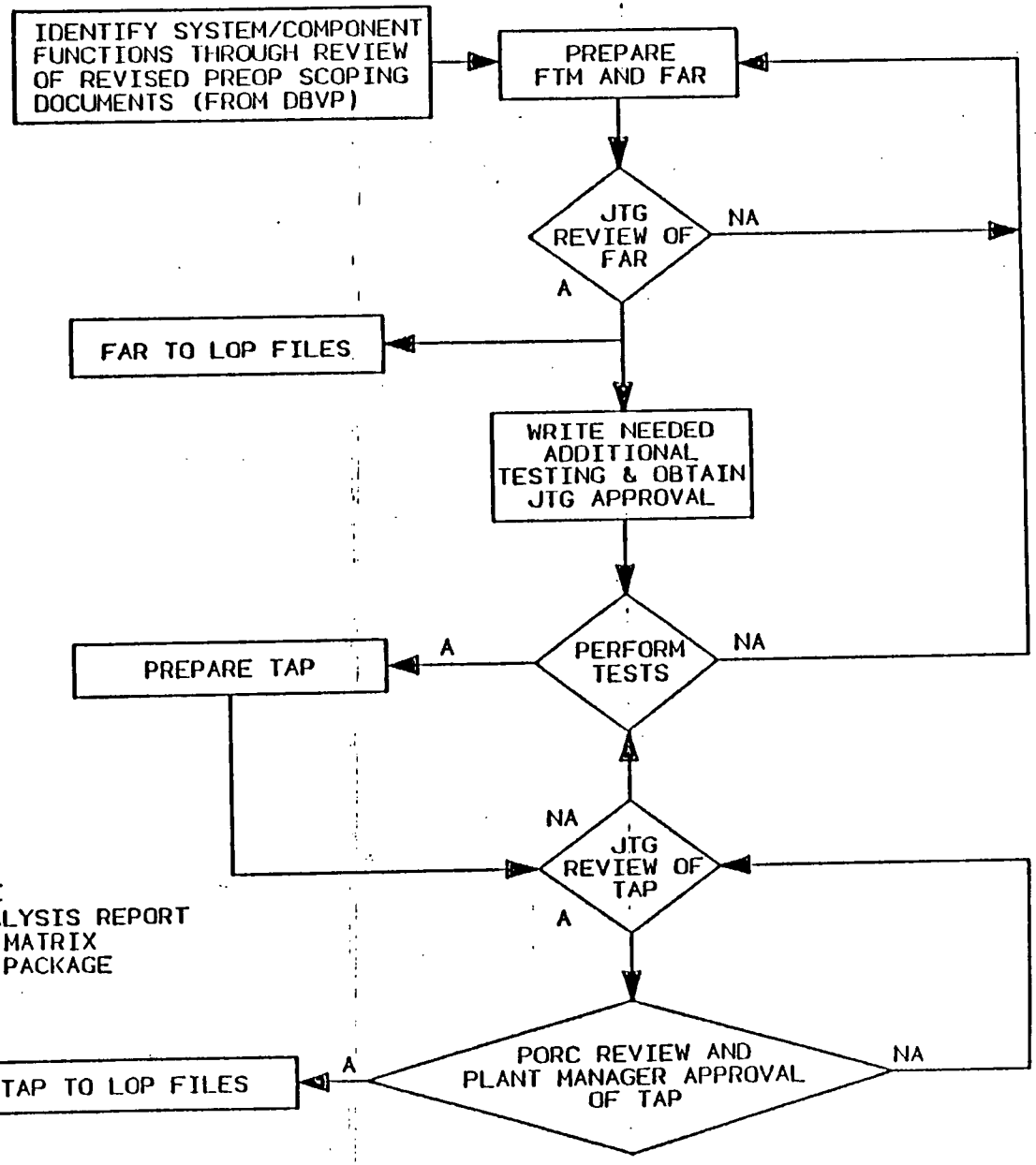
> System construction completion verification will be procedurally controlled

> The program will meet the requirements of Reg. Guide 1.68 (Nov 1973) with identified exceptions

> Will test all functions for those systems included in the Prestart Test Program

PRESTART TEST PROGRAM

FLOW CHART



NOTE: A = ACCEPTABLE
NA = NOT ACCEPTABLE
FAR = FUNCTIONAL ANALYSIS REPORT
FTM = FUNCTION TEST MATRIX
TAP = TEST ANALYSIS PACKAGE

PROGRAM GENERATED DOCUMENTATION

> Function Test Matrix (FTM)
  - Identifies each function
  - Cross references each function with its required test or tests

