April 2, 1996

Florida Power Corporation
Crystal River Energy Complex
Mr. P. M. Beard, Jr. (SA2A)
Sr. VP, Nuclear Operations
ATTN: Mgr., Nuclear Licensing
15760 West Power Line Street
stal River, FL 34428-6708

BJECT: MEETING SUMMARY - PREDECISIONAL ENFORCEMENT CONFERENCE
CRYSTAL RIVER 3 - DOCKET NO 50-302

Gentlemen:

This refers to the predecisional enforcement conference conducted at our request at the NRC Region II office in Atlanta, Georgia, on March 27, 1996. The purpose of the meeting was to discuss apparent violations regarding: 1) nine examples of operators apparently violating plant procedures and exceeding the design basis limit pressure/level curve for the reactor coolant make-up tank; 2) an apparent violation of 10 CFR 50.59 in that tests conducted on September 4 and 5, 1994, were not reviewed to determine if an unreviewed safety question existed and during the tests operating procedures were apparently violated and the design basis limit pressure/level curve for the reactor coolant make-up tank was apparently exceeded; 2) three examples of apparent failures to correct design deficiencies in a timely manner; 4) four examples of apparent failures to correctly translate design basis requirements into procedures. It is our opinion that this meeting was beneficial.

A list of attendees is provided in Enclosure 1, the material the NRC presented is provided in Enclosure 2, and the material you presented is provided in Enclosure 3.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10 Code of Federal Regulations, a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please contact us.

Sincerely,

Original signed by
Albert F. Gibson
Albert F. Gibson, Director
Division of Reactor Safety

Docket Nos. 50-302
License Nos. DPR-72

Enclosures: See page 2

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PDR ADOCK 05000302
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Enclosures:
1. List of Attendees
2. NRC Presentation
3. FPC Presentation

cc w/encls:
Gary L. Boldt, Vice President
Nuclear Production (SA2C)
Florida Power Corporation
Crystal River Energy Complex
15760 West Power Line Street
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B. J. Hickle, Director
Nuclear Plant Operations (NA2C)
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L. C. Kelley, Director (SA2A)
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cc w/encls cont'd: See page 3

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Department of Community Affairs
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Chairman
Board of County Commissioners
Citrus County
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J. Lieberman, OE
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NRC Resident Inspector
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6745 N. Tallahassee Road
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*SEE PREVIOUS PAGE FOR CONCURRENCE

SEND TO PUBLIC DOCUMENT ROOM?	YES NO				
OFFICE	RII	RII	RII	RII		
SIGNATURE						
NAME	RSchin	CCasto	KLandis	BUryc		
DATE	04 / / 96	04 / / 96	04 / / 96	04 / / 96	04 / / 96	04 / / 96
COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

cc w/encls cont'd:
Joe Myers, Director
Division of Emergency Preparedness
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Tallahassee, FL 32399-2100

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SEND TO PUBLIC DOCUMENT ROOM?	YES	NO				
OFFICE	RII	RII	RII	RII		
SIGNATURE	RS	CC	KL	BU	Gibson	
NAME	RSchin	CCasto	KLandis	BUryc		
DATE	03/28/96	03/29/96	03/29/96	03/31/96	03/ /96	03/ /96
COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\CRMTGSUM.396

LIST OF ATTENDEES

Florida Power Corporation

P. Beard, Senior Vice President, Nuclear Operations
G. Boldt, Vice President, Nuclear Production
B. Hickle, Director, Nuclear Plant Operations
L. Kelley, Director, Nuclear Operations Site Support
P. Tanguay, Director, Nuclear Operations Engineering and Projects
G. Halnon, Manager, Nuclear Plant Operations
B. Gutherman, Manager, Nuclear Licensing
M. Jacobs, Manager, Corporate Communications
G. Becker, Nuclear Operations Peer Evaluator
R. Gaddy, FPC Corporate Attorney
S. Weinberg, Attorney
D. Stenger, Attorney
B. Morris, Attorney

Nuclear Regulatory Commission

S. Ebneter, Regional Administrator, Region II (RII)
J. Lieberman, Director, Office of Enforcement (OE)
A. Gibson, Director, Division of Reactor Safety (DRS), RII
E. Merschoff, Director, Division of Reactor Projects (DRP), RII
G. Imbro, Director, Project Directorate II-1, Office of Nuclear Reactor Regulation (NRR)
J. Jaudon, Deputy Director, DRS, RII
B. Uryc, Director, Enforcement and Investigation Coordination Staff (EICS), RII
W. McNulty, Director, Office of Investigations, RII
S. Richards, Chief, Operator Licensing Branch, NRR
K. Landis, Chief, Reactor Projects Branch 3, DRP, RII
J. Vorse, Special Agent, Office of Investigations, RII
G. Tracy, RII Coordinator, EDO
L. Clark, Attorney, Office of the General Counsel
B. Keeling, Congressional Affairs Officer, Office of Congressional Affairs
J. Beall, Enforcement Coordinator, OE
L. Raghavan, Project Manager, NRR
A. Boland, Senior Enforcement Specialist, EICS, RII
C. Evans, Regional Counsel, RII
R. Butcher, Senior Resident Inspector, Crystal River, DRP, RII
C. Rapp, Reactor Inspector, Special Inspection Branch, DRS, RII
R. Schin, Reactor Inspector, Engineering Branch, DRS, RII
K. Clark, Public Affairs Officer, RII
R. Caldwell, Project Engineer, DRP, RII
D. Lanyi, Project Engineer, DRP, RII

ENCLOSURE 1

Enclosure 2

PREDECISIONAL ENFORCEMENT CONFERENCE AGENDA

CRYSTAL RIVER
MARCH 27, 1996, AT 8:00 A.M.
NRC REGION II OFFICE, ATLANTA, GEORGIA

I. OPENING REMARKS AND INTRODUCTIONS
S. Ebneter, Regional Administrator

II. NRC ENFORCEMENT POLICY
B. Uryc, Director
Enforcement and Investigation Coordination Staff

III. SUMMARY OF THE ISSUES
S. Ebneter, Regional Administrator

IV. REMARKS BY OFFICE OF ENFORCEMENT
J. Lieberman, Director
Office of Enforcement

V. APPARENT VIOLATIONS
A. Gibson, Director
Division of Reactor Safety

VI. LICENSEE PRESENTATION
P. Beard, Senior Vice President, Nuclear Operations
Crystal River Nuclear Plant

VII. BREAK / NRC CAUCUS

VIII. NRC FOLLOWUP QUESTIONS

IX. CLOSING REMARKS
S. Ebneter, Regional Administrator

SUMMARY OF ISSUES TO BE DISCUSSED

1. Apparent Violations of Operating Procedures for Controlling Make-up Tank Overpressure

2. Apparent Violations of 10 CFR 50.59 - Conducting Tests of Make-up Tank Overpressure Without a Required Safety Evaluation, on September 4 and 5, 1994.

3. Apparent Inadequate Corrective Actions for Design Deficiencies:

   a. Engineering Review of a Problem Report Expressing Operator Concern with the Accuracy of Curve 8 Failed to Identify Errors

   b. Corrective Actions on Three Occasions for Recognized Deficiencies in Curve 8 Improperly Allowed Make-up Tank Operation Outside of the Design Basis

   c. Corrective Actions for a Recognized Error in a Tank Level Calculation were not Timely in Identifying Other Errors in Tank Level Calculations

4. Apparent Inadequate Design Control in Procedures for:

   a. Maximum Make-up Tank Overpressure

   b. Emergency Operating Procedures for Manual Swap Over of the ECCS Pumps' Suction from the Borated Water Storage Tank to the Reactor Building Sump

   c. Emergency Operating Procedures for Operation of ECCS Pumps While Taking a Suction on the Reactor Building Sump

   d. Minimum Amount of Water in the Fire Water Storage Tanks

NOTE: The apparent violations discussed in this predecisional enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

ISSUES TO BE DISCUSSED

1. Technical Specification 5.6.1.1 requires, in part, that procedures be implemented covering activities as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, of February 1978. Appendix A recommends procedures for operation of the reactor coolant system make-up system.

   Procedure AI-500, Conduct of Operations, Revs. 80, 81, and 82, Step 4.3.1.1, stated that it is the duty of every member of the Crystal River Plant work force to comply with procedures. In addition, Step 6 of Enclosure 27 stated that it is the responsibility of the Chief Nuclear Operator to ensure that plant evolutions do not violate administrative controls. Procedure OP-402, Makeup and Purification System, Rev. 75, Step 4.19.9, required that operators ensure that the make-up tank pressure limits of OP-103B, Curve 8, are not exceeded when adding hydrogen to the make-up tank by manually bypassing the 15 psig hydrogen regulator. OP-402, Step 4.19.8, required that operators refer to Curve 8 of OP-103B for maximum make-up tank overpressure when adding hydrogen to the make-up tank through the 15 psig hydrogen regulator. Procedure OP-103B, Curve 8, Maximum Make-up Tank Overpressure, Rev. 12, defined the acceptable make-up tank pressure versus level operating region. Procedure AR-403, PSA-Z Annunciator Response, Annunciator H-04-06, Makeup Tank Pressure High/Low, Rev. 21, required operators to take action to reduce make-up tank pressure to within the limits of OP-103B, Curve 8, when a valid alarm is received.

   Operators failed to meet the requirements of AI-500 to comply with procedures related to maximum make-up tank pressure on numerous occasions from June 1, 1994, through September 5, 1994. Occasions when make-up tank pressure limits were exceeded for more than 30 minutes continuously and by more than 0.5 psig include:

NOTE: The apparent violations discussed in this predecisional enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

a. The limits of OP-103B, Curve 8 on acceptable make-up tank pressure were exceeded on July 23, 1994, for approximately 122 minutes continuously, from approximately 12:13 to 2:14 p.m.; on July 25, 1994, for approximately 48 minutes continuously, from approximately 10:27 to 11:14 a.m.; on July 27, 1994, for approximately 78 minutes continuously, from approximately 2:44 to 4:01 p.m.; on July 28, 1994, for approximately 184 minutes continuously, from approximately 2:26 to 5:29 p.m.; on July 30, 1994, for approximately 190 minutes continuously, from approximately 9:28 a.m. to 12:38 p.m.; on August 6, 1994, for approximately 141 minutes continuously, from approximately 9:55 a.m. to 12:15 p.m.; on August 8, 1994, for approximately 67 minutes continuously, from approximately 10:08 to 11:14 a.m.; on August 24, 1994, for approximately 87 minutes continuously, from approximately 1:24 to 2:50 p.m.; and on September 4, 1994, for approximately 86 minutes continuously, from approximately 3:21 to 4:46 p.m.

b. OP-402, Step 4.19.9, was not complied with on July 27, July 28, July 30, August 6, August 8, August 24, and September 4, 1994, in that the make-up tank pressure exceeded the limits of OP-103B, Curve 8, while adding hydrogen to the make-up tank by manually bypassing the 15 psig hydrogen regulator. Also, OP-402, Step 4.19.8, was not complied with on July 23, 1994, in that the make-up tank pressure exceeded the limits of OP-103B, Curve 8, while adding hydrogen to the make-up tank through the 15 psig hydrogen regulator.

c. AR-403, Annunciator H-04-06, was not followed on July 23, July 25, July 27, July 28, July 30, August 6, August 8, August 24, and September 4, 1994, in that timely action was not taken to reduce make-up tank pressure to within the limits of OP-103B, Curve 8, when a valid alarm was received.

NOTE: The apparent violations discussed in this predecisional enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

ISSUES TO BE DISCUSSED

2. 10 CFR 50.59; Changes, Tests, and Experiments; in part, allows the licensed facility to conduct tests not described in the safety analysis report (SAR), unless the proposed test involves an unreviewed safety question. A proposed test shall be deemed to involve an unreviewed safety question if the probability of occurrence or the consequences of an accident or malfunction of equipment important to safety previously evaluated in the SAR may be increased. The licensee shall maintain records of tests carried out pursuant to this section, including a written safety evaluation which provides the basis for the determination that the test does not involve an unreviewed safety question.

   Technical Specification 5.6.1.1 requires, in part, that procedures be implemented covering activities as recommended in Regulatory Guide 1.33, Revision 2, Appendix A, of February 1978. Appendix A recommends procedures for operation of the reactor coolant system make-up system.

   Procedure AI-500, Conduct of Operations, Rev. 82, Step 4.3.1.1 stated that it is the duty of every member of the Crystal River Plant work force to comply with procedures. In addition, Step 6 of Enclosure 27 stated that it is the responsibility of the Chief Nuclear Operator to ensure that plant evolutions do not violate administrative controls. Procedure OP-402, Makeup and Purification System, Rev. 75, Step 4.19.9 required that operators ensure that the make-up tank pressure limits of OP-103B, Curve 8, are not exceeded when adding hydrogen to the make-up tank by manually bypassing the 15 psig hydrogen regulator. Procedure OP-103B, Curve 8, Maximum Make-up Tank Overpressure, Rev. 12, defined the acceptable make-up tank pressure versus level operating region. Procedure AR-403, PSA-Z

NOTE: The apparent violations discussed in this predecisional enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

Annunciator Response, Annunciator H-04-06, Makeup Tank Pressure High/Low, Rev. 21, required operators to take action to reduce make-up tank pressure to within the limits of OP-103B, Curve 8, when a valid alarm is received.

On September 4 and 5, 1994, operators violated 10 CFR 50.59 and Crystal River 3 procedures when they conducted tests not described in the SAR, without written safety evaluations which provided the basis for the determination that the tests did not involve an unreviewed safety question. Specifically, operators conducted tests in that they conducted evolutions involving make-up tank pressure and level, not required by plant conditions, to collect data. During the tests, operators failed to meet the requirements of AI-500 to comply with the following Crystal River 3 procedures and administrative controls:

a. OP-402, Step 4.19.9, was not complied with on September 4 and 5, 1994, in that the make-up tank pressure exceeded the limits of OP-103B, Curve 8, while adding hydrogen to the make-up tank by manually bypassing the 15 psig hydrogen regulator.

b. The limits of OP-103B, Curve 8 on acceptable make-up tank pressure were exceeded on September 4, 1994, for approximately 43 minutes continuously, from approximately 4:24 a.m. to 5:06 a.m., and on September 5, 1994, for approximately 37 minutes continuously, from approximately 4:45 a.m. to 5:21 a.m.

c. AR-403, Annunciator H-04-06, was not followed on September 4 and 5, 1994, in that timely action was not taken to reduce make-up tank pressure to within the limits of OP-103B, Curve 8, when a valid alarm was received. Instead, make-up tank level was lowered which caused make-up tank pressure to exceed Curve 8 by an increasing amount.

NOTE: The apparent violations discussed in this predecisional enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

ISSUES TO BE DISCUSSED

3. 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality, such as nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

   Conditions adverse to quality were not promptly identified and corrected, and action was not taken to preclude repetition in that:

   a. The licensee failed to perform an adequate review of Problem Report (PR) 94-0149, issued May 10, 1994, in that the PR identified an operator concern with the accuracy of Curve 8 of OP-103B; and in response an engineering evaluation dated June 4, 1994, identified no errors in Curve 8 or in the calculation that was the basis for Curve 8. After the make-up tank events of September 4 and 5, 1994; and in response to PR 94-0267, dated September 7, 1994; significant errors in Curve 8 and the related calculation were identified.

   b. Between September 9, 1994, and January 30, 1995, the licensee failed to ensure that appropriate overpressure limits were set for the make-up tank by two interim curves issued under Short Term Instructions 94-019 and 94-021. The interim curves, which restricted operation of the make-up tank to 2.0 psig and 2.5 psig, respectively, below Curve 8 of OP-103B, Revision 12, did not provide adequate margin to ensure that hydrogen entrainment in the high pressure make-up pumps was prevented during design basis events when the make-up tank was operated within the specified pressure and level limits. Subsequently, between

NOTE: The apparent violations discussed in this predecisional enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

January 30 - 31, 1995, the licensee failed to ensure that appropriate overpressure limits were set for the make-up tank by Curves 8A and 8B, Maximum Makeup Tank Operating Pressure Versus Level, placed in effect by Revision 13 to OP-103B, Plant Operating Curves. Curves 8A and 8B did not provide adequate margin to ensure that hydrogen entrainment in the high pressure make-up pumps was prevented during design basis events when the make-up tank was operated within the specified pressure and level limits. Both the interim curves and Curves 8A and 8B allowed operation of the make-up tank outside of the design basis of the plant. These corrective actions for the previously identified problem with the make-up tank overpressure curve were inadequate to prevent operation outside of the design basis.

c. The licensee failed to identify the root cause and take steps to preclude repetition of a significant condition adverse to quality related to the emergency diesel generator fuel oil tank levels initially identified in LER 92-003 on August 1, 1991. Specifically, corrective actions to determine the relationship of suction point to tank level for other tanks having a TS required minimum volume including the BWST were not implemented in a timely manner. A timely review of the calculation of the BWST volume could have resulted in earlier identification and correction of the inadequacy with the BWST level for manual swapover of ECCS pumps' suction from the BWST to the RB sump. In addition, an NRC review in April 1995 of calculation M93-0028 for the fire water storage tanks revealed another discrepant condition, between the design basis required volumes and the volumes assured by the surveillance procedure.

NOTE: The apparent violations discussed in this predecisional enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

ISSUES TO BE DISCUSSED

4. 10 CFR 50, Appendix B, Criterion III, Design Control, in part, requires that measures be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2, Definitions, and as specified in the license application, are correctly translated into procedures and instructions.

