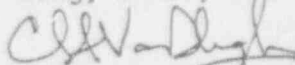


U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-528/93-50, 50-529/93-50, and 50-530/93-50  
Docket Nos. 50-528, 50-529, and 50-530  
License Nos. NPF-41, NPF-51, and NPF-74  
Licensee Arizona Public Service Company  
P. O. Box 53999, Station 9082  
Phoenix, AZ 85072-3999  
Facility Name Palo Verde Nuclear Generating Station  
Units 1, 2, and 3  
Meeting Conducted November 15, 1993  
Meeting Location NRC Region V Office, Walnut Creek, CA  
Prepared By H. J. Wong, Chief, Reactor Projects Section II  
Approved By   
C. A. VanDenburgh, Chief  
Reactor Projects Branch  
12/2/93  
Date Signed

Summary:

A management meeting was held on November 15, 1993, to discuss the status and schedule of the emergency operating procedure rewrite program, and the assessment of recent operator performance issues (i.e., operator examination failures and a reactor coolant system draindown event in Unit 1). The meeting agenda and a copy of the slides used during the licensee's presentation are enclosed.

## DETAILS

### 1. Meeting Attendees

#### Arizona Public Service Company (APS)

J. Levine, Vice President, Nuclear Production  
W. Ide, Unit 1 Plant Manager  
R. Gouge, Director, Plant Support  
E. Firth, General Manager, Nuclear Training  
J. Dennis, Manager, Operations Standards  
M. Baughman, Supervisor, Requalification Training  
L. Florence, EOP Coordinator  
P. Wiley, Unit 2 Operations Manager  
R. McKinney, Unit 1 Operations Supervisor  
B. Grabo, Supervisor, Nuclear Regulatory Affairs  
P. Coffin, Nuclear Regulatory Affairs

#### NRC

B. Faulkenberry, Regional Administrator  
K. Perkins, Director, Division of Reactor Safety and Projects  
S. Richards, Deputy Director, Division of Reactor Safety and Projects  
L. Miller, Chief, Reactor Safety Branch  
H. Wong, Chief, Reactor Projects Section II  
J. Sloan, Senior Resident Inspector  
G. Johnston, License Examiner  
K. Johnston, Project Inspector  
L. Tran, Project Manager, NRR  
D. Lange, Acting Chief, Human Factors Branch, NRR

### 2. Meeting Summary

#### A. Opening Remarks

Mr. Faulkenberry provided introductions and opening comments for the meeting and stated that the issues to be discussed in the meeting were significant in emphasizing to APS management the need for improvement in the areas of operator performance and attention-to-detail. Mr. Perkins added that he saw three principle areas which contributed to operator performance: (1) training, (2) procedures, and (3) attitudes and expectations, and noted that all three areas had to be addressed for overall improvement. Mr. Levine acknowledged the comments and stated that the discussions during the meeting would cover these areas.

#### B. Operations Program Overview

Mr. Gouge provided a summary of the developmental history of the emergency operating procedures (EOPs) and responded to comments in a recent NRC inspection report which identified weaknesses in the EOPs and in the APS oversight of the EOP revision process. He acknowledged that he was responsible for assuring the consistency of the operations program and was also the interface for operations.

Mr. Gouge described that earlier EOPs had weaknesses in the "human factors" area and that APS obtained a consultant to address the issue. However, this effort resulted in detailed EOPs which could handle almost all situations, but were complex to use. Mr. Gouge acknowledged that the current EOPs were very operator training intensive and were too detailed to be easily used by operators. He also noted that in February 1993, APS identified the need to improve the EOPs and noted that the NRC had made similar comments.

Mr. Dennis described the APS actions which had been underway and those planned to rewrite the EOPs. He noted that a steering committee had been established previously to guide the development of the EOPs and to review the EOPs of other Combustion Engineering (CE) facilities. The steering group recommendations to APS senior management were to: adopt the standard CE format (CEN 152), establish a procedure philosophy which placed greater reliance on operator knowledge, train operators on the tasks in the EOPs, and maintain just a few simple rules for EOP use. In essence, the new EOPs would be less detailed and use more operator knowledge to handle events.

Mr. Florence described the current EOP rewrite schedule which consisted of four phases: preparation, development of the procedure framework, development of the procedures, and final review and training. Mr. Florence stated that the phases would be continuous such that procedures could be in any of the phases at any one time and would avoid the production and review of procedures in blocks. The projected timeline showed completion of rewriting all EOPs and training by August 1995. Possible NRC inspection points were discussed: March 1994 for review of the APS procedure framework, late April 1994 for review of post trip actions, September 1994 for review of recovery procedures, April 1995 for overall EOP rewrite review, and September 1995 for an EOP inspection.

#### C. Training Program

Mr. Firth reviewed the history of the Palo Verde operator training program and the results of NRC-licensed operator examinations since 1991. Mr. Perkins noted the APS assessment of the examination failures included instances of operator inattention-to-detail, which was common to the reactor coolant system draindown event to be discussed later.

Mr. Firth also highlighted some of the enhancements in the operator training program based on their assessment. He noted that improvements in training were made to emphasize teamwork and communication and also to formally incorporate job performance measures (JPM) training into the training program. Also, with the recent addition of the second simulator, more simulator time would be available to support training. Mr. Wiley noted that operator crews were recently observed to be more forthright in directing their training to best suit their needs and indicated that

operations managers and supervisors were evaluating crew and individual performance to better communicate management expectations. APS management expressed a desire to further discuss the most recent initial operator examinations with the Region V staff in the next few weeks. Mr. Perkins stated that the NRC was interested in understanding any licensee comments regarding the examinations and directed the regional staff to contact APS personnel to set up these discussions.