> Function Analysis Report (FAR)
  - Overall analysis of component & system functions
  - Establishes scope of testing
  - Presents rationale and conclusions of reviews
  - Presents FTM
  - Presents Interface Report

> Test Analysis Package (TAP)
  - Describes testing conducted
  - Describes any significant problems or concerns encountered during testing
  - Presents any recommendations to enhance system operability, maintainability or testability
  - Includes completed FTM
  - Includes test results and reviews referenced in the completed FTM

JOINT TEST GROUP

Membership

> Chairman
  Appointed by Site Director

> Members' organizations
  QA
  Operations
  Technical Support
  Nuclear Engineering
  NSSS vendor (Westinghouse)

Responsibilities

> JTG will provide an overall review of the program to ensure
  - The results of other programs that affect testing are adequately addressed
  - The scope and depth of the program are acceptable
  - Test instructions are developed as required
  - The performance results of the tests are acceptable
  - Each FAR and TAP is prepared in accordance with program procedures/instructions and adequately supports the program objectives

THE PRESTART TEST PROGRAM IS A COMPREHENSIVE PROGRAM

> NE identifies functions to be tested
  Includes:
  Integrated Systems
  System
  Component

> Each function is cross referenced to a test in a Function Test Matrix. (If practical, testing is to be consolidated in a single instruction)

> Testing to be conducted by:
  - Utilizing existing test instructions as written

  - Modifying existing test instructions for program

  - Preparing tests for program under existing administrative program (TIs)

> All test program instructions and results are reviewed and approved by a Joint Test Group

> Test requirements and results are reviewed and maintained in a system package

WATTS BAR NUCLEAR PLANT UNIT ONE
PRESTART TEST PROGRAM
FUNCTION TEST MATRIX

FUNCTION ID NO. MAJOR COMP OR MAJOR FUNCTION INITIATING DEVICE INITIATING CONDITION	ACTUATED DEVICE FUNCTION DESCRIPTION	FSAR SECTION SYS DESCRIPTION TECH SPEC SECTION OTHER	FUNCTION TEST NUMBERS * -IC OR REVISION REQUIRED	P2 ACTIVITY NUMBER
70-117 AUTO RESPONSE 2-LS-70-63A/B, 63CA 75 IN DECR LOW SURGE TANK LEVEL	2-LCV-70-63 OPENS ON LOW SURGE TANK LEVEL TRAIN A	9.2.2.7.3 N3-70-4002 R1 45N600-70 R3	TI-XXX	
70-118 AUTO RESPONSE 0, 1, 2-RM-90-123 HIGH RAD @ CCS HX DISCHARGE	1-FCV-70-66 VALVE CLOSES TO ISOLATE SURGE TANK A	9.2.2.2 N3-70-4002 R1 45N600-70 R3	TI-XXX	
70-119 AUTO RESPONSE 0, 1, 2-RM-90-123 HIGH RAD @ CCS HX DISCHARGE	2-FCV-70-66 VALVE CLOSES TO ISOLATE SURGE TANK B	9.2.2.2 N3-70-4002 R1 45N600-70 R3	TI-XXX	
70-120 AUTO RESPONSE 1-FDS-70-81B 5 GPM INCR HIGH DIFFERENTIAL FLOW	1-FCV-70-87 VALVE CLOSES TO ISOLATE THERMAL BARRIER	9.2.2.3.6 N3-70-4002 R1 45W760-70-4 R11	TI-XXX	
70-121 AUTO RESPONSE 1-FDS-70-81E 5 GPM INCR HIGH DIFFERENTIAL FLOW	1-FCV-70-90 VALVE CLOSES TO ISOLATE THERMAL BARRIER	9.2.2.3.6 N3-70-4002 R1 45W760-70-4 R11	TI-XXX	
70-122 AUTO RESPONSE 1-FDS-70-81E 5 GPM INCR HIGH DIFFERENTIAL FLOW	1-FCV-70-133 VALVE CLOSES TO ISOLATE THERMAL BARRIER	9.2.2.3.6 N3-70-4002 R1 45W760-70-5 R10	TI-XXX	