   The design basis was not correctly translated into drawings, procedures, and instructions in that:

   a. Between approximately April 1993 and September 9, 1994, make-up tank procedure limits on make-up tank pressure failed to meet the emergency core cooling system (ECCS) design basis. Specifically, procedure OP-103B, Curve 8, Maximum Makeup Tank Overpressure, Revision 12, did not provide adequate margin to ensure that hydrogen entrainment in the high pressure make-up pumps was prevented when the make-up tank was operated within the specified pressure and level limits.

   b. Between initial operation on March 13, 1977, and February 2, 1995, except for the time period of June 1990 through April 1993, the licensee failed to correctly translate the design basis for the ECCS into Final Safety Analysis Report (FSAR) Section 6.1.2.1.2; procedure EOP-07, Inadequate Core Cooling; and procedure EOP-08, LOCA Cooldown. Specifically, FSAR Section 6.1.2.1.2, EOP-07, and EOP-08 failed to meet the design basis in that the manual swapover from the borated water storage tank (BWST) to the reactor building (RB) sump was directed to be initiated at a level of five feet or less in the BWST, which was insufficient to assure that all of the ECCS pumps would not be damaged by air entrainment from vortexing in the BWST.

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Additionally, the licensee had no official design calculation to support the swapover level of five feet that was incorporated into EOPs in April 1993. The official calculation, I90-0024, supported a swapover level equivalent to approximately 14 feet in the BWST. An internal Engineering memorandum was inappropriately used to support the swapover level of five feet.

c. Between April 8, 1993, and March 22, 1995, procedures EOP-07 and EOP-08 failed to meet the ECCS design basis. Specifically, during post loss-of-coolant accident (LOCA) operation with one low pressure injection (LPI) pump and two high pressure injection (HPI) pumps operating, and with the HPI pump suction crosstie valve open, as directed by EOP-07 and EOP-08, the licensee's engineering calculation M90-0021, revision 5, dated March 22, 1995, indicated that the water inventory in the Reactor Building (RB) sump would not have provided adequate net positive suction head to the one LPI pump. This lineup could result in the loss of the only operable LPI pump.

d. Design basis requirements for the amount of fire water available were not correctly translated into procedures. Specifically, neither the Fire Protection Plan requirement that 345,000 gallons of water be contained in each fire water storage tank nor the Enhanced Design Basis Document requirement that a minimum capacity of 300,000 gallons of water be available from each tank to the fire pumps was correctly incorporated into surveillance procedure SP-300, Operating Daily Surveillance Log. SP-300 required that each tank be verified to contain greater than 35 feet of water by level indicators FS-1-LI and FS-2-LI which corresponded, in the worst case condition, to a level of approximately 283,000 gallons of available water in the tank.

NOTE: The apparent violations discussed in this predecisional enforcement conference are subject to further review and are subject to change prior to any resulting enforcement decision.

Enclsoure 3

Agenda

1. Introduction and Chronology — Pat Beard

2. High Pressure Injection / Make Up & Purification System Layout — Greg Halnon

3. Operations Issues — Bruce Hickle

    A. Response to Apparent Violation 95-22-02
    B. Response to Apparent Violation 95-22-01
    C. FPC Management Oversight

4. Engineering Issues — Paul Tanguay

    A. Response to Apparent Violation 95-22-03
    B. Response to Apparent Violation 95-22-04
    C. FPC Management Oversight

5. Conclusion — Pat Beard

Chronology of Events

1991-1992	INPO Plant Evaluations recommended EPRI and B&W Chemistry Guidelines
4/93	Make Up (MUT) Curve 8, OP-103B implemented
5/94	SP-630, HPI full flow test results in Problem Report PR94-0149
6/94-9/94	Management / Operations / Engineering interactions address PR94-0149
9/2/94	System Engineering Memo sent to Plant Manager
9/4 & 5/94	MUT evolutions conducted
9/7/94	Problem Report PR94-0267 generated addressing 9/5 evolution

Chronology of Events

9/13/94	FPC learned that 9/5 evolution may have been an unauthorized test and notified NRC
9/15/94	Management Review Committee (MRC) convened
9/94 -12/94	Corrective actions being implemented from MRC and PR94-0267
11/16/94	Curve 8 determined to be Design Basis Curve and reported in LER 94-009
11/22/94	FPC-NRC management meeting conducted
12/2/94	FPC corrective actions to address 9/5 MUT test reported to NRC in letter
	FPC initiated management self-assessment

Chronology of Events

12/94 -3/95	First OI investigation conducted
2/95	Issue Manager for MUT technical issues assigned
2/95	49 step Management Corrective Action Plan (MCAP) established
3/95	First FPC- NRC MCAP meeting conducted
7/7/95	NRC Inspection Report 95-13 for Predecisional Enforcement Conference issued
7/13/95	FPC management alerted to 9/4/94 test and notified NRC
8/95	FPC investigation initiated as a result of learning of 9/4/94 test

Chronology of Events

8/95 -10/95	Additional corrective actions resulting from investigation implemented
8/95 -12/95	Second OI investigation conducted
12/8/95	Additional MUT alarm events identified: • Investigation conducted • additional corrective actions implemented
12/27/95	FPC Reported results of investigation to NRC
3/8/96	NRC Inspection Report 95-22 with 4 apparent violations issued

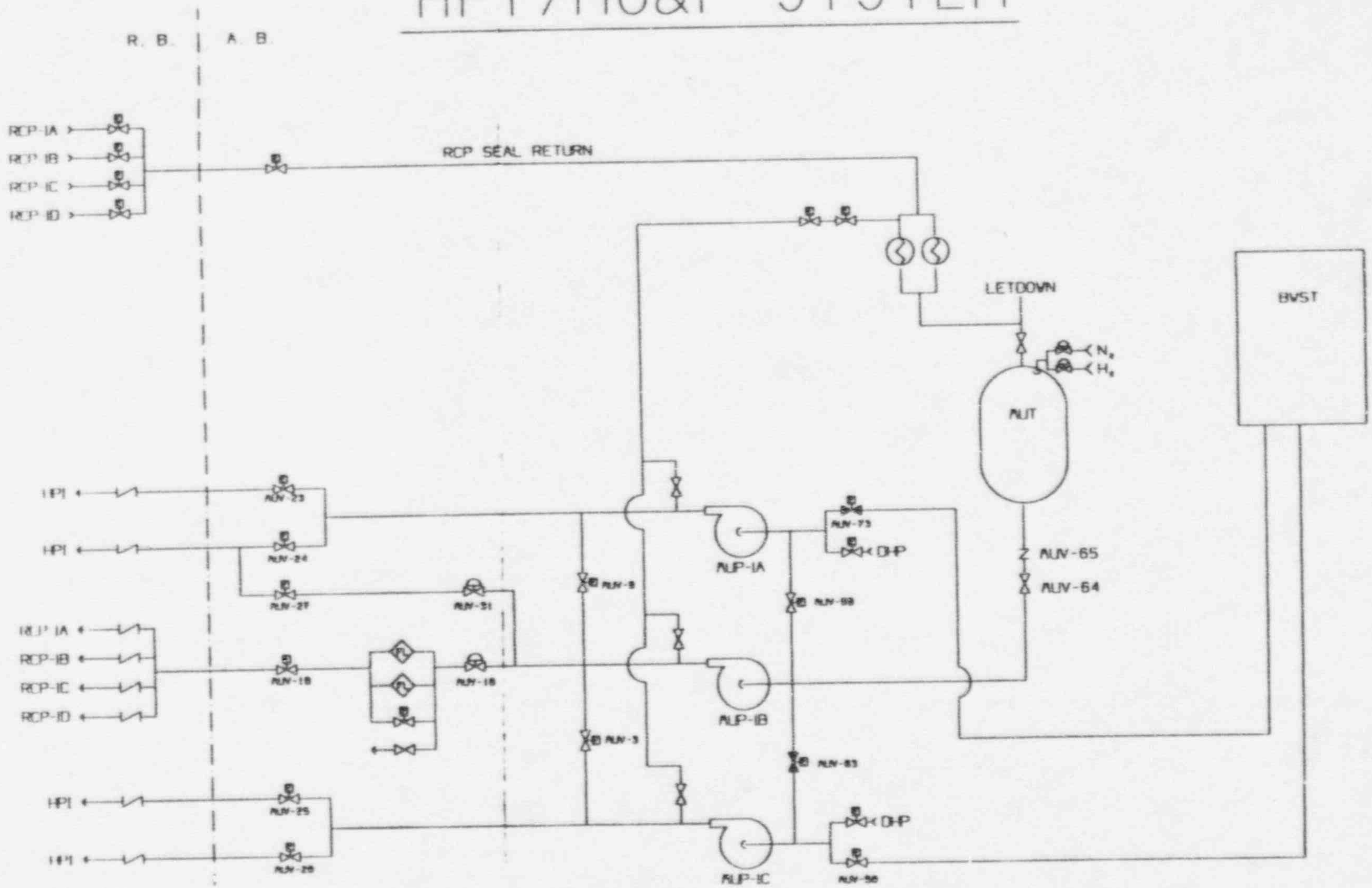
Summary

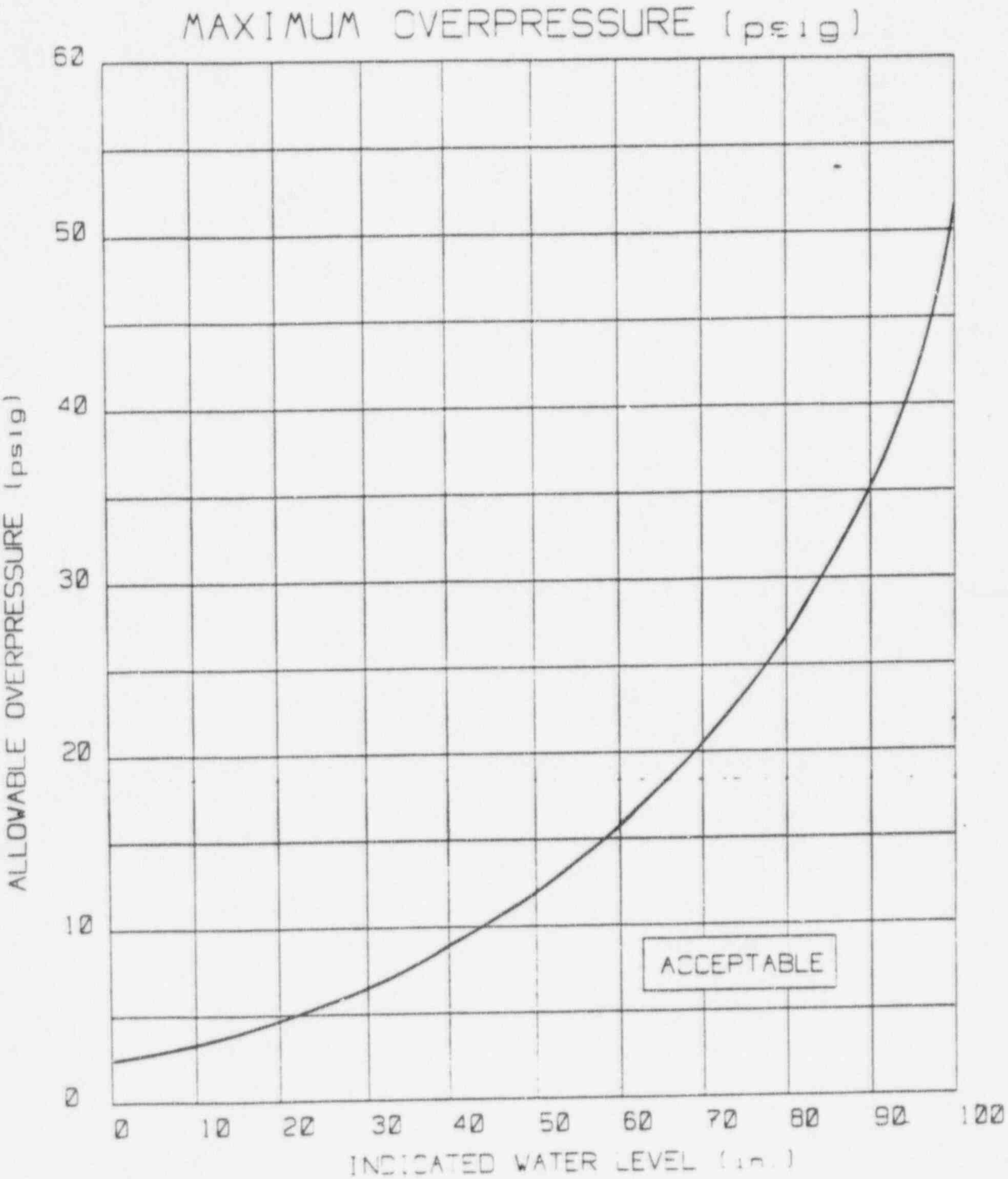
- Issues involved are complex
- FPC corrective actions have been ongoing since Sept. 1994
  - » Management Corrective Action Plan (MCAP) of Feb. 1995 address the underlying factors
- NRC/FPC interactions have been ongoing since Nov. 1994
- FPC kept NRC informed
- Safety Consequences were low <u>but</u> human performance issues were significant

Objective

- Provide an overview of Make up and HPI system configuration and operation
  - » Simplify a complex system interaction
- Summarize the key points to remember throughout the presentations

HPI/MU&P SYSTEM

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ALLOWABLE OVERPRESSURE (psig)
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ACCEPTABLE
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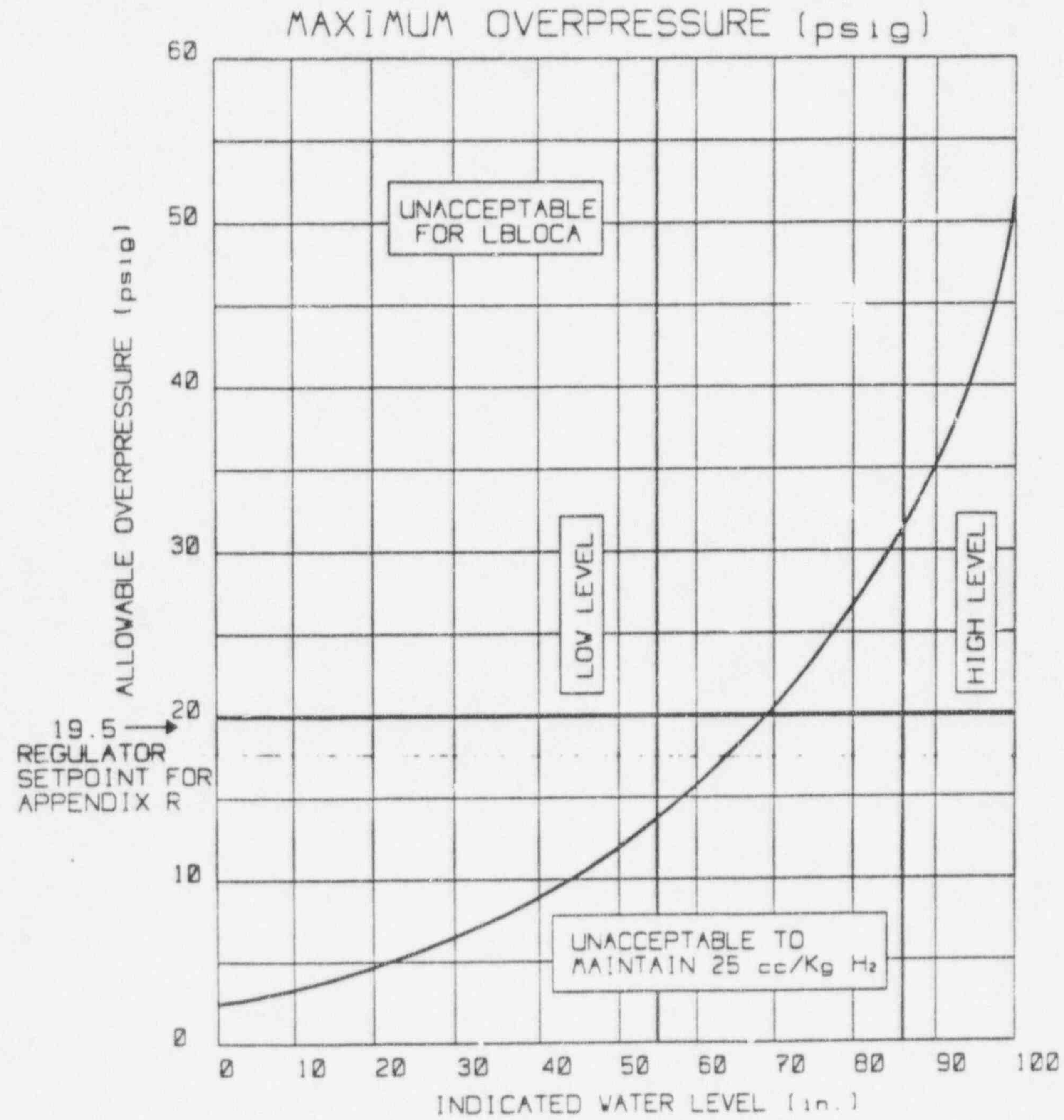
70
80
90
100

System Overview

- Multi-function system: normal make up, seal injection, and High Pressure Safety Injection
- 3 Make Up Pumps
  - » 2 of which are ES selected for High Pressure Safety Injection
  - » 1 ES pump doubles as normal running MUP
- Two sources of water
  - » MUT for the normal running pump
  - » BWST dedicated for standby HPI pump

System Overview

- Normal Operation
  - » Normal running pump takes suction from MUT and is also ES/HPI pump
  - » Normal running pump will auto-connect to BWST on ES/HPI signal
  - » Standby ES/HPI pump is dedicated to BWST and isolated from MUT
  - » 3rd pump is an idle spare
- MUT Pressure manually controlled