D. Unit 1 Reactor Coolant System Draindown Event

Mr. McKinney described the details pertaining to the Unit 1 reactor coolant system (RCS) draindown event which occurred on November 3, 1993. Mr. McKinney described the plant initial conditions and background of the evolution. The reactor operator was attempting to maintain the RCS level at just below the reactor vessel flange to minimize the differential pressure across the installed steam generator nozzle dams. The operator lowered RCS level by having a portion of the shutdown cooling flow go to the refueling water tank. Because in-leakage to the RCS had been occurring due to a leaking valve from the refueling water tank to the shutdown cooling system, the reactor operator had performed the draindown evolution nine times in his last two shifts. The evolution normally takes about two minutes.

Mr. McKinney described that after beginning the draindown evolution, the reactor operator was distracted by other activities in the control room and took actions to secure the draindown only after a second reactor operator noted a decreasing RCS level (eight minutes after the evolution was started). RCS level was then raised to its normal band just below the reactor vessel flange.

Mr. Ide summarized the licensee's corrective actions. Subsequent to the event, the licensee removed the control room crew from duty to participate in the investigation, provided specific directions on the control of RCS inventory, briefed control room staff on the event, moved trend recorders for RCS level closer to where the valve controller was located on the control panel, and conducted high intensity training for the crew involved in the event to emphasize communications and teamwork.

Mr. Ide stated that APS' conclusions on the causes of the event were: the operator lost safety sensitivity to the evolution because he had performed the operation several times, communications in the control room were inadequate, and shift management had not been successful in maintaining adequate communications.

Mr. Levine reemphasized that APS management considered this event to be significant and that broad actions were being taken to resolve the issues identified. Mr. Faulkenberry stated that the event caused the NRC significant concern particularly regarding operator control of activities.

E. Closing Remarks

Mr. Faulkenberry added that the weaknesses evident in the operator examination failures, the weaknesses in the EOPs, and weaknesses evident in RCS draindown event should not be occurring at this stage of Palo Verde operations. He added that the NRC was concerned that operations management had not been paying sufficient attention to crew and operator performance, and that operators not paying attention to detail is a highly significant issue.

Mr. Levine acknowledged the comments and stated that comprehensive corrective actions had been taken to address the issues, including emphasis on operator knowledge, moving standards personnel closer to those that use the procedures, and emphasizing accountability.

The meeting was then concluded.

**APS/NRC STATUS MEETING**

**NOVEMBER 15, 1993**



# APS/NRC STATUS MEETING

NOVEMBER 15, 1993

## AGENDA

- |      |  |                |
|------|--|----------------|
| I.   | OPENING REMARKS                                    | J. M. LEVINE   |
| II.  | OPERATIONS PROGRAM OVERVIEW                        |                |
|      | • INTRODUCTION                                     | R. E. GOUGE    |
|      | • EOP REWRITE PROJECT                              |                |
|      | - BACKGROUND                                       | J. W. DENNIS   |
|      | - ACTION PLAN AND SCHEDULE                         | L. A. FLORENCE |
| III. | TRAINING PROGRAM                                   | E. G. FIRTH    |
|      | • 1992-1993 ENHANCEMENTS                           |                |
|      | • APS EVALUATION OF<br>INITIAL LICENSE EXAMINATION |                |
| IV.  | UNIT 1 INVENTORY CONTROL                           |                |
|      | • EVALUATION                                       | R. S. MCKINNEY |
|      | • CORRECTIVE ACTION                                | W. E. IDE      |
| V.   | CLOSING REMARKS                                    | J. M. LEVINE   |

# OPERATIONS PROGRAM OVERVIEW

- INTRODUCTION
- EOP REWRITE PROJECT
  - BACKGROUND
  - ACTION PLAN AND SCHEDULE



# OPERATIONS PROGRAM OVERVIEW

## INTRODUCTION

- PROGRAM CONTENT
- SINGLE POINT OF ACCOUNTABILITY

# EMERGENCY OPERATING PROCEDURES (EOP) REWRITE PROJECT

## BACKGROUND

- UPGRADED EOPs IMPLEMENTED - AUGUST 1992
- NEED TO SIMPLIFY EOPs IDENTIFIED - FEBRUARY 1993
  - EOPs COMPLEX AND LENGTHY
  - CHANGE TO CEN-152 FORMAT
  - NO CHANGE IN TECHNICAL GUIDELINES OR STRATEGY
- EOP IMPROVEMENT SCOPE AND SCHEDULE APPROVED
  - PHASE 1:      CONVERT DLT TO DFC; MODIFY SPTAs -  
   OCTOBER 1993
  - PHASE 2:      REWRITE FRP; CONVERT ACTIONS AND  
   DETAILS TO INSTRUCTIONS AND  
   CONTINGENCIES - SEPTEMBER 1994
- NRC REQUALIFICATION PROGRAM INSPECTION - AUGUST 1993
  - EOPs ADEQUATE; OPERATORS CONTINUE TO HAVE  
   DIFFICULTY IMPLEMENTING
  - OPERATIONS/OPERATIONS STANDARDS DECISION-MAKING  
   PERSONNEL HAVE LIMITED EXPOSURE TO OTHER CE  
   FACILITIES' EOPs