WATTS BAR NUCLEAR PLANT UNIT ONE
PRESTART TEST PROGRAM
FUNCTION TEST MATRIX

FUNCTION ID NO. MAJOR COMP OR MAJOR FUNCTION INITIATING DEVICE INITIATING CONDITION	ACTUATED DEVICE FUNCTION DESCRIPTION	FSAR SECTION SYS DESCRIPTION TECH SPEC SECTION OTHER	FUNCTION TEST NUMBERS * -IC OR REVISION REQUIRED	P2 ACTIVITY NUMBER
70-203 AUTO RESPONSE SI RELAY K-608 (1-R-48) SAFETY INJECTION	CCS PUMP 1A-A PUMP STARTS UPON RECEIPT OF A U1 SI AND REMAINS ON WHEN SI SIGNAL IS RESET	9.2.2.9 N3-70-4002 R1 45W760-70-1 R9	SI-K608A	
70-204 AUTO RESPONSE SI RELAY K-608 (2-R-48) SAFETY INJECTION	CCS PUMP 2A-A PUMP STARTS UPON RECEIPT OF A U2 SI AND REMAINS ON WHEN SE SIGNAL IS RESET	9.2.2.9 N3-70-4002 R1 45W760-70-1 R9	SI-K608A	
70-205 AUTO RESPONSE SI RELAY K-608 (2-R-48) SAFETY INJECTION	CCS PUMP C-S TRAIN A U1 PUMP STARTS UPON RECEIPT OF A U1 SI AND REMAINS ON WHEN SE SIGNAL IS RESET	9.2.2.9 N3-70-4002 R1 45W760-70-2 R9	SI-K608A	
70-206 AUTO RESPONSE SI RELAY K-608 (2-R-51) SAFETY INJECTION	CCS PUMP C-S TRAIN B U2 PUMP STARTS UPON RECEIPT OF A U2 SI AND REMAINS ON WHEN SE SIGNAL IS RESET	9.2.2.9 N3-70-4002 R1 45W760-70-2 R9	SI-K608B	
70-207 AUTO RESPONSE SI RELAY K-608 (1-R-51) SAFETY INJECTION	CCS PUMP 1B-B PUMP STARTS UPON RECEIPT OF A U1 SI AND REMAINS ON WHEN SE SIGNAL IS RESET	9.2.2.9 N3-70-4002 R1 45W760-70-1 R9	SI-K608B	
70-208 AUTO RESPONSE SI RELAY K-608 (2-R-51) SAFETY INJECTION	CCS PUMP 2B-B PUMP STARTS UPON RECEIPT OF A U2 SI AND REMAINS ON WHEN SE SIGNAL IS RESET	9.2.2.9 N3-70-4002 R1 45W760-70-1 R9	SI-K608B	
70-209 AUTO RESPONSE LOSS OF OFF SITE POWER	CCS PUMP 1A-A PUMP STARTS UPON LOSS OF OFF SITE POWER	9.2.2.9 N3-70-4002 R1 45W760-70-1 R9	SI-8.10	
70-210 AUTO RESPONSE LOSS OF OFF SITE POWER	CCS PUMP 2A-A PUMP STARTS UPON LOSS OF OFF SITE POWER	9.2.2.9 N3-70-4002 R1 45W760-70-1 R9	SI-8.12	
70-211 AUTO RESPONSE LOSS OF OFF SITE POWER	CCS PUMP C-S PUMP STARTS UPON LOSS OF OFF SITE POWER	9.2.2.9 N3-70-4002 R1 45W760-70-2 R9	SI-8.10 SI-8.13	

INTEGRATED SYSTEM TESTING

In addition to the component and system testing, the following major tests which involve integrated system testing (testing which involves operation of several system together) are included:

- Integrated Engineered Safety Features (ESF) Actuation. Involves:
  - All ESF systems
  - Reactor Protection System
  - Class 1E power systems
  - Supporting systems

- Onsite Load Shedding & Load Sequencing Logic. Involves:
  - All ESF systems
  - Reactor Protection System
  - Class 1E power systems
  - Emergency diesel generators
  - Supporting Systems

INTEGRATED SYSTEM TESTING
(continued)

- Hot Functional Testing. Involves:
  - Reactor Coolant System
  - Chemical and Volume Control System
  - Main Steam System
  - Main and Auxiliary Feedwater System
  - Ultimate Heat Sink
  - Supporting systems

PRESTART TEST PROGRAM
SELF ASSESSMENT

- Inline review by Systems Engineering
- JTG review & approval
- PORC review
- Plant Manager approval
- Verification of critical alignments and data