MAXIMUM OVERPRESSURE (psig)
ALLOWABLE OVERPRESSURE (psig)
INDICATED WATER LEVEL (in.)
UNACCEPTABLE FOR LBLOCA
LOW LEVEL
HIGH LEVEL
UNACCEPTABLE TO MAINTAIN 25 cc/Kg H2
19.5
REGULATOR SETPOINT FOR APPENDIX R
0
10
20
30
40
50
60
70
80
90
100

System Overview

- Emergency Operation after Large Break LOCA
  - » HPI and LPI (DHP) start and inject water to Reactor Coolant System
  - » Normal running pump continues to run with suction off of both MUT and BWST
  - » Other ES/HPI pump auto starts and takes suction from BWST only
  - » Spare pump is idle and can be used if one of the other pumps fail

System Overview

- MUT and BWST levels lower as water is injected to RCS
- BWST Swapover for Sump Recirculation
  - » Based on BWST level, the operator swaps suctions to the RB Sump
  - » Discharge pressure of LPI pumps closes MUV-65, isolating the MUT from the system

Key Points

- There are competing operational requirements
- Standby ES selected HPI pump is dedicated to the BWST and isolated from the MUT
- Spare (third) pump is available
- After swapover to the RB sump, the discharge pressure of the LPI pumps isolates the MUT via MUV-65 check valve

Second Apparent Violation

- Two examples of conducting an unauthorized test or experiment without a written safety evaluation containing the basis for the determination that an unreviewed safety question did not exist.
  - » No approved procedure existed for test
  - » Failure to follow procedure

Second Apparent Violation

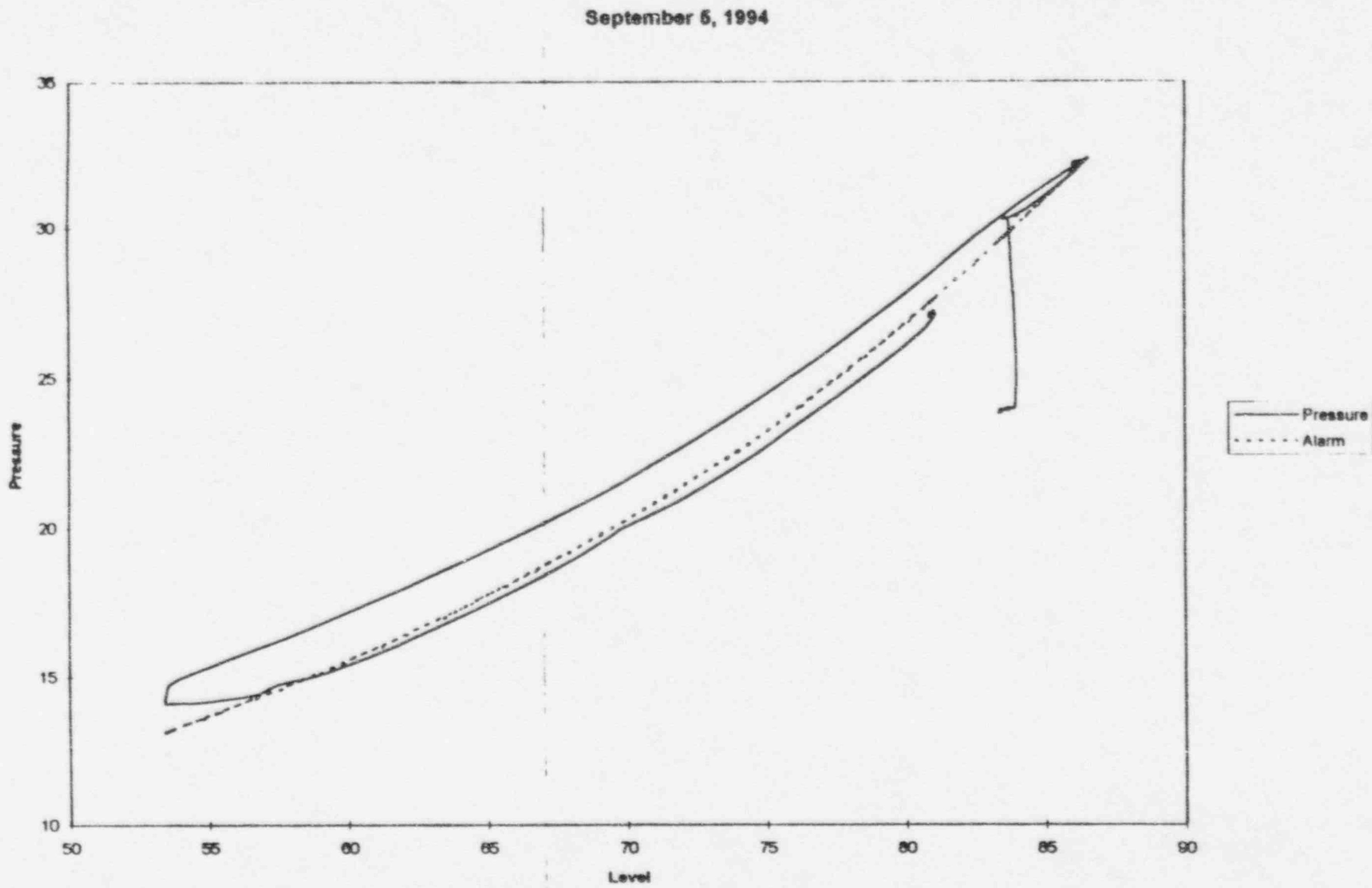
- Background

  » Two unusual evolutions performed September 4 and September 5, 1994, on midnight shift to test validity of MUT curve

  » Both tests were performed without a test procedure or 50.59 evaluation

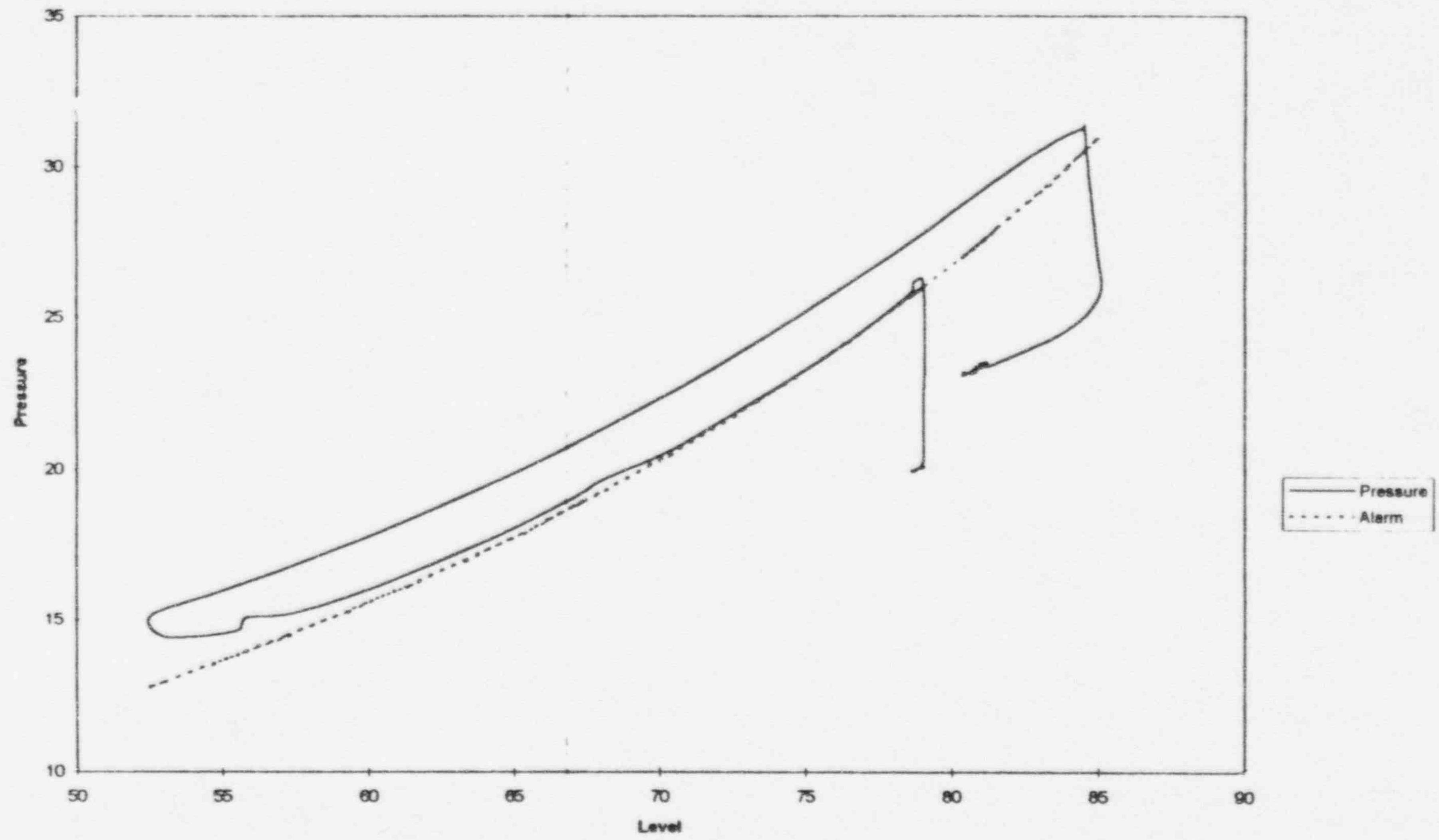
Second Apparent Violation

- EVOLUTION SCENARIO-September 5, 1994--Midshift
  - » Pre-job briefing including precautions, responsibilities and expectations, and designation of dedicated operator
  - » Hydrogen pressure raised to above alarm
  - » MUT level raised to 86"
  - » MUT level lowered to 55" by diverting letdown flow to a bleed tank
  - » Data taken and normal operating parameters restored after about 35 minutes
  - » Problem report written September 7, 1994 documenting observations
  - » MUT pressure exceeded curve limit by approximately 1.7 psig at 55"



September 5, 1994
Pressure
Level
10
15
20
25
30
35
50
55
60
65
70
75
80
85
90
Pressure
Alarm

September 4, 1994 MUT Evolution



Second Apparent Violation

- Root Cause
  - » Deficient shift supervisor leadership
  - » Existing procedures were not consulted or used correctly
  - » Cognitive errors by shift crew indicating poor judgment, rationalization and probable group think
  - » Management was not successful in achieving consistent adherence to procedures by operators

Second Apparent Violation

- Contributing Factors
  - » Crew strongly motivated to prove MUT curve was wrong
  - » Crew mistakenly felt issue was going to be closed
  - » Management efforts to strengthen shift supervisor leadership not timely

Second Apparent Violation

Florida Power CORPORATION

INTEROFFICE CORRESPONDENCE

Nuclear Plant Technical Support NA1E 240-3522

SUBJECT: Make-Up Tank Hydrogen Overpressure

TO: B. J. Hickle

DATE: September 2, 1994
NPTS 94-0429

EXCERPT FROM LETTER

"Engineering believes this curve is accurate and reasonably conservative to protect the high pressure injection pumps from hydrogen gas intrusion in the worst case Large Break LOCA. In addition, corrective action #8 of PR94-0149 is currently i[n] progress to provide technical basis for the BWST swap over point. During this analysis, Make-Up Tank overpressure per Curve #8 will be re-evaluated. This action is scheduled to be completed by September 30, 1994."

Second Apparent Violation

- Corrective Actions related to September 5, 1994, test
  - » Notified NRC and convened Management Review Committee
  - » Crew discipline
    - – Counseling
    - – Operator retraining on lessons learned
    - – Required crew to develop test procedure and safety analysis (50.59 evaluation)
  - » Reinforced management expectations and strengthened program barriers to prevent similar judgmental errors
    - – Shift meetings conducted
    - – Procedure use expectations reinforced
    - – Procedures for "procedure use" strengthened
    - – Training improvements made
    - – Lessons learned incorporated into Event-Free Operations Program
  - » Strengthening on-shift leadership

Second Apparent Violation

- Management Review Committee
  - » Purpose: Conduct an overview of open issues relative to problem report and review test performed by operating crew
  - » Committee Members:
    - – Director Nuclear Plant Operations
    - – Manager Nuclear Plant Operations
    - – Director Quality Programs
    - – Director Nuclear Operations Site Support
    - – Director Nuclear Operations Engineering & Projects
    - – Manager Nuclear Operations Engineering
    - – Manager Nuclear Plant Maintenance

Second Apparent Violation

- General Conclusions of Management Review Committee
  - » Evolution clearly did not meet documented operating standards and expectations reinforced in training
  - » A test procedure with a 50.59 evaluation should have been used to perform evolution
  - » Did not characterize operator actions as an intentional violation of procedures

Second Apparent Violation

- MRC Recommendations:
  - » Discuss the importance of adherence to operating curves and other limits and expected response to alarm conditions with all operating shifts.
  - » Review all operating curves in OP-103 to identify other instances where operating crews may be required to operate too close to limit, i.e., too little margin exists between normal administrative limit and operating limit.
  - » Provide counseling for shift that performed test stressing importance of avenues for resolving issues, importance of maintaining operating limits, correct methods for performance of evolutions, abnormal evolutions, and consequences of repeat performance.

Second Apparent Violation

- MRC Recommendations (continued):
  - » Generate procedure or work instructions as appropriate after the fact for make-up tank overpressure test.
  - » Counseling of reactor operators on the shift that performed the make-up tank test.
  - » Validate the make-up tank hydrogen overpressure curve and reissue.
  - » Review plant modifications to ensure that operator burden is minimized.
  - » Revisit the technical justification for 25cc/kg. dissolved hydrogen in the reactor coolant system to determine whether or not there is technical justification for lowering the limit.
- All recommendations completed

Second Apparent Violation

- Additional Corrective Actions related to September 4, 1994, test
  - » Conducted formal investigation
  - » Crew further disciplined
  - » Procedure revisions to:
    - – Expand scope of "infrequently performed test or evolution" (IPTE) checklist
    - – Require director approval of IPTE checklist
    - – Incorporate "CAPS" approach into criteria for determining procedure adequacy and shift supervisor authority.
      - Communicate
      - Approve
      - Plan
      - Schedule

Second Apparent Violation

- Additional Corrective Actions (continued)
  - » Expanded management review panel (MRP) process
    - – Applied to potential NRC violations and other significant safety problems
    - – Established documented standard for conduct of MRP operation
  - » Reinforced logkeeping practices
  - » Provided additional training, using examples, describing shift supervisor authority

Second Apparent Violation

- Results
  - » Have increased sensitivity throughout Operations as to procedure use standards
  - » Additional procedural barriers will help ensure similar judgmental errors are avoided
  - » Lessons learned are continuing to be reinforced to assure operating principles are firmly ingrained
  - » Shift supervisor leadership improved

Second Apparent Violation

- Significance
  - » Safety consequence of tests was low
  - » Human performance significance was high
    - – Fundamental operating principles were violated
    - – Similar judgmental errors could have serious safety consequences if allowed to continue

First Apparent Violation

- Nine examples of operation of the make-up tank outside the acceptable operating region while adding hydrogen

  » Untimely alarm response

First Apparent Violation

- Background
  - » Violations occurred during operational evolutions conducted to establish optimum MUT hydrogen pressure
  - » June 1 through September 30, 1994
    - –669 manipulations of tank level or pressure
    - –21 alarm conditions
    - –9 untimely alarm responses

First Apparent Violation

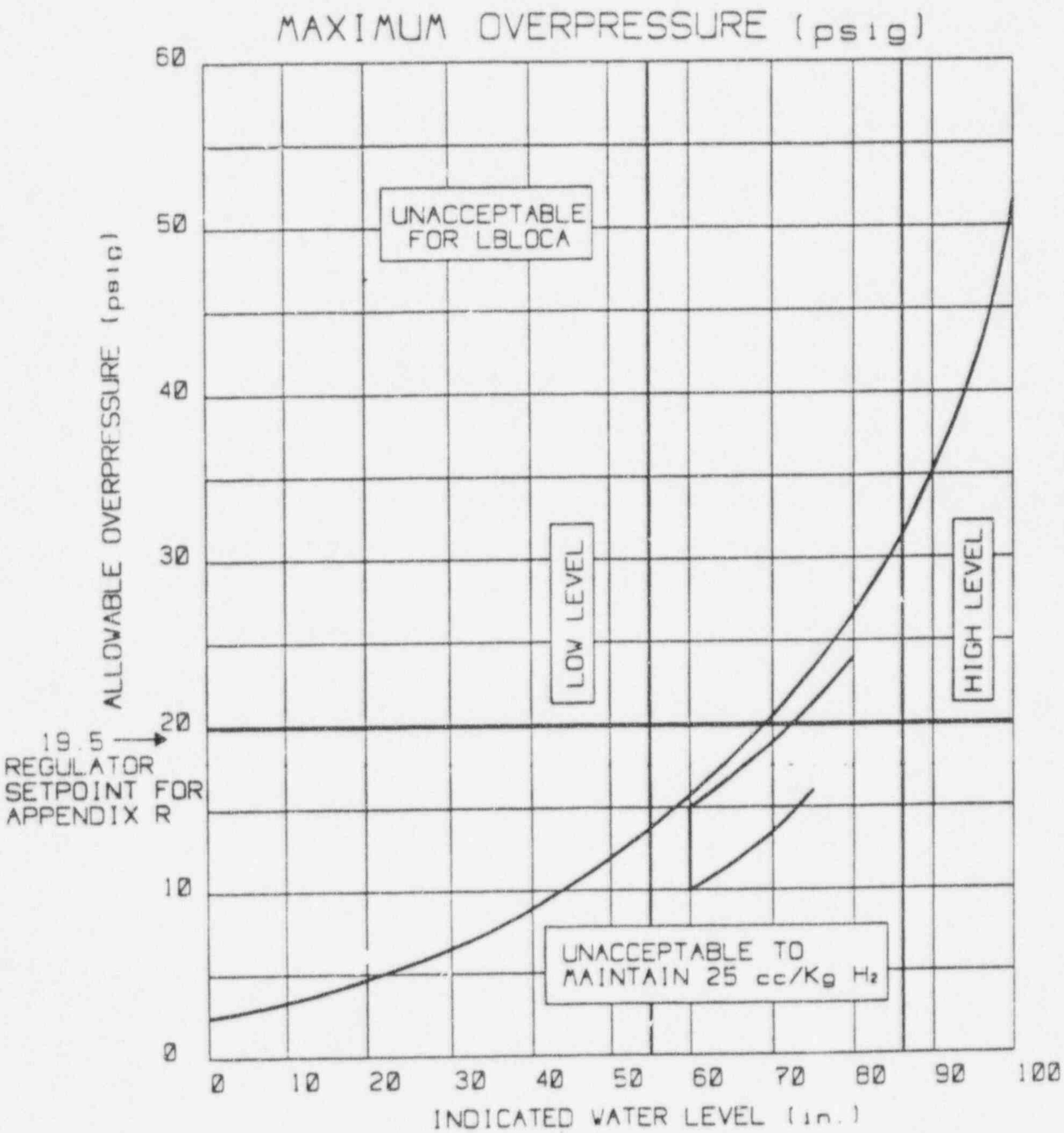
- Background (continued)