## BACKGROUND (CONT'D)

- EOP STEERING COMMITTEE (EOPSC) ESTABLISHED

- CHARTER

- STUDY OTHER CE FACILITIES' EOP PROGRAMS
    - PROVIDE DIRECTION FOR CURRENT EOPs

- MEMBERSHIP (CROSS-SECTION MANAGEMENT/FRONTLINE PERSONNEL)

- OPERATIONS:

- OPERATIONS SUPERVISOR
      - SHIFT SUPERVISOR
      - REACTOR OPERATOR

- TRAINING:

- TRAINING SUPERVISOR
      - INSTRUCTOR

- ENGINEERING:

- SHIFT TECHNICAL ADVISOR

- OPERATIONS STANDARDS:

- OPERATIONS STANDARDS MANAGER (CHAIRMAN)
      - EOP COORDINATOR

- BENEFITS

- DEFINES EOP ACCOUNTABILITY

- PROVIDES CLEAR METHOD FOR EOP PROBLEM RESOLUTION

- FOSTERS TIMELY DECISIONS

- INCREASES CREDIBILITY WITH USERS

## BACKGROUND (CONT'D)

- EOPSC REVIEWED ONGOING AND PLANNED EOP CHANGES
  - PHASE 1 AND PHASE 2 FORMAT CHANGES PUT ON HOLD
  - EOP CHANGES TO IMPROVE TECHNICAL QUALITY TO CONTINUE

EOP REVISION IMPLEMENTED OCTOBER 29, 1993  
REVISION OF EPTGs TO BE COMPLETED BY  
DECEMBER 30, 1993

- EOPSC STUDIED EOP PROGRAMS AT 5 PLANTS
  - SUCCESSFUL EOPS DEFINED AS:
    - CLOSELY FOLLOW CEN-152
    - SIMPLE TO USE
    - TECHNICALLY ACCURATE
    - USERS ACCEPTANCE AND CONFIDENCE
    - ABSENCE OF EOP ISSUES WITH REGULATORS AND  
OVERSIGHT ORGANIZATIONS
    - PROVEN ABILITY TO MITIGATE ACTUAL EVENTS
  - FACILITIES OBSERVED
    - FORT CALHOUN
    - ANO-2
    - CALVERT CLIFFS
    - MAINE YANKEE
    - DIABLO CANYON

## BACKGROUND (CONT'D)

- OVERALL CONCLUSION

SUCCESSFUL EOPs HAVE FORMAT CLOSE TO GENERIC GUIDELINES AND PHILOSOPHY OF USE THAT EMPHASIZES OPERATOR KNOWLEDGE.

- RECOMMENDATIONS PRESENTED TO SENIOR MANAGEMENT

ADOPT CEN-152 FORMAT, INCLUDING SPTA IMPLEMENTATION

ESTABLISH NEW PROCEDURE PHILOSOPHY WHICH PLACES GREATER RELIANCE ON OPERATOR KNOWLEDGE

TRAIN OPERATORS ON TASKS IDENTIFIED IN EOPs

KEEP TO A FEW SIMPLE RULES FOR USE

- EOP REWRITE SCHEDULE DEVELOPED INCORPORATING LESSONS LEARNED FROM EOP UPGRADE

## EOP REWRITE PROJECT TASKS

- TRAIN WRITERS AND REVIEWERS ON CEN-152
- DETERMINE PLANT SPECIFIC STRATEGIES AND CHOOSE METHOD TO IMPLEMENT THE CEN-152 FORMAT
- DEVELOP DETAILED FORMAT AND RULES FOR USE BASED UPON SUCCESSFUL CEN-152 PLANTS
- WRITE THE PROCEDURES AND PERFORM DEVELOPMENTAL VALIDATION
- VERIFY THE PROCEDURES
  - INTERNAL REVIEWS
  - OUTSIDE REVIEWS
- VALIDATE THE COMPLETE SET OF PROCEDURES
- PERFORM FINAL REVIEWS
- TRAIN THE USERS WITH TWICE THE SIMULATOR CONTACT HOURS AS PRIOR EOP REVISIONS
  - MAINTAIN USER PROFICIENCY ON CURRENT EOP'S
- CONDUCT AN OUTSIDE ASSESSMENT OF THE REWRITE AS IT PROGRESSES



## EOP REWRITE RESOURCES

- WRITING TEAM
  - OPERATIONS SHIFT SUPERVISOR
  - SENIOR TRAINING INSTRUCTOR (NON-PVNGS SRO)
  - SAFETY ANALYSIS ENGINEER
  - OPERATIONS STANDARDS PROCEDURE WRITER
- DEVELOPMENTAL VALIDATION PARTICIPANTS
- INTERNAL REVIEW TEAM
- INTERNAL OVERSIGHT TEAM
- OUTSIDE TECHNICAL REVIEWER
- OUTSIDE HUMAN FACTORS REVIEWER
  - WRITER'S GUIDE REVIEW
  - DEVELOPMENTAL VALIDATION OBSERVATION
  - PROCEDURE REVIEW
- OUTSIDE PROJECT REVIEWER (DESIGNATED SKEPTIC)