QUALITY ASSURANCE ORGANIZATION INVOLVEMENT

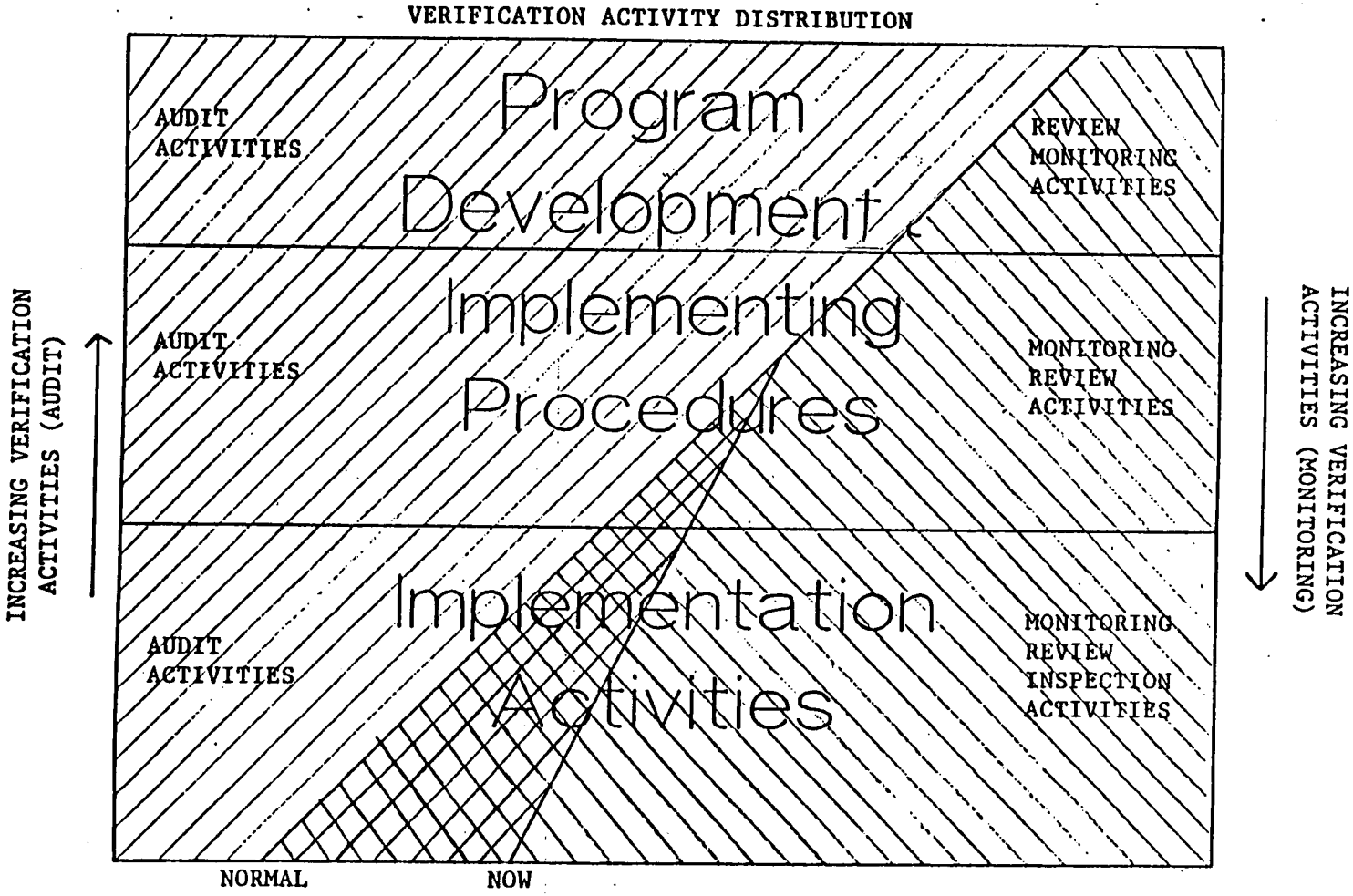
J. P. Mulkey
Watts Bar Site Quality Assurance

PRESTART TEST PROGRAM
QUALITY VERIFICATION

> Objective
- Independent verification

> Scope
- Quality affecting activities
- All organizations

> Methods
- Review
- Audit
- Monitoring Test Performance (Real Time)



- AUDIT ACTIVITIES TYPICALLY CONCENTRATE ON PROGRAM DEVELOPMENT
- MONITORING ACTIVITIES TYPICALLY CONCENTRATE ON IMPLEMENTATION ACTIVITIES
- VERIFICATION OVERLAP