  » Operators controlled evolutions using MUT strip chart recorder

  » One of the nine apparent violation evolutions exceeded MUT curve limit as indicated by strip chart for a short time (about 15 minutes)

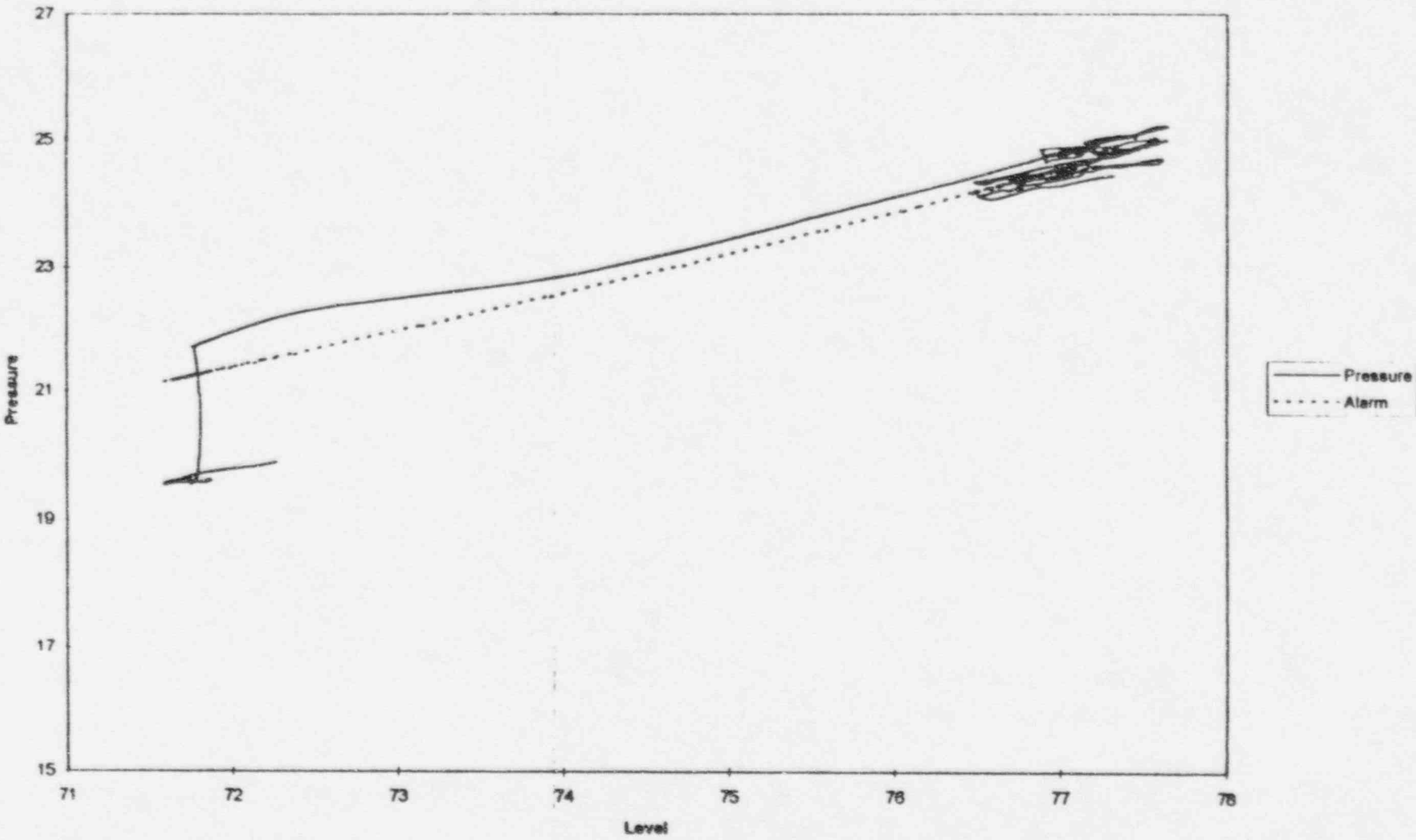
  » During the rest of the evolutions, the strip chart recorder indicated on or below curve eight.

  » Evolution Descriptions



MAXIMUM OVERPRESSURE (psig)
ALLOWABLE OVERPRESSURE (psig)
0
10
20
30
40
50
60
UNACCEPTABLE FOR LBLOCA
LOW LEVEL
HIGH LEVEL
19.5
REGULATOR SETPOINT FOR APPENDIX R
UNACCEPTABLE TO MAINTAIN 25 cc/Kg H2
0 10 20 30 40 50 60 70 80 90 100
INDICATED WATER LEVEL (in.)

July 27, 1994 MUT Evolution



First Apparent Violation

- Root Cause

  » Operating crews had insufficient questioning attitude as to alarm condition

  » Supervisors became complacent and failed to address alarm condition

  » There was insufficient day-to-day management presence in control room

First Apparent Violation

- Contributing Factors
  - » System design not intended for fine tuned control
    - – Control board indications do not emulate MUT curve
    - – Strip chart recorder too inaccurate for intended use
    - – System operated manually
  - » Management guidance regarding H2 concentration vs alarm limit could have been clearer
  - » Operators did not realize MUT curve was a design basis limit
  - » Procedures weak on guidance for timeliness of alarm response

First Apparent Violation

- Corrective Actions
  - » September 9, 1994, placed offset on MUT operating curve
  - » Revised administrative procedures for alarm response*
  - » Reinforced expectations on alarm response through training

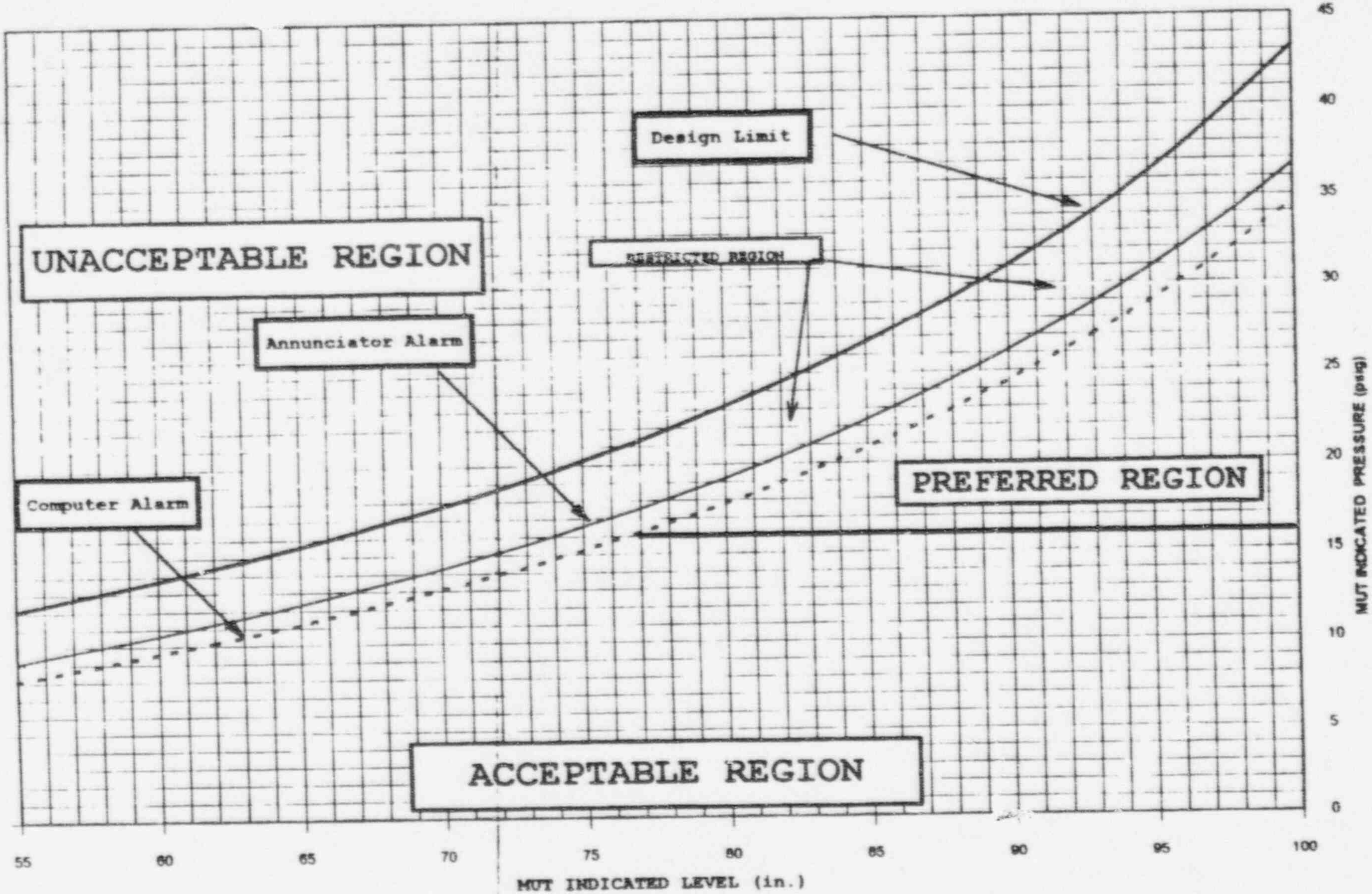
*Directly in response to this apparent violation

First Apparent Violation

- Corrective Actions (continued)
  - » Created additional management position to focus on shift operations*
  - » Event-Free Operations implemented
  - » Implemented changes to reduce operator burden
    - – MUT high level limit increased (100 inches)
    - – Installed pre-alarm (computer alarm)
    - – Provided conservative operating curve
    - – Added Chain wheel on MUV-64 (Refuel 10)
    - – Restored MUV-64 position indication (Refuel 10)
    - – Addition of a manual isolation valve for H_2 in Turbine Building (Refuel 10)

*Directly in response to this apparent violation

MAX. MUT OPERATING PRESSURE vs LEVEL
Operating Range



First Apparent Violation

- Results

  » All corrective actions complete by end of Refuel 10

  » There have been **no** high pressure alarms identified since September 9, 1994 (new administrative curves in place)

  » Questioning attitude regarding expected alarms improved

  » Increased management presence in control room

First Apparent Violation

- Significance
  - » Safety consequence was low
    - – One train would be affected
      - Tech Spec allowed outage time is 72 hours for one train
    - – Time in violation of curve short relative to allowed outage time
    - – No other related TS actions were in effect
    - – Curve was a design basis limit for a single accident scenario with core damage frequency 3.5 E-8 per year

NRC March 8 Letter

(1) "Inadequate management oversight allowed recurrent challenges to and violations of operating curves that were intended to ensure that design basis limits were not exceeded."

- Agree; however, management oversight contains several elements not all of which were inadequate.

NRC March 8 Letter

- Management Oversight consists of:
  1. Providing written guidance establishing management expectations and standards
  2. Communicating operating standards, including training on these
  3. Establishing processes to identify deviations from standards
  4. Observing and self-assessing to ensure standards are met
  5. Following-up on deviations from standards (includes intervention)
- In summary, FPC oversight Elements 1. and 5. were adequate Elements 2.,3., and 4., were deficient

NRC March 8 Letter

(2) "Management did not provide adequate guidance on the use of routine procedures for non-routine evolutions."

- Disagree; procedures in place were adequate for trained operators.
- Procedures have been strengthened to provide defense-in-depth.

- CORRECT LOGIC PATH IF PROCEDURES WERE USED

Identify desire to perform evolution

↓

Define nature of evolution

↓

Determine procedural adequacy using AI-500 (Conduct of Operations)

↓

Consult AI-400A (Description and General Administration of Plant Procedures)

↓

Determine written procedure required for test

↓

Decide to use new procedure or operating procedure

↓

DEFENSE IN DEPTH

Review OP-402 (Operation of the Make-Up and Purification System): Determine that OP does not allow operation in unacceptable region of curve

OR

Consult AI-400B (Originating New Procedures) and determine new procedure required for test or unusual evolution

OR

Consult AI-400A and determine that "interpretation contact" must "resolve questions regarding intent, content, and clarifications"

OR

Consult NOD-11 (Preparation of Safety, Regulatory, and Environmental Compliance Reviews) and determine 50.59 evaluation was required

OR

Exhibit questioning Attitude (AI-500) and get some help to make decision

4.2.35 <u>Activities Affecting Design Conditions or Requirements</u>

****

CAUTION: ACTIVITIES BY OPERATIONS PERSONNEL MUST NOT ALTER THE APPROVED DESIGN CONFIGURATION OF THE PLANT. THIS IS TO ENSURE THAT CRITICAL DESIGN PARAMETERS REMAIN WITHIN THEIR ANALYZED RANGES.

****

4.2.35.1 <u>IF</u> a specific work activity will change <u>any</u> of the example design conditions or requirements of Enclosure 31, Guidelines for Identification of Design Changes (contact Site Nuclear Engineering Services if in doubt about other conditions),
<u>THEN</u> a Modification or another approved Engineering process is required <u>PRIOR to performing the activity</u>.

4.3 <u>PLANT OPERATIONS PROCEDURES</u>

4.3.1 <u>Procedure Compliance</u>

4.3.1.1 It is the duty of every member of the CR-3 Nuclear Plant work force to strictly adhere to written policies and to comply with procedures written for the CR-3 Nuclear Plant.

4.3.1.2 <u>IF</u> any worker finds that a procedure directs them to take action or perform steps they know to be wrong or may be wrong,
<u>THEN</u> the worker must:

1. STOP the work.
2. RESTORE the system to a stable and safe condition.
3. BRING THE DISCREPANCY TO THE ATTENTION OF THEIR SUPERVISOR.
4. It is the responsibility of the supervisor to direct whatever resources are necessary to resolve the issue.

4.3.2.2.3 The Control Board Operators should announce receipt or clearing of annunciator alarms.

4.3.2.2.4 Annunciator Response Procedures (AR's) shall be utilized as follows:

1. Annunciator response procedures shall be used to diagnose alarms not expected (not directly related to intentional manipulation of plant controls), and for any alarm that the operators are not explicitly familiar with.

2. The Control Board Operators shall interpret and verify that annunciator alarm signals are consistent with plant conditions.

4.3.2.2.5 EOP/AP entry and performance of immediate actions take precedence over usage of Annunciator Response Procedures (AR's).

4.3.2.3 General Practices for Procedure Implementation

4.3.2.3.1 AI-400A, Description and General Administration of Plant Procedures, Section 4.1, Requirements for Approved Written Procedures, must be utilized to determine if a procedure is required for an evolution.

4.3.2.3.2 Written procedures are also needed for those evolutions that would affect a change in the system flowpath or operating parameters.

- o The boundary between an "evolution" and a "task" may not always be clear and, as such, it is expected that plant operators will encounter situations where the adequacy of existing procedures may be questioned.

  a. In these instances, shift supervision will make the determination as to what procedural requirements are applicable.

4.3.2.3.3 For procedures performed by Plant Operations, the Shift Supervisor or his designee shall ensure the principles of Enclosure 19, Pre-Job Briefing Checklist, are met.

- o Using his judgement in regard to plant safety, the SSOD may elect to formally complete Enclosure 19, Pre-Job Briefing Checklist, for the applicable procedure.

3.1.8 Interdisciplinary Qualified Reviewer

A Qualified Reviewer responsible for the review and approval of those POQAM procedures affecting not only his department/discipline, but also procedures from interfacing departments when necessary.

3.1.9 PRC - Plant Review Committee

A committee which advises the Director, Nuclear Plant Operations on all matters relating to nuclear safety.

3.2 RESPONSIBILITIES

3.2.1 The Interpretation Contact is the sole authority responsible for resolving questions regarding intent, content, and clarifications for procedures under his/her jurisdiction, and shall retain final authority over such procedures. It is the Interpretation Contact's responsibility to notify Document Control when he/she is no longer responsible for a procedure.