## EOP REWRITE MILESTONES

- PHASE 1 - PREPARE TO WRITE

- CEN-152 TRAINING
- PROCEDURE FORMAT AND STRATEGIES DIRECTION  
DETERMINED BY EOP STEERING COMMITTEE

START: 11/29/93  
FINISH: 12/31/93

- PHASE 2 - DEVELOP FRAMEWORK

- DEVELOP WRITER'S GUIDE
- DEVELOP PROCEDURE TEMPLATE

START: 01/03/94  
FINISH: 02/27/94

## EOP REWRITE MILESTONES (CONT'D)

### ● PHASE 3 - DEVELOP PROCEDURES

- WRITE PROCEDURES AND PERFORM DEVELOPMENTAL VALIDATION
- VERIFY PROCEDURES

START: 02/28/94  
FINISH: 03/06/95

### ● PHASE 4 - FINAL REVIEWS AND TRAINING

- VALIDATE THE COMPLETE PROCEDURE SET
- WRITERS AND QUALITY SYSTEMS PERFORM FINAL REVIEWS
- APPROVE PROCEDURES
- TRAINING PRESENTED DURING TWO WEEKS OF REQUALIFICATION TRAINING

START: 03/07/95  
FINISH: 08/24/95

# EOP Rewrite - Overall Schedule

ID	Name	Scheduled Start	Scheduled Finish	1994												1995												
				N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
1	PREPARE TO WRITE	11/29/93	12/31/93																									
2	DEVELOP FRAMEWORK	1/3/94	2/27/94																									
3	DEVELOP PROCEDURES	2/28/94	3/6/95																									
4	VALIDATION & FINAL REVIEW	3/7/95	5/30/95																									
5	APPROVAL	5/31/95	5/31/95																									
6	TRAINING	6/1/95	8/24/95																									
7	PROCEDURES EFFECTIVE	8/25/95	8/25/95																									
8																												
9	PRELIMINARY ASSESSMENT	2/22/94	3/7/94																									
12	FIRST INSPECTION WINDOW	3/8/94	4/18/94																									
13																												
14	POST TRIP ACTIONS ASSESSMENT	4/6/94	4/19/94																									
17	SECOND INSPECTION WINDOW	4/20/94	5/31/94																									
18																												
19	RECOVERY PROCEDURE ASSESSMEN	8/29/94	9/9/94																									
22	THIRD INSPECTION WINDOW	9/12/94	10/21/94																									
23																												
24	FINAL ASSESSMENT	3/27/95	4/7/95																									
27	FOURTH INSPECTION WINDOW	4/10/95	5/19/95																									
28																												
29	EOP INSPECTION WINDOW	9/11/95	10/27/95																									

# TRAINING PROGRAM

- HISTORY
- 1992-1993 ENHANCEMENTS
- APS EVALUATION OF INITIAL LICENSE EXAMINATION
  - APS EVALUATION OF JPM EXAMINATION
  - APS EVALUATION OF SIMULATOR EXAMINATION
  - APS EVALUATION OF WRITTEN EXAMINATION
  - INITIAL/REQUALIFICATION EXAM COMPARISON
  - SUMMARY OF PLANNED CHANGES
  - APS CONCERNS NEEDING FURTHER DISCUSSION

# TRAINING PROGRAM

## HISTORY

- 1991 RESULTS
  - 16 OF 18 ROs PASSED
  - 2 ROs FAILED SIMULATOR
- 1992 RESULTS
  - 3 OUT OF 3 SROs PASSED
  - 13 OUT OF 14 ROs PASSED
  - 1 RO FAILED WRITTEN
- 1993 RESULTS
  - 2 OUT OF 5 SROs PASSED
  - 2 SROs FAILED SIMULATOR
  - 1 SRO FAILED SIMULATOR AND WRITTEN
  - 9 OUT OF 12 ROs PASSED
  - 2 ROs FAILED JPMs
  - 1 RO FAILED SIMULATOR AND JPMs



## 1992-1993 ENHANCEMENTS

- INITIAL AND REQUALIFICATION PROGRAMS
  - TEAMWORK AND COMMUNICATION TRAINING
  - JPM TRAINING INCORPORATED INTO PROGRAMS
- REQUALIFICATION PROGRAM
  - NUMBER OF SIMULATOR CONTACT HOURS INCREASED BY APPROXIMATELY 30% DURING THIS TRAINING YEAR
  - HIGH INTENSITY TRAINING PROVIDED TO ALL CREWS
  - INDUSTRY EVENTS NOW TESTED TO IMPROVE OPERATOR KNOWLEDGE RETENTION
  - WEEKLY SIMULATOR EVALUATIONS USING ANNUAL EXAMINATION FORMAT TO ASSESS PROGRAM EFFECTIVENESS
  - POST-SIMULATOR SCENARIO CRITIQUES STRENGTHENED BY REQUIRING SHIFT SUPERVISORS TO LEAD CRITIQUES

## 1992-1993 ENHANCEMENTS (CONT'D)

### ● INITIAL PROGRAM

- REQUALIFICATION EVALUATION SCENARIOS ADDED TO INCREASE COMPLEXITY
- REQUALIFICATION TRAINING INSTRUCTORS USED TO SHARE LESSONS LEARNED FROM REQUALIFICATION PROGRAM
- OUTSIDE EVALUATORS FROM REGION IV & V PLANTS USED TO ASSESS CANDIDATE READINESS
- OPERATIONS MANAGEMENT USED TO ASSESS CANDIDATE READINESS
- REVIEW SECTION ADDED TO SYSTEMS EXAMS TO IMPROVE OPERATOR KNOWLEDGE RETENTION

## APS EVALUATION OF JPM EXAMINATION

- ISSUE

- FAILURE OF JPM EXAMINATION BY 3 REACTOR OPERATORS

- CAUSES

- OPERATOR 1

INATTENTION TO DETAIL/INADEQUATE SELF-CHECKING  
(USED WRONG ANNUNCIATOR RESPONSE PROCEDURE, DATA  
ENTRY ERRORS)