PRESTART TEST PROGRAM
QUALITY VERIFICATION

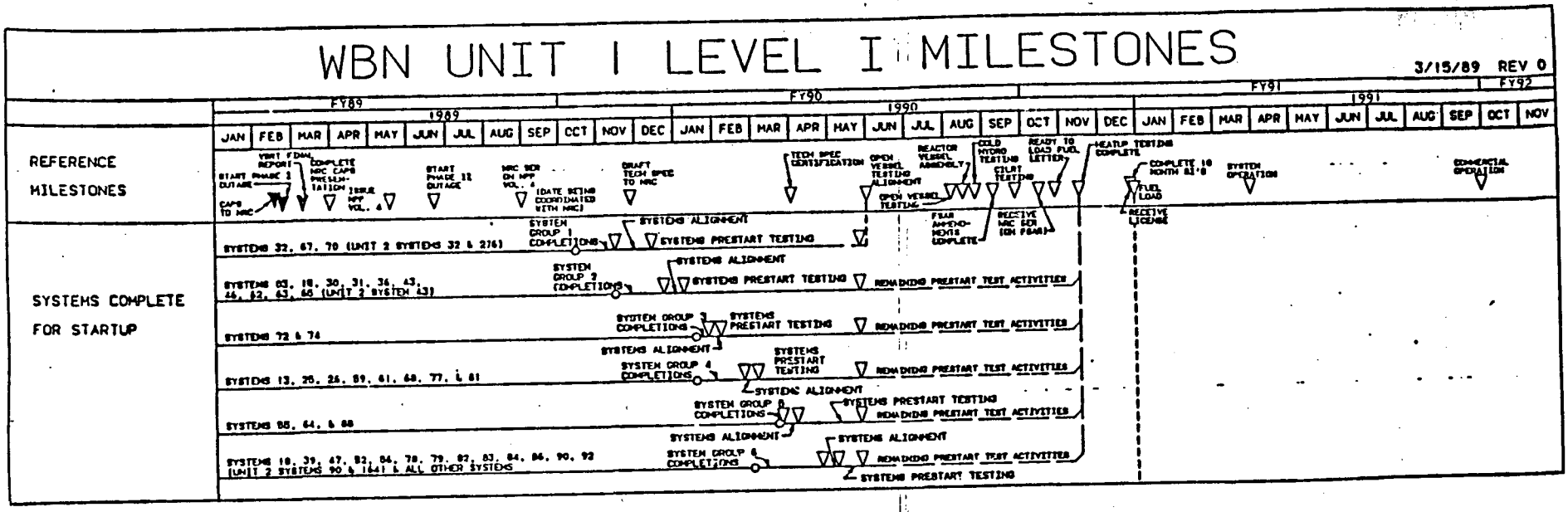
Line Organization	Quality Organization
Program Development Procedures	Reviews for approval
Scoping Document	Monitors and audits
Program Implementing Procedures	Reviews for approval
FAR and FTM	Monitors and audits
SIs and TIs	Reviews for approval
Test Results	Monitors and audits

CONCLUSIONS

R. A. PEDDE
Watts Bar Site Director

WBN UNIT 1 LEVEL I MILESTONES

3/15/89 REV 0



CONCLUSIONS

- Reg Guide 1.68 requirements (with identified exceptions) satisfied through the Prestart Test Program
- Plant equipment and systems are capable of performing design requirements
- Plant equipment that has been modified has been adeqately tested
- Any plant equipment performance degredation has been identified and resolved
- Operating organizations are knowledgable of plant equipment and procedures
- Quality is ensured through QA's active involvement in the Prestart Test Program

WBN UNIT 1 LEVEL I MILESTONES

3/15/89 REV

FY89 | FY90 | FY91 | FY92

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV

REFERENCE MILESTONES

SYSTEMS COMPLETE FOR STARTUP

CAPS/MAJOR ISSUES

DESIGN BASIS & LICENSING VERIFICATION

CALCULATIONS

CONTAINMENT ISOLATION

CONDUIT SUPPORTS

HANGER ANALYSIS AND UPGRADE PROGRAM (HAAUP)

CONTAINMENT COOLING

CABLE & RACEWAY ISSUES

INSTRUMENT PROJECT

PIECE PARTS

EQUIPMENT SEISMIC QUALIFICATION

WELDING PROJECT/WELD EVALUATION

QA RECORDS

Q LIST

CONTROL ROOM DESIGN REVIEW

MECHANICAL ISSUES

NUCLEAR ISSUES

SECURITY UPGRADE

CRITICAL PATH/ SYSTEMS GROUP OUTAGES/SI'S & FUEL LOAD

NON-PROJECT INSPECTIONS/AUDITS, REP & NRC ACTIVITIES

NOTE: WBN LICENSING IS CURRENTLY WORKING WITH THE NRC ON SUPPORTING LICENSING ISSUES AND AT THIS TIME HAS NOT RECEIVED THE NRC'S INSPECTION PLAN. ALSO, THE DEP FOR WBN IS TO BE DEVELOPED LATER.

WBN M19003.0.0.0 JAN