3.3 DESCRIPTION

Throughout the AI-400 Series of procedures, various forms are used. The forms are SAMPLE forms and are available for use. However, the actual form is not required to be used providing that the content of each form is present or attached (e.g., computer generated facsimile of the form).

4.0 INSTRUCTIONS

4.1 REQUIREMENTS FOR APPROVED WRITTEN PROCEDURES (POQAM PROCEDURES, TECHNICAL MANUALS, WORK INSTRUCTIONS, SPECIAL TESTS, ETC.)

4.1.1 Appropriate Managers/Superintendents are responsible for identifying which activities require approved procedures.

4.1.2 Written approved procedures are required for those activities recommended in Appendix A of Regulatory Guide 1.33. Refer to Enclosure 4, Applicable Regulatory Guide 1.33 Activities at Crystal River Unit 3.

4.1.3 For activities not falling under 4.1.2 above, and
IF the answer to any of the following is "YES",
THEN the activity must be evaluated per Enclosure 5, Criteria for Establishing, Implementing, and Maintaining Procedures, to determine the need to have an approved procedure:

- Does the activity involve or affect nuclear safety-related structures, systems, or components? The Configuration Management Information System (CMIS) should be used to determine if structure, system, or component is safety-related.

- Does the activity perform or result in adjustments to valves, electrical pots, physical tolerances, or any device with variable settings?

- Does the activity disconnect, remove, or loosen any subassembly or part of the component, structure, or system?

- Does the activity modify the system structure or component?

- Does the activity operate systems or components which perform a safety-related function?

- Is this activity a part of refueling operations?

- Is this activity a surveillance or test of safety-related equipment?

- Does this activity implement a portion of the Security Plan, Emergency Plan, Fire Protection Program, Systems Integrity Program, Iodine Monitoring Program, Process Control Program, Offsite Dose Calculation Manual, or Quality Assurance Program for effluent and environmental monitoring?

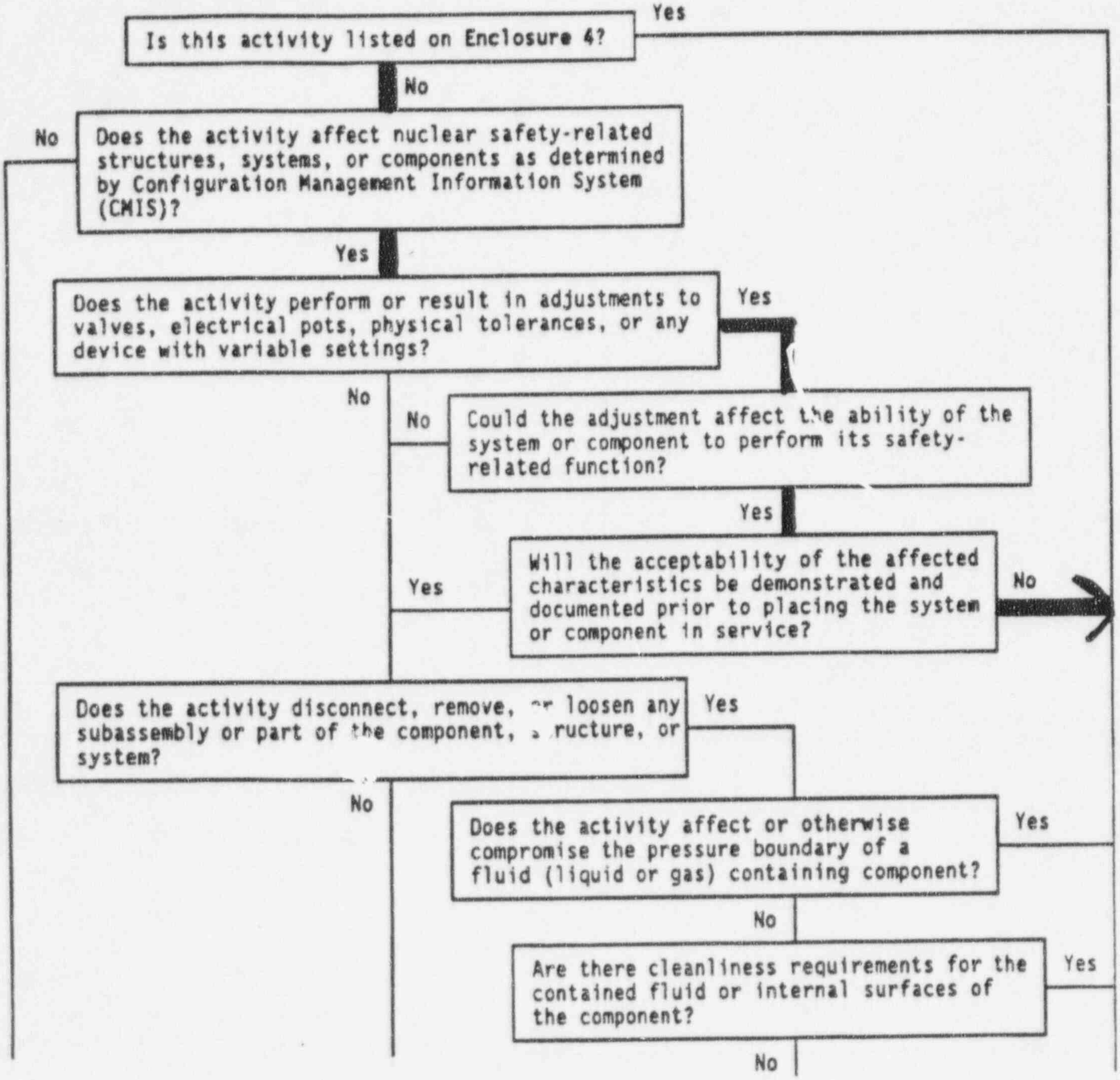
- Is the activity required as part of a regulatory commitment or other commitment where documentation of compliance with an acceptance criteria is required?

4.1.4 Additional guidance may be found in NOD-12, Implementation of Technical Specification 6.8.1.a.

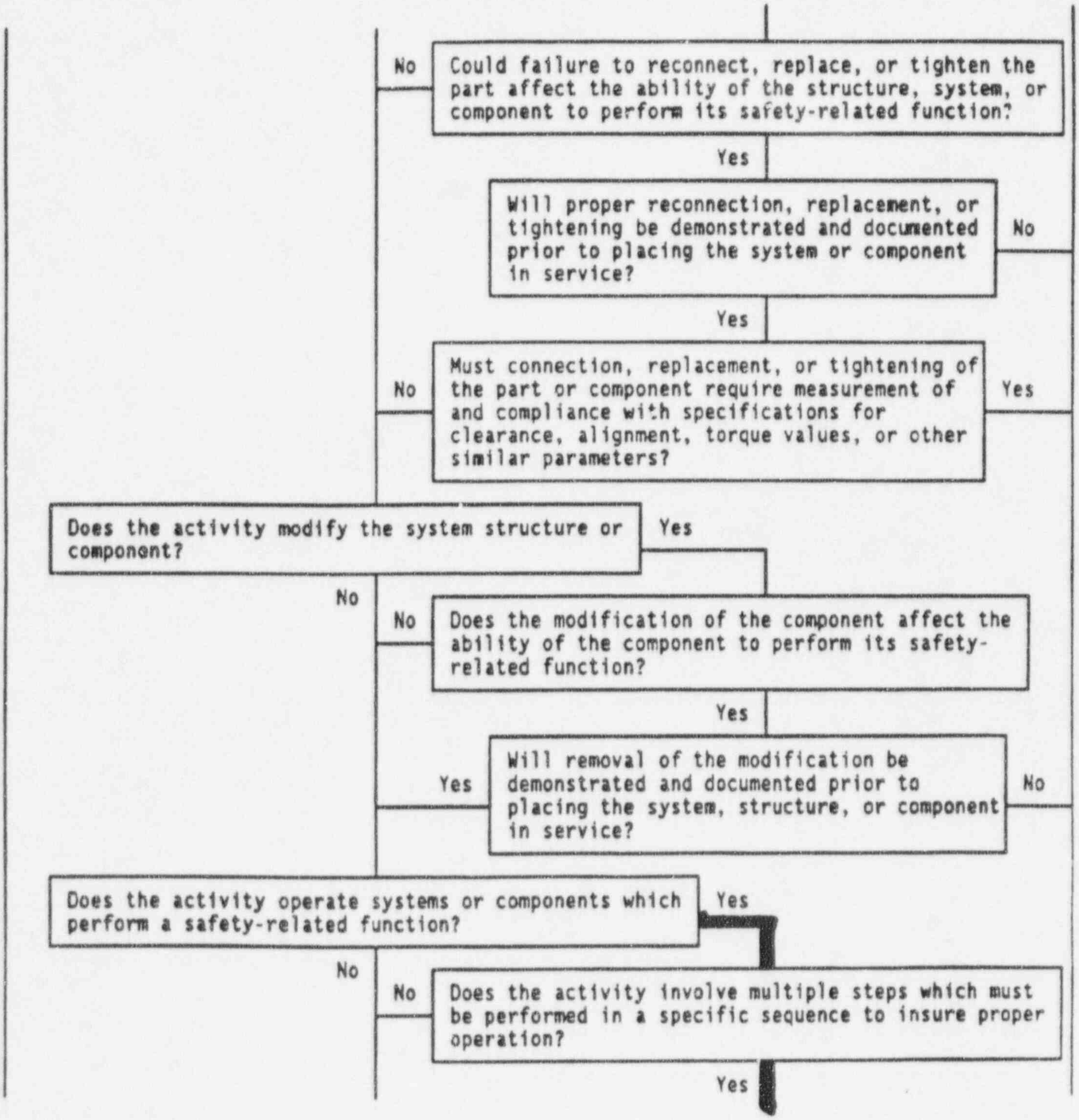
4.2 GENERAL DESCRIPTION OF POQAM PROCEDURES

POQAM is composed of 17 volumes of procedures. With the exception of Volume I, "Administrative Instructions", which constitute the overall control document for POQAM, each volume applies to a specific segment of plant activities. The scope of each volume is as follows.

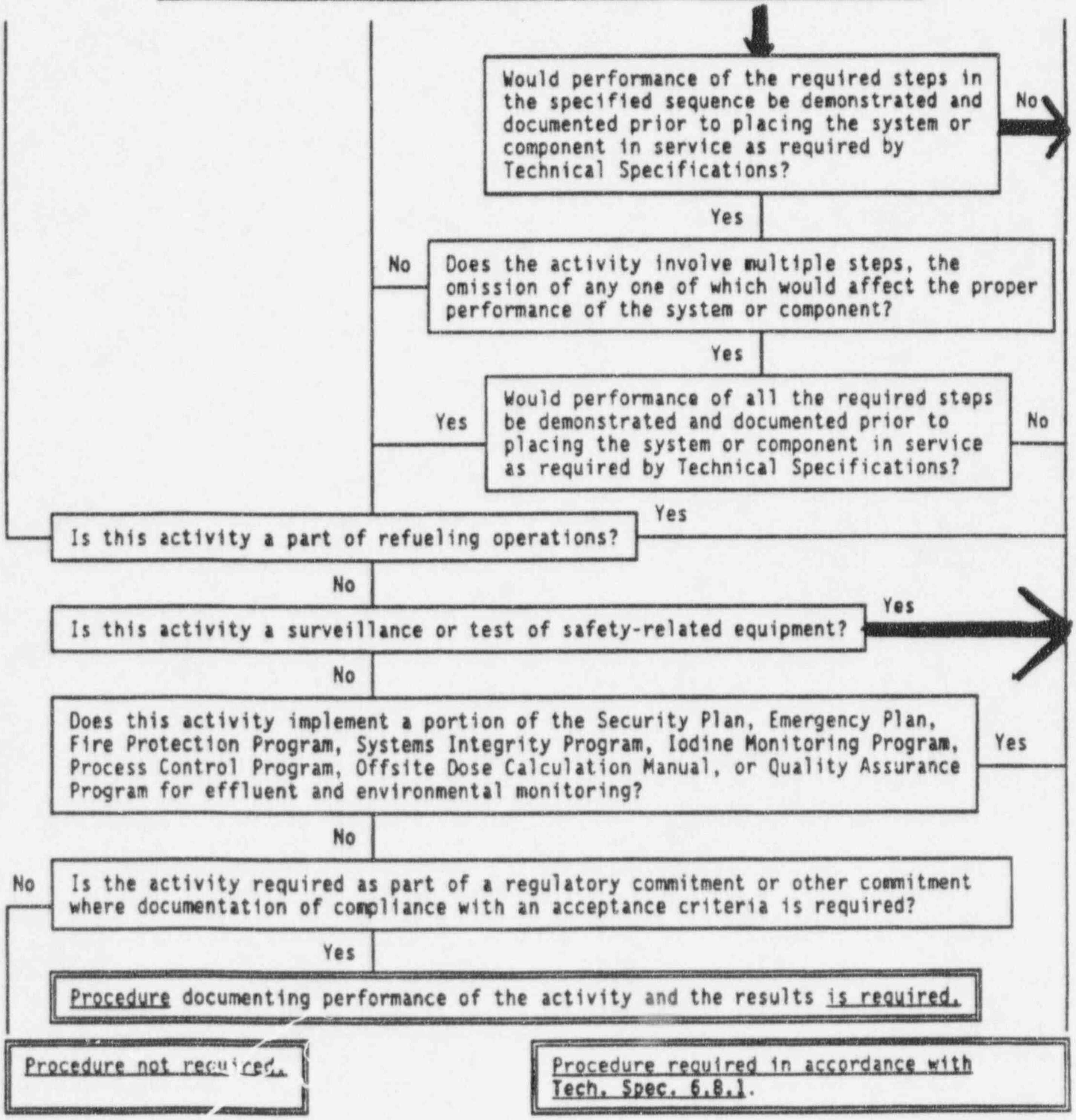
CRITERIA FOR ESTABLISHING, IMPLEMENTING, AND MAINTAINING PROCEDURES



CRITERIA FOR ESTABLISHING, IMPLEMENTING, AND MAINTAINING PROCEDURES



CRITERIA FOR ESTABLISHING, IMPLEMENTING, AND MAINTAINING PROCEDURES



4.2.15 Volume XVI - Performance Testing Procedures

- o Performance Testing Procedures provide a means of conducting specialized nuclear, thermal, and other system performance tests of plant equipment and systems in order to verify design, optimize performance, and/or minimize the loss of electrical generation.

- o Performance Testing Procedures are identified by the letters "PT," followed by three or four characters, and the title.

4.2.16 Volume XVII - Modifications Projects Procedures

- o Modification Projects Procedures identify the duties of the Nuclear Modifications Projects Department.

- o The scope of the procedure begins with the receipt at the plant site of the Modifications Approval Record (MAR) Work Packages and continues until each MAR Work Package has been approved, installed, accepted for plant operations, and closed.

- o Modification Projects Procedures are identified by the letters "MPP," followed by three or four characters, and the title.

4.3 TECHNICAL MANUALS

4.3.1 IF the following types of maintenance documents provide sufficient instructions to assure the quality of work performed:

- o Vendor Technical Manuals

- o Equipment Operating and Maintenance Instructions

- o Approved Drawings with Acceptance Criteria

THEN the applicable sections of the documents can be incorporated into plant approved procedures or may be approved for use as plant procedures in their original form. Such procedures shall receive the same level of review and approval as other procedures.

4.4.2 Interpretation Contact

4.4.2.1 The Interpretation Contact is the sole authority responsible for resolving questions regarding intent, content, and clarifications for procedures under his/her jurisdiction, and shall retain final authority over such procedures.

4.4.2.2 The Interpretation Contact is responsible for reviewing the procedures under his/her jurisdiction when notified of non-conformances affecting his procedures.

4.4.2.3 The applicable procedures shall also be reviewed following any modification to a system that is affected by such modification, as well as any other situation that may indicate that a revision is necessary.

4.4.2.4 Biennial/Annual reviews will also be performed when a Procedure Review Notification Record-A is received from Nuclear Document Control. These reviews are conducted at regular intervals and are delineated in the POQAM index.

4.4.2.5 Biennial/Annual Reviews are performed per the Procedure Review Checklist (Enclosure 23) of AI-402B which ensures technical adequacy by the nature of the detail provided.

- o Procedures must be written to the format provided in the appropriate Procedure Writing Guide (AI-402A/B) whenever a permanent revision to the procedure is made.

4.4.2.6 a. IF the review determines that no revision is required, THEN forward the following to Nuclear Document Control for retention:

1. Completed Enclosure 23 of AI-402B
2. Completed Procedure Review Notification Record-A originally received from Nuclear Document Control

b. IF the review determines that a revision is required, THEN perform the following:

1. Forward to Nuclear Document Control the completed Procedure Review Notification Record-A originally received from Nuclear Document Control.
2. Initiate required procedure changes per AI-400C and check the appropriate biennial review block on the PRR.

INFREQUENTLY PERFORMED TEST OR EVOLUTION CHECKLIST

Answer the following questions to determine if this procedure describes an infrequently performed test or evolution.

IF unable to make a determination following completion of this checklist, THEN consult the DNPO for final decision.

1. Does this procedure create a situation that can affect the core, reactivity control, or the reactor protection system?

   ☐ NO — IF the answer is no, THEN this checklist is complete and it is NOT to be included in the procedure package.

   ☑ YES — IF the answer is yes, THEN SOER 91-01, Conduct of Infrequently Performed Tests or Evolutions (available from the Operations Technical Advisors), should be reviewed to help assure adequate controls are in place for the optimization of reactor safety, AND continue on with this checklist.