- OPERATOR 2

INATTENTION TO DETAIL/INADEQUATE SELF-CHECKING

INADEQUATE KNOWLEDGE RETENTION AND USE OF  
RESOURCES (BYPASS PPS, SIT TECH SPEC, ECCS DESIGN  
CRITERIA)

TRAINING PROGRAM WEAKNESS IN AZ TILT CALCULATION  
KNOWLEDGE

- OPERATOR 3

INATTENTION TO DETAIL/INADEQUATE SELF-CHECKING

INADEQUATE KNOWLEDGE RETENTION (SBCS OPERATION)

TRAINING PROGRAM WEAKNESS IN AZ TILT CALCULATION  
KNOWLEDGE

## APS EVALUATION OF JPM EXAMINATION (CONT'D)

- JPM TRAINING
  - 32 HOURS PER CANDIDATE DEDICATED TO JPM TRAINING
- CORRECTIVE ACTIONS
  - CONTINUE TO STRESS SELF-CHECKING ON THE JOB AND IN BOTH INITIAL AND REQUALIFICATION TRAINING
  - CONDUCT JPM "TECHNIQUE" TRAINING IN INITIAL AND REQUALIFICATION TRAINING PROGRAMS
  - REVISE INITIAL TRAINING PROGRAM TO ENSURE AZ TILT CALCULATION IS EFFECTIVELY ADDRESSED

## APS EVALUATION OF SIMULATOR EXAMINATION

- ISSUE

- FAILURE OF SIMULATOR EXAMINATION BY 3 SRO'S AND 1 RO

- CAUSES

- SRO 1

INCORRECT ASSESSMENT OF PLANT CONDITIONS

- SRO 2

INABILITY TO PROVIDE APPROPRIATE DIRECTION TO USE AUXILIARY FEEDWATER TO FEED STEAM GENERATORS

FAILURE TO USE ACP WHICH LED TO FAILURE TO CALL LOAD DISPATCHER AND REVIEW TECHNICAL SPECIFICATION CONCERNS

- SRO 3

TRAINING'S ASSESSMENT IS THAT THE INDIVIDUAL PASSED EXAMINATION

- RO 1

POOR RECOGNITION OF MULTIPLE INSTRUMENT FAILURE IMPACT ON PPS

DIFFICULTY PERFORMING LEAK RATE CALCULATION AND BORATION SIMULTANEOUSLY

## APS EVALUATION OF SIMULATOR EXAMINATION (CONT'D)

- GENERIC CAUSES

- TRAINING PROGRAM WEAKNESSES REGARDING MULTIPLE INSTRUMENT FAILURE IMPACT ON PPS
- DIFFERENCES IN PERFORMANCE EXPECTATIONS BETWEEN TRAINING PROGRAM AND NRC

- CORRECTIVE ACTIONS

- REVISE INITIAL TRAINING PROGRAM TO ADDRESS:  
  
DETERMINATION OF RELEASE TO ATMOSPHERE  
(SIGNIFICANT SINGLE EVENT)  
  
OPERATION OF AUXILIARY FEEDWATER SYSTEM  
(SIGNIFICANT SINGLE EVENT)  
  
MITIGATION OF MULTIPLE EVENTS
- REVISE INITIAL AND REQUALIFICATION TRAINING PROGRAMS TO INCORPORATE RECOGNITION OF MULTIPLE INSTRUMENT FAILURES ON PPS
- IDENTIFY AND EVALUATE PERFORMANCE EXPECTATION DIFFERENCES AND INCORPORATE EXPECTATION CHANGES AS APPROPRIATE



## APS EVALUATION OF WRITTEN EXAMINATION

- ISSUE

- GENERIC WEAKNESSES IN THE FOLLOWING AREAS:
  - AUTOMATIC ACTIONS FOLLOWING AN AFAS SIGNAL
  - MODIFICATION TO UNIT 2 ADV CONTROLLERS
  - AUTOMATIC SEQUENCING TO 1-PBA-S03 FOLLOWING ENERGIZING FROM UNIT 3 DIESEL GENERATOR
  - ACTIONS ASSOCIATED WITH VCT LEVEL TRANSMITTER FAILURES
  - ESCORT REQUIREMENTS
  - PRESSURIZER PRESSURE CONTROL SYSTEM RESPONSE
  - CEDMCS REED SWITCH POSITION SIGNALS
  - RVLMS KNOWLEDGE
  - FEEDWATER CONTROL SYSTEM RESPONSE TO REACTOR TRIP OVERRIDE

- CAUSES

- INADEQUATE OPERATOR KNOWLEDGE RETENTION AND TRAINING REINFORCEMENT

- CORRECTIVE ACTIONS

- INCORPORATE EXPANDED TESTING INTO INITIAL PROGRAM TO MONITOR OPERATOR KNOWLEDGE RETENTION

## INITIAL/REQUALIFICATION EXAM COMPARISON

- WRITTEN EXAMS

- NO COMMON KNOWLEDGE OR SKILL WEAKNESSES

### INITIAL

AUTO ACTIONS FOR AFAS

RCP TRIP CRITERIA

ADV RSDP CONTROLLER  
LOGIC

RCP HOT/COLD  
START CRITERIA

86 LOCKOUT EFFECT  
ON ESFAS

### REQUALIFICATION

RSDP CONTROL OF PZR  
HEATERS

ESFAS RESET

ESFAS LOADING SEQUENCES  
DURING LOP

PZR HEATER CONTROL WITH  
SIAS/VITAL AUX  
RESTORATION

- CONCLUSION

- THREE YEAR HISTORY OF HIGH PASS RATE
- NO APPARENT CONNECTION BETWEEN WEAKNESSES IN  
INITIAL AND REQUALIFICATION EXAMINATIONS