2. Does this procedure create an evolution not covered by an existing normal or abnormal operating procedure?

   ☑ YES ☐ NO

3. Does this procedure create an evolution that will seldom be performed, even though it is covered by an existing normal or abnormal operating procedure?

   ☑ YES ☐ NO

4. Does this procedure create an infrequently performed surveillance test that involves complicated sequencing, or placing the plant in an unusual configuration?

   ☐ YES ☐ NO

5. Does this procedure required the use of a special test procedure in conjunction with existing operating or testing procedures?

   ☑ YES ☐ NO

IF the answer to question 1 AND at least one other question is "YES," THEN this procedure is an infrequently performed test or evolution and requires a briefing in accordance with AI-500 prior to being performed. The procedure shall contain a sign off step, either as a prerequisite to performing the procedure or as its first step, that documents this briefing having been performed. This can be included in the procedure as shown in the example below.

Example:

4.1 Initial Conditions

4.1.1 Perform a DNPO pre-job briefing in accordance with AI-500, Conduct of Operations.

DNPO pre-job briefing has been completed for each new shift

0000-0800 ____________/____
DNPO or Designee/Date

0800-1600 ____________/____
DNPO or Designee/Date

1600-2400 ____________/____
DNPO or Designee/Date

Other Shifts List Below:

____________/____
DNPO or Designee/Date

______________________________ Performed By

______________ Date

ATTACHMENT A (Continued)

GUIDELINES FOR SCREENING FOR APPLICABILITY OF 10 CFR 50.59

(Part 1 of the 10 CFR 50.59 Evaluation Form)

3. There is a general description of the activities covered by the change contained in the FSAR.

4. Changes to procedures simply listed (and not outlined, summarized, or completely described) in the FSAR do not require review in accordance with 10 CFR 50.59.

5. Changes to procedures that are outlined, summarized, or completely described in the FSAR must be evaluated under 10 CFR 50.59.

D. **Involve tests or experiments not described in the FSAR.**

Previously evaluated tests do not require a 10 CFR 50.59 evaluation, such as, surveillance tests, functional tests, and startup tests that are performed monthly, quarterly, or on a refueling basis.

One-of-a-kind tests to measure the effectiveness of new techniques or a new system configuration that can affect systems necessary to mitigate design basis events would require a 10 CFR 50.59 evaluation.

Post-modification testing should be considered for 10 CFR 50.59 evaluation if an abnormal mode of operation during testing is required.

E. **Involve temporary changes in plant configurations while the proposed work is in progress.**

Temporary changes, such as jumpers and lifted leads, shielding on pipes and equipment, supports, blocked open doorways, etc. may require a 10 CFR 50.59 evaluation.

3.0 PERSONNEL INDOCTRINATION

DESCRIPTION	VALUE

3.1 SETPOINTS

3.1.1 Makeup Tank

a. MUT High Level Alarm	86 inches
b. MUT Low Level Alarm	55 inches
c. MUT Low-Low Level Interlock	21 inches positions MUV-112 to MUT
d. MUT Low-Low Level Interlock and Alarm	18 inches Opens MUV-58 and MUV-73
e. MUT High Temperature Alarm	135°F
f. MUT Low Temperature Alarm	95°F
g. MUT High Pressure Alarm	Emulates curve 8 of OP-103B
h. MUT Low Pressure Alarm	3 PSIG

3.1.2 Makeup Pumps

a. MUP Radial Bearing HI Temp Alarm	170°F
b. MUP End Bearing HI Temp Alarm	170°F
c. MUP End Gear Bearing HI Temp Alarm	165°F
d. MUP End Center Bearing HI Temp Alarm	165°F
e. MUP and Motor Lube Oil Low Pressure Alarm	5 PSIG
f. MUP Motor Inboard Bearing HI Temp Alarm	180°F
g. MUP Motor Outboard Bearing HI Temp Alarm	180°F
h. MUP Motor Stator HI Temp Alarm	260°F
i. MUP Gear Oil Pressure Low Alarm	7 PSIG

NRC March 8 Letter

(3) "Other procedural guidance was lacking such as guidelines for operator response to alarms, procedural precautions regarding adherence to operating parameters contained in administrative curves and the responsibilities and limitations of the shift supervisors."

- Guidelines for operator response to alarms
  - » Agree, although operators are expected to address alarms promptly (as routinely reinforced in simulator training), procedure guidance needed to be strengthened. AI-500 has been revised.
  - » AR-403 has been strengthened to require "immediate" response to MUT alarm.

NRC March 8 Letter

- Procedural precautions regarding adherence to operating parameters contained in administrative curves
  - » Disagree; OP-402 provided adequate guidance regarding adherence to MUT curve.
  - » MUT High Pressure alarms resulted from hydrogen addition to MUT. The MUT curve was specified for this procedure step and referenced in the setpoint section of the procedure.
  - » Additional reference to MUT curve added to Limit and Precautions section of OP-402 for defense in depth

- Responsibilities and limitations of shift supervisors
  - » Disagree; responsibilities and limitations were clearly defined in AI-500
  - » Additional guidance has been added for defense in depth

4.19 MUT VENTING AND GAS ADDITION (Cont'd)

ACTIONS		DETAILS
4.19.7	Remove Waste Gas Decay Tank selected in Step 4.19.3 from service	o Place selector switch in OVERRIDE o Place desired tank in service and ensure Gas Sample Analyzer WDGA-1 lined up to in service Waste Gas Decay Tank ___/___ Initial/Date
4.19.8	Establish H_2 pressure in MUT if desired, otherwise N/A	1. ___ Refer to Curve 8 of OP-103B for maximum MUT overpressure 2. ___ OPEN MUV-143, MCB Control switch 3. ___ WHEN MUT is at desired pressure, THEN CLOSE the following: ___ MUV-143 ___/___ Initial/Date
4.19.9	IF H_2 addition with the manual bypass is desired THEN perform the following OTHERWISE N/A	1. ___ Determine maximum MUT overpressure using Curve 8 of OP-103B 2. ___ Locally open MUV-492, regulator bypass 3. ___ Open MUV-143 on MCB 4. ___ Add desired amount of H_2 while ensuring MUT pressure limit is not exceeded 5. ___ Close MUV-143 on MCB 6. ___ Locally close MUV-492 ___/___ Initial/Date
4.19.10	IF N_2 overpressure is desired, THEN perform the following, OTHERWISE N/A	1. ___ Determine maximum MUT overpressure using curve 8 of OP-103B 2. ___ Locally open MUV-467 3. ___ OPEN MUV-141 on MCB 4. ___ Add desired amount of N_2 while ensuring MUT pressure limit is not exceeded 5. ___ Close MUV-141 on MCB 6. ___ Locally close MUV-467 ___/___ Initial/Date

RESPONSIBILITIES OF OPERATIONS PERSONNEL

NUCLEAR SHIFT SUPERVISOR (NSS)

The Nuclear Shift Supervisor is responsible to the Manager Nuclear Plant Operations to/for:

1. The activities of the operating shift.

2. Direct command of the operating shift and ongoing review of operations, maintenance, and support functions.

   o These command duties require that the NSS be on duty normally in the control room.

   o If the NSS is temporarily absent from the Control Room during routine operations, the Assistant Nuclear Shift Supervisor shall assume the Control Room command functions with the responsibilities and authority of the NSS.

   o Maintain control room activities within the scope of Enclosure 14, Shift Teamwork Guidelines.

   o During abnormal or emergency conditions, the NSS shall remain in the control room in a command role to direct the activities of operations until properly relieved by another Shift Supervisor or Assistant Shift Supervisor.

      a. The Shift Supervisors decisions shall be based on an overview of the plant conditions and activities directed to ensure reactor safety.

   o Notify the Shift Operations Technical Advisor and solicit their technical expertise, recommendations, and analytical capabilities for conditions that may compromise the safety of operations, including off-normal, accident, or severe plant transient conditions.

3. Maintain administrative tagging orders on equipment that is in an off-normal condition due to existing plant configuration.

   o These tagging orders should not be utilized by other departments to perform maintenance functions.

4. Act as the senior <u>licensed</u> manager on shift.

5. Maintain the broadest perspective of operational conditions with emphasis on reactor safety and the protection of the health and safety of plant personnel and the public being of highest priority.

RESPONSIBILITIES OF OPERATIONS PERSONNEL

NUCLEAR SHIFT SUPERVISOR (NSS)

6. Act as emergency coordinator until relieved by higher management authority.

   o As the emergency coordinator, the NSS has full authority to evaluate and classify the emergency and to initiate appropriate actions to mitigate the consequences of the emergency.

     Should this evaluation indicate that extreme measures must be taken, the NSS has the authority to:

     o Direct any or all personnel to evacuate the plant site.

     o Place any or all generating plants in a safe shutdown condition.

     o Notify all applicable agencies of the plant status or required outside assistance.

   o The NSS should ensure that the emergency operating procedures are correctly implemented during emergency conditions.

   o The NSS should utilize the procedures contained in the Control Room Emergency Coordinator's Manual (contents listed on Enclosure 20, Control Room Emergency Coordinator Manual-Table of Contents).

7. During backshifts and weekends (when the Director Nuclear Plant Operations (DNPO) or his designee (Manager-on-Call or Nuclear Shift Manager) is not present at the Crystal River Plant Site) the Nuclear Shift Supervisor has the full authority of the office of the DNPO, <u>except</u> for item 2 below.

   1. In exercising this authority, directions from the NSS shall be followed without exception.

      a. Should a conflict arise between the directions given by the NSS and any other supervisor/superintendent/manager, the NSS's directions are to be followed <u>first</u> and the conflict resolved <u>after</u> the work is completed.

      b. While it is recognized that direction by the NSS may in some cases be a less efficient utilization of personnel, this sometimes is essential to the general safe and reliable operation of the plant.

   2. Certain operating decisions and actions require the review and approval of the DNPO, Nuclear Shift Manager, or Manager on-Call as defined in applicable plant procedures. Processes concerning review and approval by these individuals remain the same.

RESPONSIBILITIES OF OPERATIONS PERSONNEL

NUCLEAR SHIFT SUPERVISOR (NSS)

8. Provide close oversight of activities supporting complex and infrequently performed plant evolutions such as plant heatup, startup, shutdown, cooldown, and refueling.

9. Determine operability conditions and status of plant equipment.

10. Evaluate Plant Problem Reports concerning reportability.

11. Function as the reactivity manager during all modes of plant operation (for further details, refer to section 4.2.7, Reactivity Control).

12. Maintain cognizance of primary and secondary chemistry, and coordinate with chemistry personnel to resolve chemistry-related problems (use Enclosure 17, Supplemental Laboratory Analysis Request Form, when supplemental chemistry analysis is desired).

13. Apply the safety limits, action statements, and limiting conditions for operation as required by technical specifications.

* 14. Authorize deviation from license conditions or technical specifications as allowed by 10CFR 50.54(x) (Implicit in this is an obligation to deviate from license conditions or technical specifications only when this action is immediately needed to protect the public health and safety).

15. Supervise placing and maintaining the plant in a safe configuration using the remote shutdown systems in the event that the control room is uninhabitable.

16. Before the reactor is returned to criticality after a trip or unanticipated transient, ensure that: the circumstances have been analyzed, the cause has been determined, plant operations can proceed safely, and the DNPO's or his designee's (Manager-on-Call or Nuclear Shift Manager) approval for restart has been obtained (for details, refer to AI-704, Reactor Trip Review and Analysis).

17. Notify higher management authority as required by plant reporting and notification requirements.

* 18. Ensure shift operations are conducted in accordance with plant procedures, the operating license, and other requirements.

19. Ensure shift operating crews and shift technical advisors review significant changes to operating procedures, plant modification, and revisions to the technical specifications.

Third Apparent Violation

- Inadequate Corrective Action - Corrective actions for engineering calculations were not completed in a timely manner
  - » Failed to identify error in calculation
    - – PR94-0149, HPI Flow Test
  - » Failed to correct calc. errors with subsequent revisions
    - – PR94-0267, Sept. 5 Test
  - » Corrective actions for safety related tanks were not completed in a timely manner

Third Apparent Violation

- Root Cause
  - » Engineers did not obtain input needed to perform the calc. from Operations
    - – assumptions did not reflect operating procedures
  - » Inadequate management involvement
    - – did not assure that Operations input was obtained for use in calc.
  - » Calc. process weaknesses
    - – verification of assumptions & design inputs
    - – method of verification
  - » Ineffective communication & interaction between Design & System Engineering

Third Apparent Violation

- Contributing Factor
  - » Complexity of MUT Curve 8 was not understood
    - – did not realize so many issues affected the calc.

MUT Issues

- Issues which impact the MUT Curve
  - Appendix "R"
  - H_2 Concentration
  - RB Sump level - source term
  - BWST Level (Vortexing & NPSH)
  - HPI & LPI NPSH in sump
  - Operator response & valve stroke time
  - RB sump chemistry

Third Apparent Violation

- Corrective Actions
  - » Counseled the Engineers*
  - » Calc. process now includes Operations and System Eng. signoff of Design Eng. calcs.*
  - » Relocated Design Eng. to site
  - » Design Eng. Review Board formed *
  - » Important issues designated as Management Focus Items*
    - – Issue Managers established as single point of accountability
  - » 3rd party review of calculations*
  - » Eng. mgmt. attends Operations turnover meetings daily
  - » Event Free Operation Program (precursors) implemented

*Directly in response to this apparent violation issue

Third Apparent Violation

- Results
  - » Revised/corrected MUT calc. has been issued.
  - » Interaction between Design & System Engineers with Operations is improved
  - » In line reviews of calcs have identified discrepancies prior to them being completed.
  - » Trending Eng. performance with precursors as part of Event Free Operation Program
    - – Integral part of continuous improvement efforts

Fourth Apparent Violation

- Inadequate design control in that design basis information was not correctly translated into operating procedures
  - » MUT Pressure/Level Curve was incorrect
  - » Interim and revised curves incorrectly assumed 5' BWST swapover completion
  - » LPI pump NPSH requirement not adequate for 2 HPI pump operation while in piggy back
  - » Fire Service Tank volume not met

Fourth Apparent Violation

- Root Cause
  - » Lack of Operations involvement in the calculation development process
  - » Inadequate Engineering involvement in operating procedure revisions
  - » Ineffective communication between Eng. & Operations
  - » Management did not assure calc. and operating procedure processes included interdepartmental reviews

Fourth Apparent Violation

- Corrective Actions
  - » Calc. process now includes Operations and System Eng. signoff of Design Eng. calcs.*
  - » Both Design & System Eng. review operating procedure revisions*
  - » Relocated Design Eng. to site
  - » Established an Operation's contact for technical issues*
  - » Management structure/ interfaces strengthened

*Directly in response to this apparent violation issue

Fourth Apparent Violation

- Results
  - » New processes have been implemented:
    - Operations is involved in the calculation development process
    - Both Design & System Engineers are involved in operating procedure preparation
  - » Changes made to the calc. and operating procedure review processes have resulted in additional issues and discrepancies being identified
    - Setpoint & EOP Review Programs
  - » Using performance indicators and precursor card trends to monitor progress
  - » Management appropriately involved in design issues

Safety Consequences

- Safety Consequences of Apparent Violations 3 and 4 were low

NRC March 8th Letter

(4)"...management did not work <u>effectively</u> with the engineering and operations staff to resolve a long standing operator concern."

» Agree; however:

» Significant management involvement occurred during the months prior to the Sept. 5th test in response to PR94-0149, HPI Flow Test

- Considerable interaction between Engineering & Operations
- Engineering promptly addressed the cavitation issue to Operations
- Meeting to review CAP

NRC March 8th Letter

» Significant management involvement actions continued:
  - Operations management initiated interdepartmental meetings to:
  - Engineering worked to reduce Operator burden with plant mods.

» Ongoing corrective actions were pre-empted by the Sept. 5 test

» Corrective Actions have addressed and strengthened management effectiveness

NRC March 8th Letter

(5)"...a series of engineering reviews of the adequacy of the makeup tank operating curve and other design basis parameters were in error reflecting inadequate verification of design parameters by management."

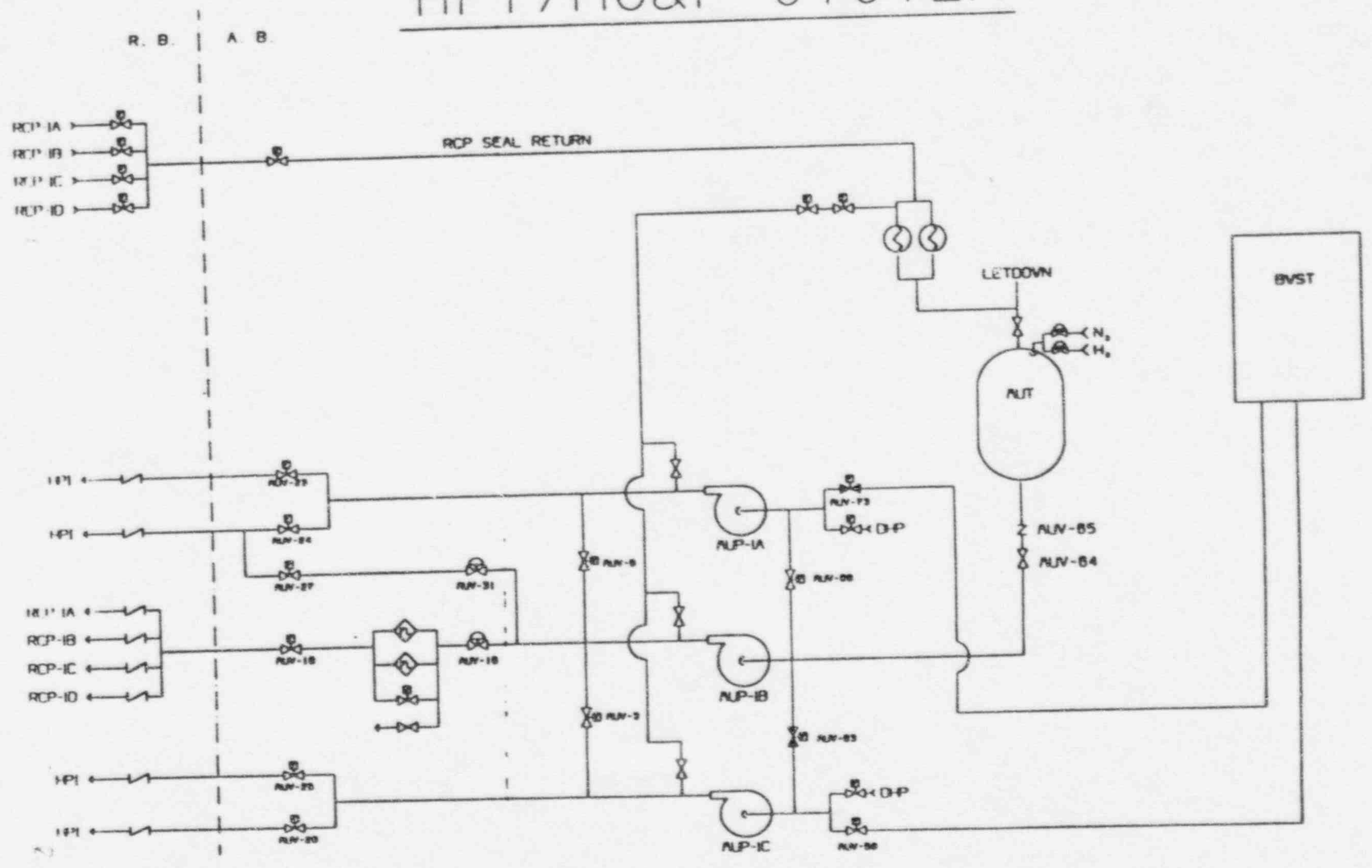
  » Agree
  » Rigor applied to the calc. review was not adequate
  » Lack of a questioning attitude
  » Calc. process did not include Operations
  » Management failed to recognize the deficiencies and intervene in a timely manner

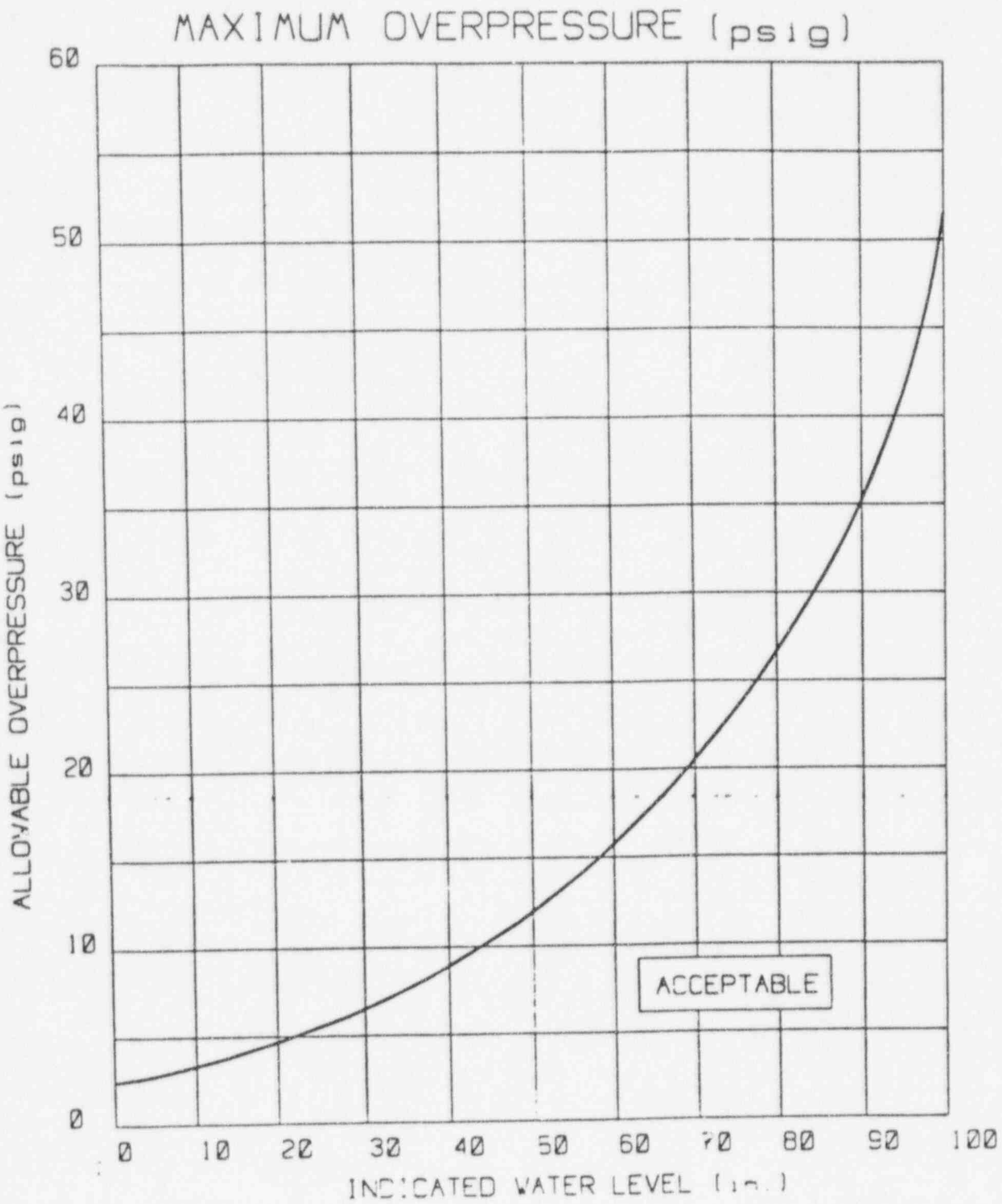
- Corrective actions have addressed this concern

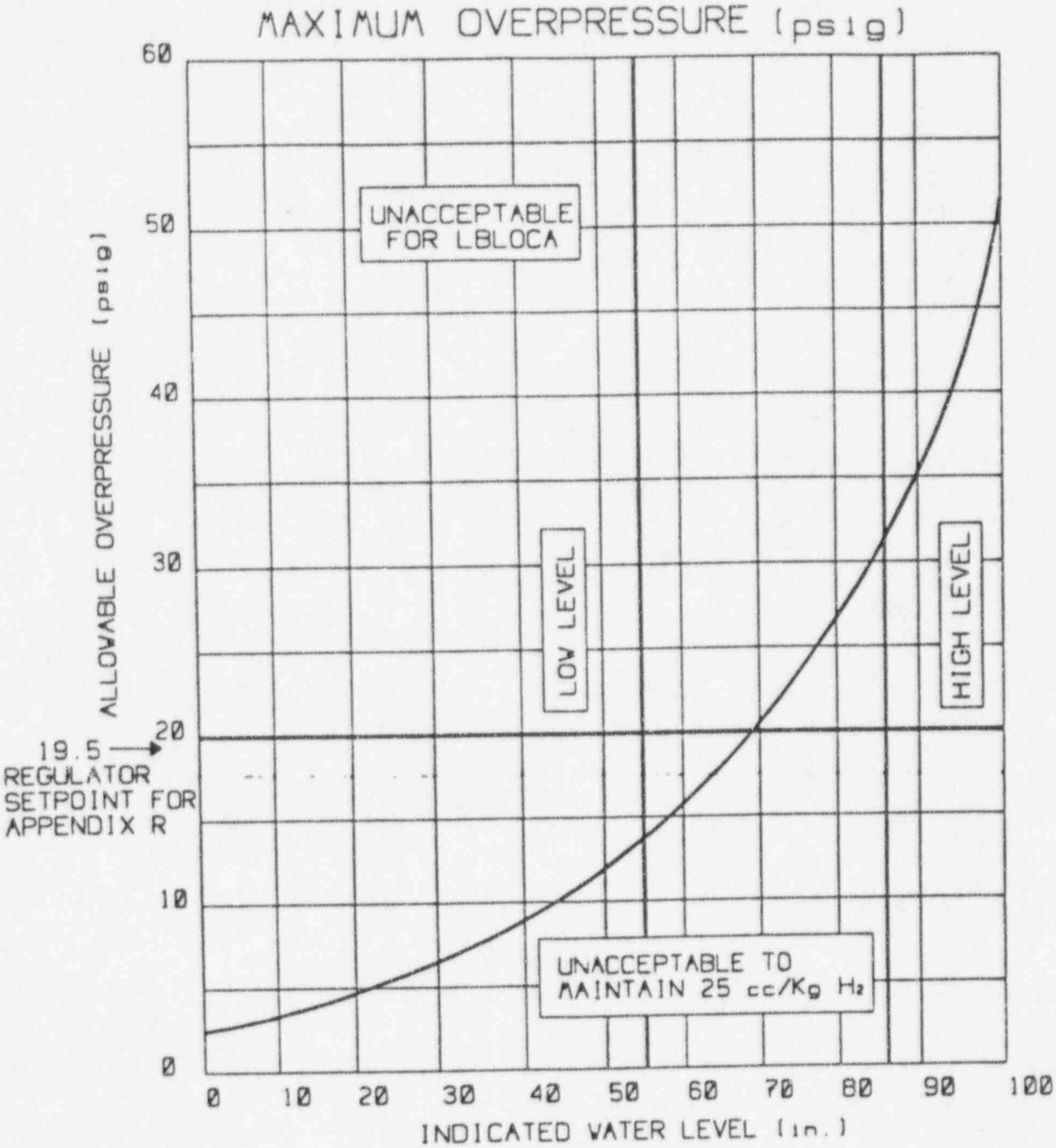
Conclusion

- FPC Management accepts responsibility for apparent violations
- There were deficiencies in some elements of management oversight in Sept. 1994
- The management oversight deficiencies and the other causes / contributing factors of the apparent violations have been addressed
- Effectiveness of corrective action is being monitored through enhanced self-assessment processes
  - » Senior management periodic self-assessment
  - » Department manager periodic self-assessments
  - » Nuclear Safety Assessment Team