## INITIAL/REQUALIFICATION EXAM COMPARISON (CONT'D)

### ● JOB PERFORMANCE MEASURES

- INATTENTION TO DETAIL/SELF-CHECKING IDENTIFIED AS GENERIC WEAKNESS

#### INITIAL

CEDM MG SET OPERATIONS

72ST-1RX03 PERFORMANCE

PPS BYPASS

ECCS RESTORATION  
AFTER LOCA

RECOGNITION OF AZ  
TILT OUT OF SPEC

CONTROL ROOM EVACUATION

#### REQUALIFICATION

EDG OPERATIONS

MODE 3 RCP START

CVCS OPERATION

EMERGENCY  
CLASSIFICATION

MANUAL STEAM GENERATOR  
FEEDWATER CONTROL

### ● CONCLUSIONS

- STRUCTURED JPM TRAINING NOT INCLUDED IN REQUALIFICATION PROGRAM HAD BEEN INCORPORATED IN INITIAL PROGRAM
- JPM "TECHNIQUE" TRAINING IN INITIAL AND REQUALIFICATION PROGRAMS

## INITIAL/REQUALIFICATION EXAM COMPARISON (CONT'D)

- SIMULATOR EXAM

- NO COMMON TASK WEAKNESSES

### INITIAL

EVENT DIAGNOSIS

RECOGNITION OF  
PPS FAILURES

RECOGNITION OF  
AFAS INITIATION

### REQUALIFICATION

FEED/STEAMING OF STEAM  
GENERATORS

ELECTRICAL PLANT AWARENESS

TIME TO PERFORM EOPS

- CONCLUSION

- ALTHOUGH NO SPECIFIC TASK TIES, IMPROVEMENTS  
NEEDED IN OVERALL CREW PERFORMANCE IN TEAM  
SKILLS, COMMUNICATIONS, AND EOP USE

## SUMMARY OF PLANNED CHANGES

### ● REQUALIFICATION PROGRAM

- SIMULATOR CONTACT HOURS TO BE INCREASED
- WEEKLY STATIC SIMULATOR EXAM TO BE ADDED
- REQUIRED READING FOR LICENSED OPERATORS
- JPM "TECHNIQUE" COURSE TO BE DEVELOPED

### ● INITIAL PROGRAM

- JPM "TECHNIQUE" COURSE TO BE DEVELOPED
- INSTRUCTORS TO SPEND TIME ON SHIFT TO OBSERVE PROCEDURAL ADHERENCE/SELF-CHECKING/JPM PERFORMANCE
- MULTIPLE EVENT/INSTRUMENT FAILURE SCENARIOS TO BE DEVELOPED AND IMPLEMENTED
- ADDITIONAL MALFUNCTIONS WILL BE ADDED TO EXISTING SCENARIOS TO INCLUDE VCT LEVEL TRANSMITTER FAILURES
- STRUCTURED END-OF-SCENARIO CRITIQUES WILL BE CONDUCTED
- SYSTEMS TRAINING WILL INCLUDE A GREATER PERCENTAGE OF REVIEW QUESTIONS
- REVISE INITIAL TRAINING PROGRAM TO ENSURE AZ TILT CALCULATION IS EFFECTIVELY ADDRESSED
- PROGRAM ASSESSMENT TO DETERMINE IF FURTHER ENHANCEMENTS NEEDED

# INVENTORY CONTROL INCIDENT.

- EVALUATION

- INITIAL CONDITIONS
- EVENT DESCRIPTION
- INITIAL CORRECTIVE ACTION
- PRIMARY CAUSE
- SAFETY EVALUATION
- ADDITIONAL ISSUE

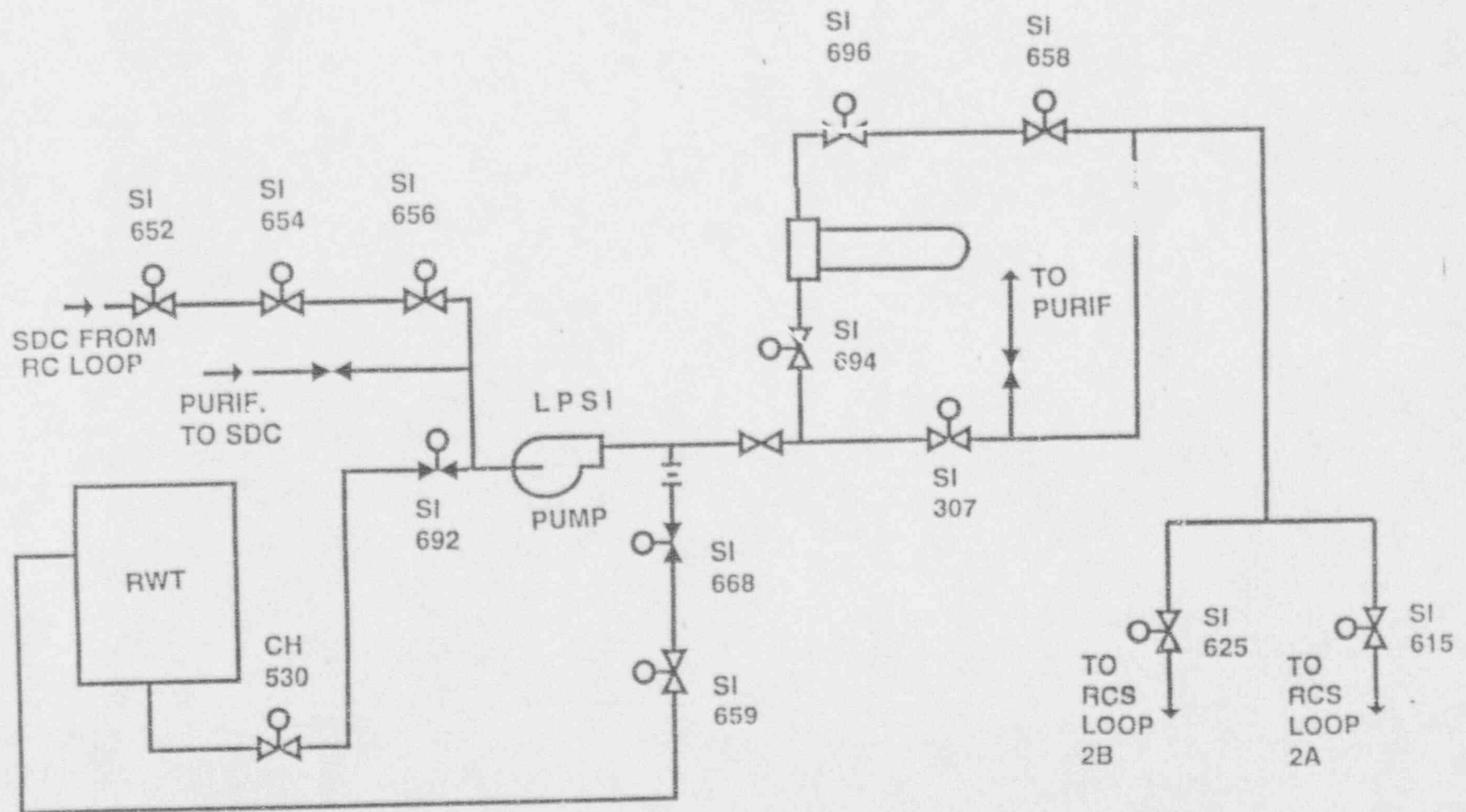
- CORRECTIVE ACTION



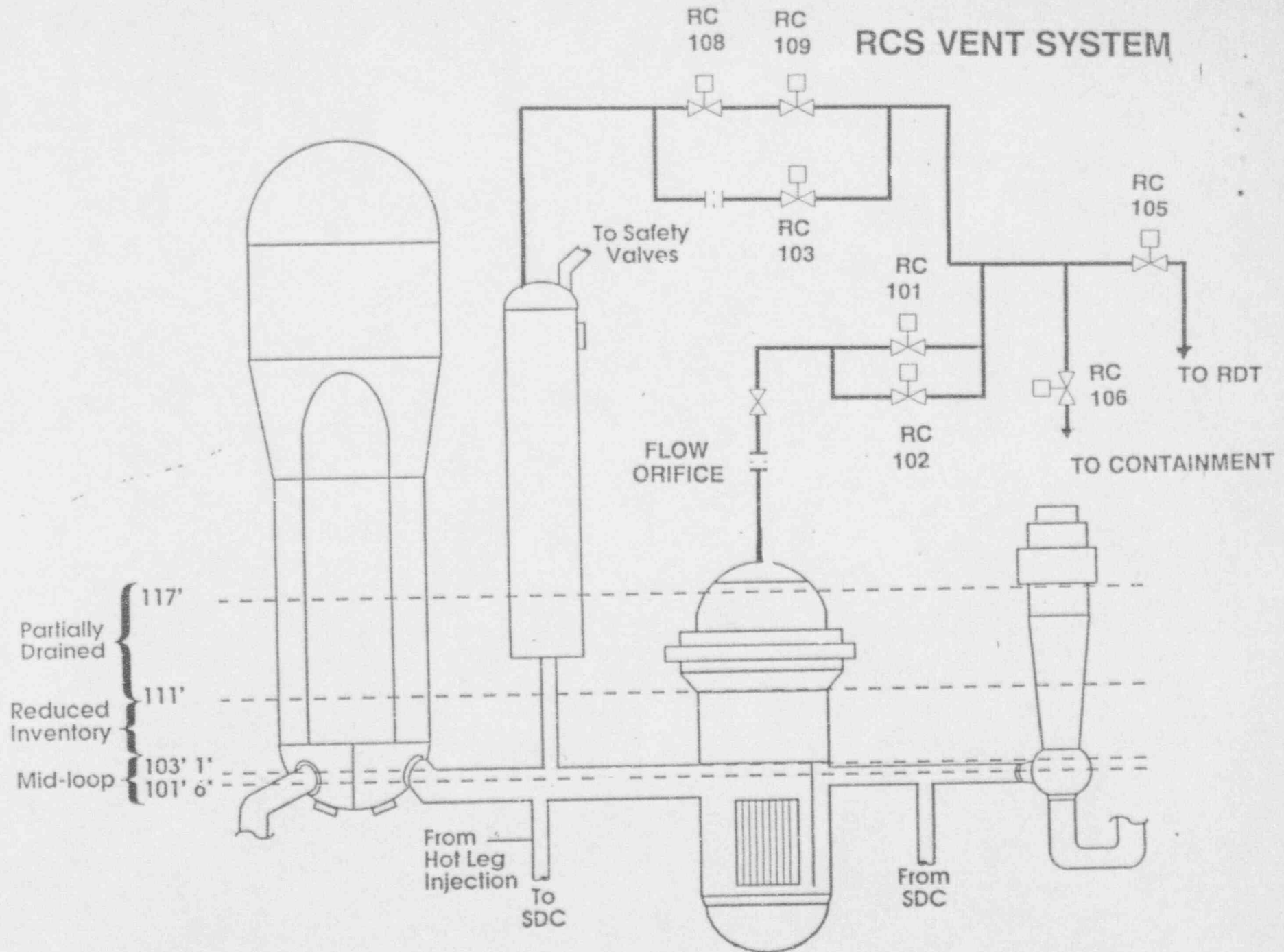
## INITIAL CONDITIONS

- MODE 5
- EQUIPMENT HATCH OPEN
- TRAIN B SHUTDOWN COOLING IN SERVICE
- RCS LEVEL BEING MAINTAINED JUST BELOW FLANGE (112-113 FEET)
  - IN THIS CONDITION SINCE OCTOBER 25, 1993
- PERIODICALLY DIVERTING/DRAINING RCS TO RWT
- SHIFT SUPERVISOR ACTING AS CONTROL ROOM SUPERVISOR.
  - ASSISTANT SHIFT SUPERVISOR WITH AUXILIARY OPERATOR IN PLANT
- REACTOR OPERATOR HAD PERFORMED DRAINING EVOLUTION NINE (9) TIMES IN LAST TWO (2) SHIFTS
  - ALL CREWS RECEIVED DETAILED BRIEFING PRIOR TO BEGINNING MID-LOOP OPERATION
  - WALKTHROUGH CONTINGENCY PLANNING DURING INITIAL PERFORMANCE
  - REACTOR OPERATOR EVALUATED CHANGING CONDITIONS
- OTHER ACTIVITIES
  - PREPARATION FOR VACUUM
  - MOV TESTING ON CIRC WATER

## SHUT DOWN COOLING LOOP



# RCS VENT SYSTEM



## EVENT DESCRIPTION

- LEVEL AT 113 FEET
- REACTOR OPERATOR ANNOUNCED INTENTION TO REDUCE LEVEL TO 112 FEET
- THIRD REACTOR OPERATOR ACKNOWLEDGED AND WENT TO BACK OF CONTROL ROOM
- NO OTHER ACKNOWLEDGEMENT
- REACTOR OPERATOR OPENED SIB-UV-668 AND BEGAN DRAINING
- REACTOR OPERATOR CHECKED EXPECTED LEVEL DECREASE THEN BECAME DISTRACTED BY OTHER ACTIVITIES
- SECONDARY REACTOR OPERATOR NOTICED RCS DECREASING TOWARD 108 FEET
- REACTOR OPERATOR STOPPED DIVERTING WATER AND BEGAN MAKEUP
- LEVEL WAS RESTORED TO 112 FEET, 4 INCHES

## INITIAL CORRECTIVE ACTION

- SPECIFIC INTERIM DIRECTIONS ISSUED FOR CONTROL OF RCS INVENTORY
- CONTROL ROOM STAFF BRIEFED ON THE EVENT AND NEED FOR CONTROL OF SAFETY SENSITIVE ACTIVITIES
- REFUELING WATER LEVEL INDICATORS PLACED ON TREND RECORDER CLOSER TO VALVE CONTROLS
- CONTROL ROOM STAFF REMOVED FROM SHIFT TO PARTICIPATE IN INVESTIGATION

## PRIMARY CAUSES

- OPERATOR LOST HIS LEVEL OF SENSITIVITY TO THE SAFETY SIGNIFICANCE OF THE EVOLUTION BECAUSE HE HAD PERFORMED IT REPEATEDLY
- OPERATOR'S COMMUNICATION WAS UNDIRECTED AND PROPER ACKNOWLEDGEMENT WAS NOT RECEIVED
- SHIFT SUPERVISION HAD NOT BEEN SUCCESSFUL IN MAINTAINING COMMUNICATION STANDARDS



## SAFETY EVALUATION

- PARTICULAR INCIDENT HAD NO SAFETY SIGNIFICANCE
  - INDICATED LEVEL WAS 108 FEET, 6 INCHES  
(ACTUAL LEVEL DECREASED TO 111 FEET, 8 INCHES)
- IF DRAINING HAD CONTINUED:
  - ALARM AT 101 FEET, 7 INCHES WOULD HAVE ALERTED OPERATOR
  - IT WOULD HAVE TAKEN 138 MINUTES TO REACH POINT VORTEXING
  - IT WOULD HAVE TAKEN 34 MINUTES TO REACH CORE BOILING AFTER LOSING SDCS AT THE POINT OF VORTEXING
- THE SIGNIFICANCE OF THE EVENT IS THE LOSS OF CONTI  
OF ACTIVITY AFFECTING A SAFETY FUNCTION

## CORRECTIVE ACTION

- TEAM TRAINING
  - IMPROVE TEAMWORK
  - IMPROVE COMMUNICATIONS
  - DEMONSTRATE ABILITY TO MEET MANAGEMENT EXPECTATIONS
- EVALUATE SHIFT SUPERVISION PERFORMANCE
- BRIEF OPERATIONS DEPARTMENT/MANAGEMENT
  - EMPHASIZE THE OVER-RIDING NEED TO CONTROL CRITICAL SAFETY FUNCTIONS
  - EMPHASIZE THAT CONTROL MUST BE APPARENT
  - EMPHASIZE THAT NOTIFICATION MUST BE PROMPT
  - REVIEW HOW AN INCIDENT IS VIEWED IN THE INDUSTRY
  - REVIEW POTENTIAL RESULTS OF AN INCIDENT