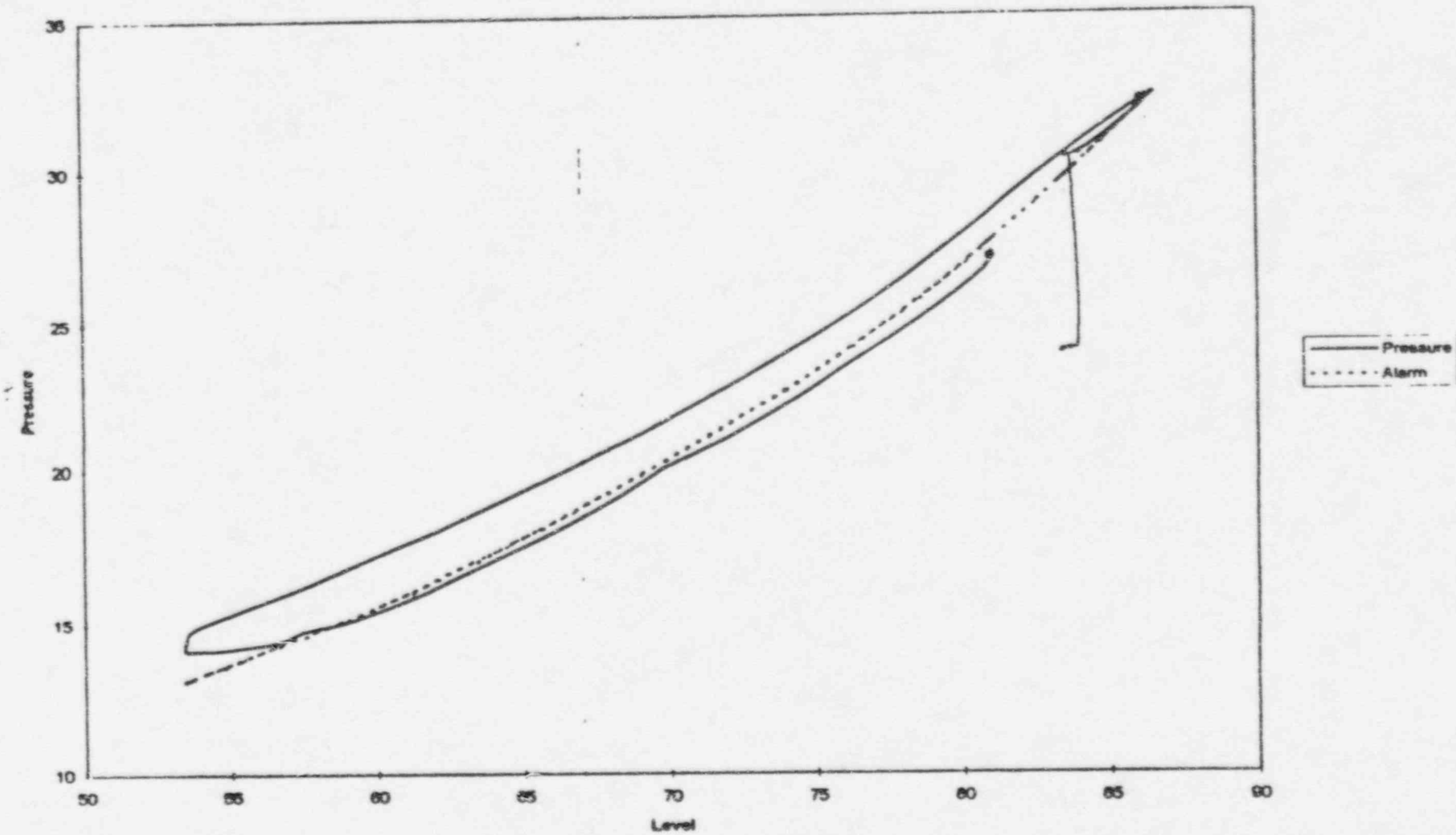
HPI/MU&P SYSTEM

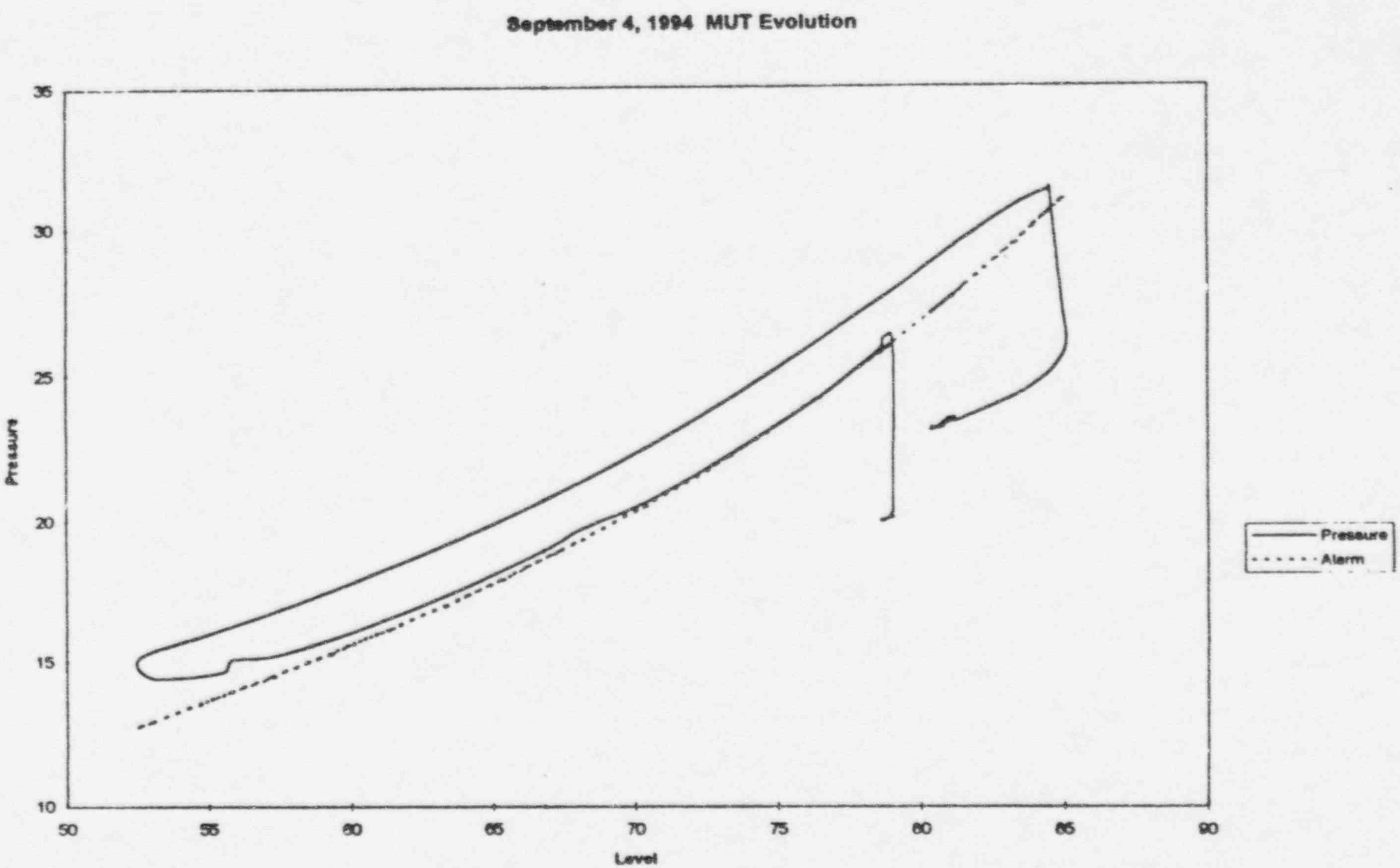


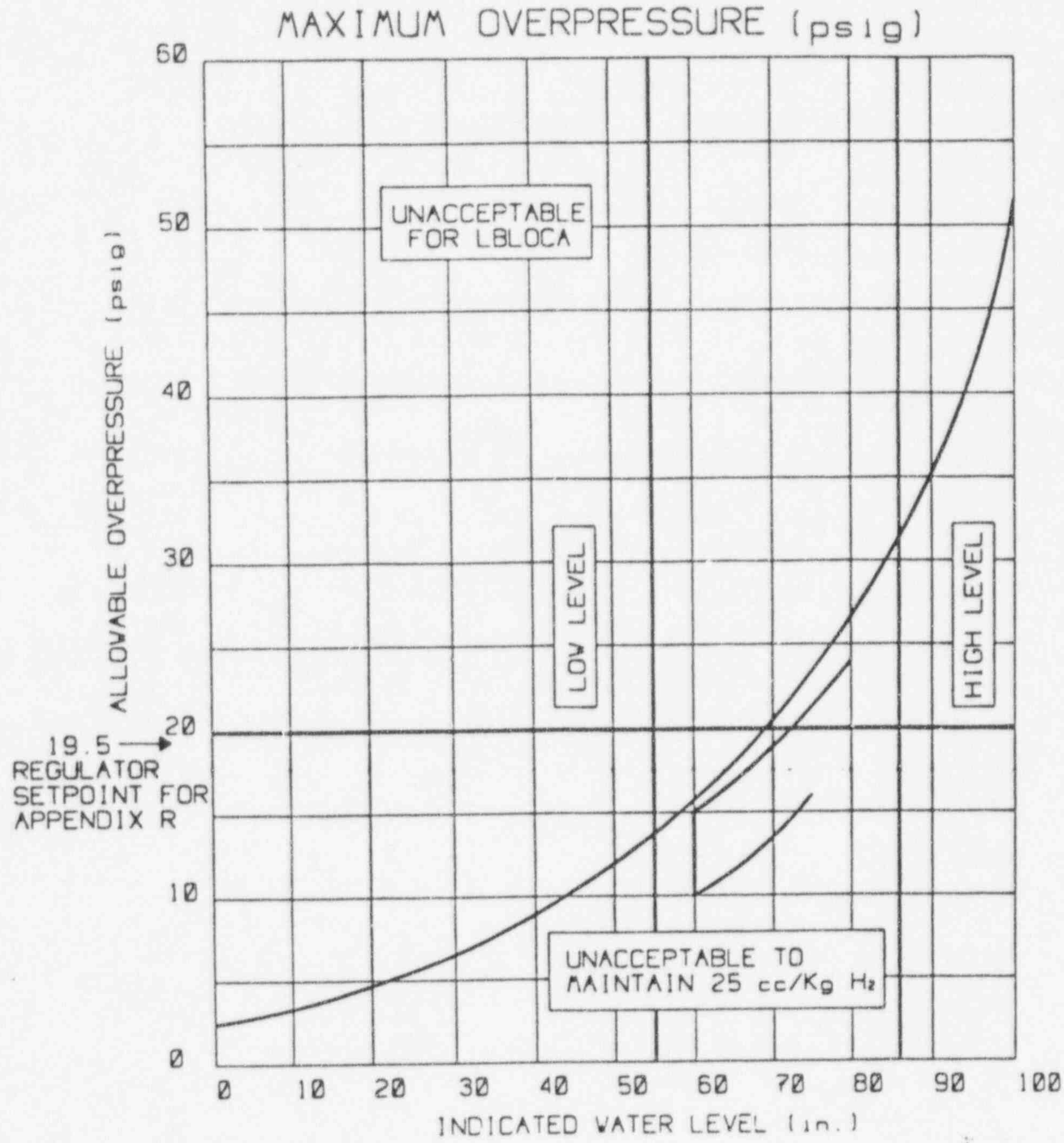

MAXIMUM OVERPRESSURE (psig)
ALLOWABLE OVERPRESSURE (psig)
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
INDICATED WATER LEVEL (in.)
ACCEPTABLE


MAXIMUM OVERPRESSURE (psig)
UNACCEPTABLE FOR LBLOCA
ALLOWABLE OVERPRESSURE (psig)
LOW LEVEL
HIGH LEVEL
19.5
REGULATOR SETPOINT FOR APPENDIX R
UNACCEPTABLE TO MAINTAIN 25 cc/Kg H2
60
50
40
30
20
10
0
0 10 20 30 40 50 60 70 80 90 100
INDICATED WATER LEVEL (in.)

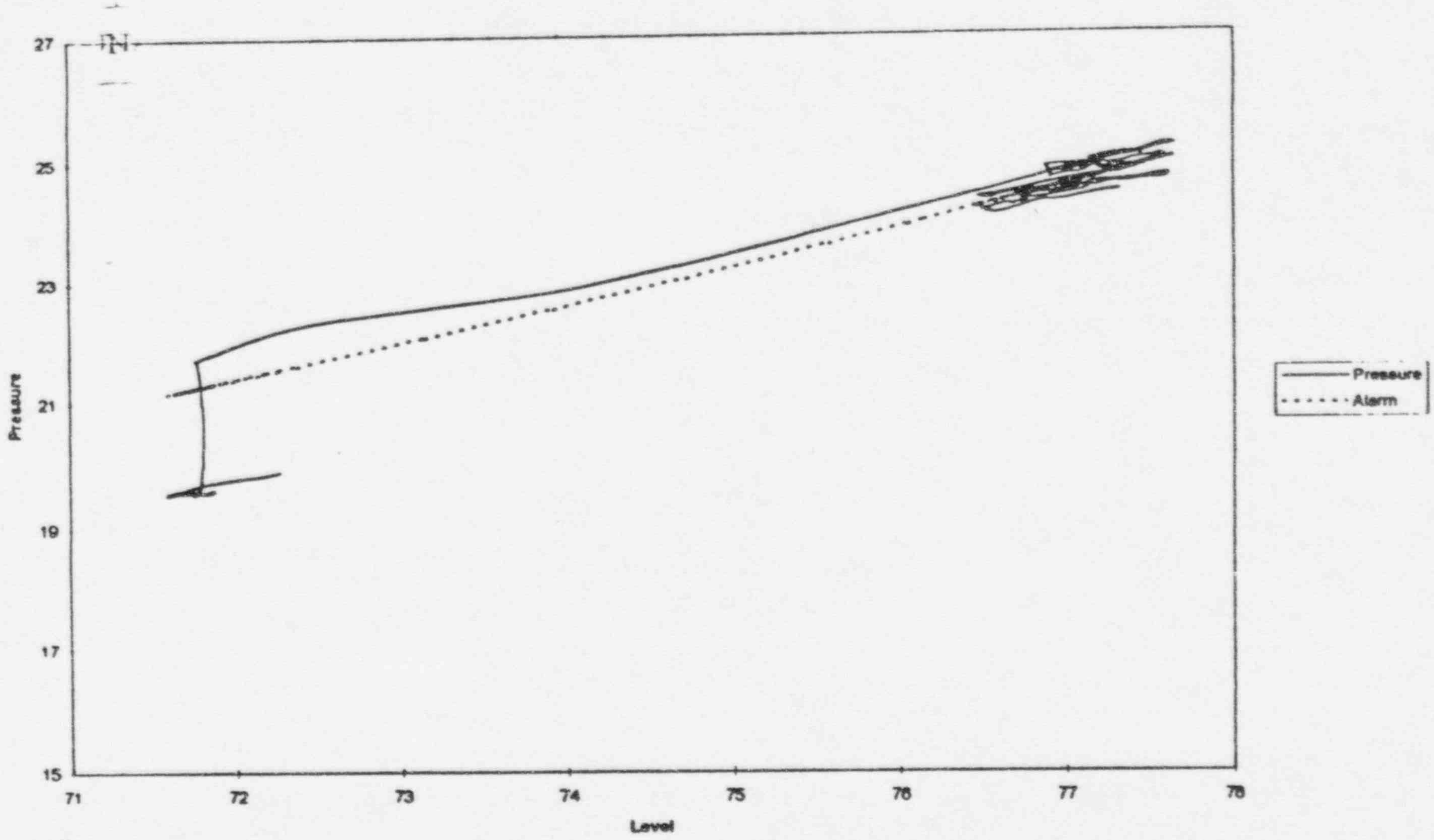
September 5, 1994



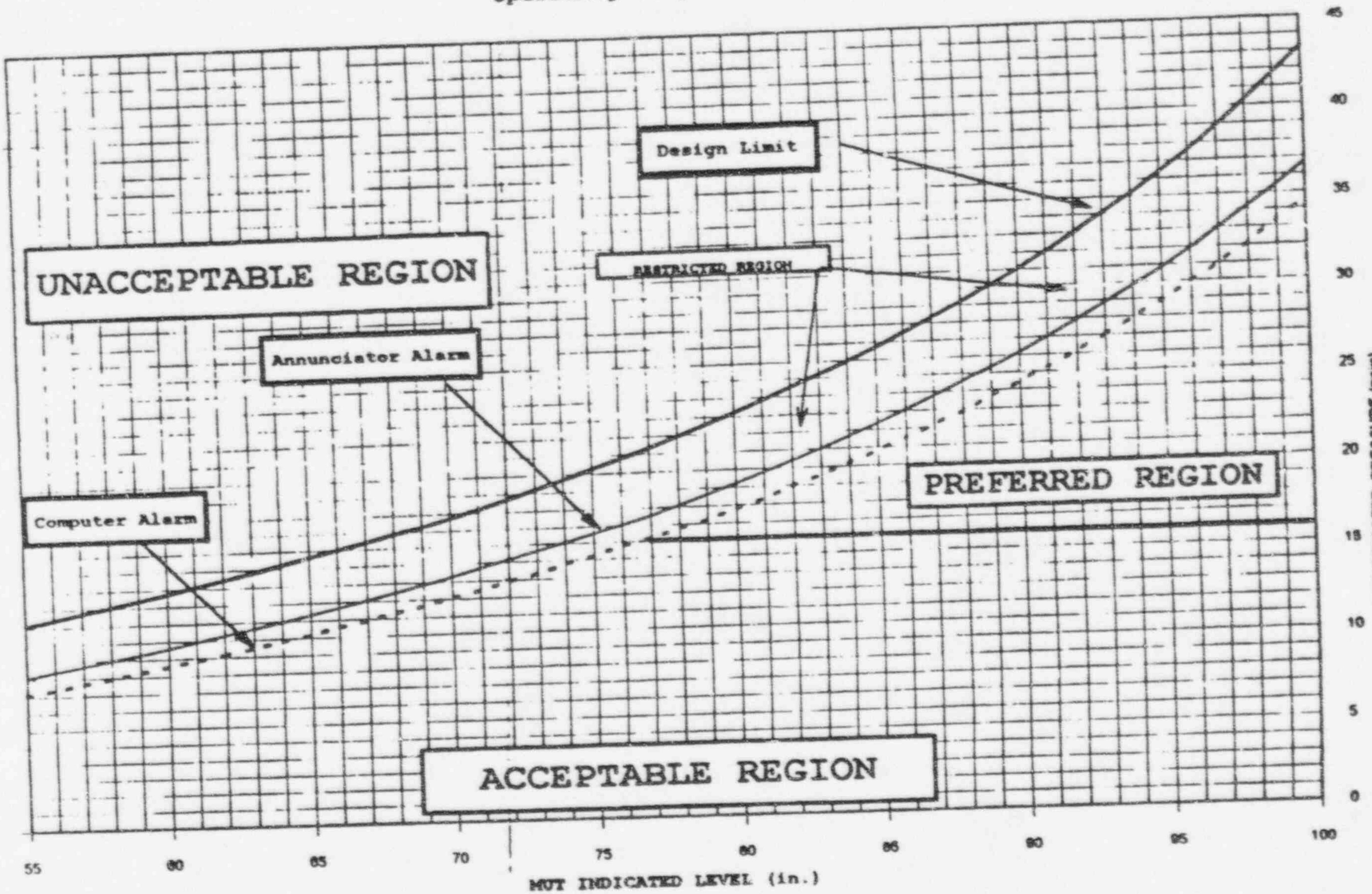

September 4, 1994 MUT Evolution
Pressure
Level
35
30
25
20
15
10
50
55
60
65
70
75
80
85
90
Pressure
Alarm


MAXIMUM OVERPRESSURE (psig)
ALLOWABLE OVERPRESSURE (psig)
UNACCEPTABLE FOR LBLOCA
LOW LEVEL
HIGH LEVEL
19.5
REGULATOR SETPOINT FOR APPENDIX R
UNACCEPTABLE TO MAINTAIN 25 cc/Kg H2
INDICATED WATER LEVEL (in.)
0
10
20
30
40
50
60
70
80
90
100

July 27, 1994 MUT Evolution



MAX. MUT OPERATING PRESSURE vs LEVEL
Operating Range



Index of Chronology Documents

Tab Number	Document
1	Detail Chronology notes
2	5/10/94 Problem Report PR94-0149
3	8/9/94 Email: Manager Operations to all operators
4	12/2/94 Management Review Panel to review NRC concerns of 11/16/94 meeting
5	12/8/94 Correspondence: FPC to NRC letter on Unresolved Item on Make Up Tank Operation (Beard to Ebneter)
6	12/19/94 LER 94-009
7	12/31/94 Memorandum: Poole to Beard; Management Review Panel results
8	3/10/95 Correspondence: FPC to NRC; Follow up to March 1, 1995 Management meeting
9	4/24/95 Memorandum: Management Follow-up to Make-Up Tank Event
10	5/5/95 Correspondence: FPC to NRC letter on Unresolved Item on Makeup Tank Operation (Beard to Ebneter)
11	7/7/95 Correspondence: NRC to FPC letter, Office of Investigation Report 2-94-036 and NRC Inspection Report 95-13
12	7/22/95 Memorandum: Letter sanctioning the FPC investigation into possible misconduct
13	9/6/95 Memorandum: Final Report on the Investigation of Possible Misconduct-Phase 1
14	9/18/95 Memorandum: Additional MUT Event Corrective Actions
15	12/27/95 Correspondence: FPC to NRC Letter on Additional MUT Alarm Conditions
16	1/24/96 Correspondence: Letter from FPC Counsel to NRC Office of Investigation
17	3/21/96: Status of 49 + 6 Corrective Actions
18	3/26/96: Status of MUT Action Plan

CHRONOLOGY OF EVENTS

1991 - 1992 **INPO Plant Evaluations recommended EPRI and B&W Chemistry Guidelines**

- o Industry focus on fuel failures
- o 1992 FPC response expressed intent to meet guideline recommendation of H2 concentration of 25 - 50 cc/kg
- o 1992 - 1993 series of plant meetings to determine how to raise pressure

04/93 **Make-Up Tank (MUT) Curve 8, OP-103B implemented**

- o Previous limit was flat line, maximum H2 pressure of 15 psig
- o Provided variable pressure / level alarm
- o Enabled operators to maintain higher H2 pressures
- o However, imposed additional operator burden

05/94 **SP-630, HPI full flow test results in Problem Report PR94-0149**

- o PR94-0149 to address anomalies noted during flow test
- o Level dropped unexpectedly
- o Possible MU pump cavitation
- o MUT pressure / level response did not follow shape of limit curve

06/94 - 09/94 **Management / Operations / Engineering interactions address PR94-0149**

- o Engineering reviewed MUT curve bases calculation
- o Curve reviewed and other initial actions completed in June 94
- o Series of meetings with Engineering and Operations
  - formal meeting on 08/05/94 with Operations and Engineering
  - followed by management meeting with DPNO, MNPO, MNPTS

09/02/94 **System Engineering Memo sent to Plant Manager**

- o Mainly addressed options to alleviate operator burden (included were operations suggestions form 08/05 meeting
- o Erroneously stated Curve 8 was reasonable and correct
- o Included PR94-0149 corrective action to review Curve 8 again by September 30, 1994
- o described options for addressing the MUT H2 issue

09/04/94 09/05/94 **MUT evolutions conducted**

- o "A" Shift Crew performs evolution on September 4, 1994
- o "A" Shift Crew reviews Curve 8 calculation on September 5, 1994 and concludes assumptions were incorrect
- o "A" Shift Crew performs evolution again on September 5, 1994
- o Crew presented data to generate Problem Report

09/07/94 **Problem Report PR94-0267 generated addressing 09/05 evolution**

- o PR94-0267 "MUT Pressure Curve Technical Basis Inadequate" written based on September 5, 1994 evolution

CHRONOLOGY OF EVENTS (continued)

09/13/94 **FPC learned that 09/05 evolution may have been an unauthorized test and notified NRC**

- o DPNO learns from system engineers about how evolution conducted and believe may be an unauthorized test
- o Notified NRC Senior Resident Inspector and Branch Chief

09/15/94 **Management Review Committee (MRC) convened**

- o Purpose was to review evolution and to address crew performance
- o Meant to enhance process by getting management involved
- o Confirmed was unauthorized test; developed recommendations to address issue and crew performance
- o MRC was good initiative, but circumvented normal Problem Report / root cause process
- o But didn't because trusted operators, etc.

09/94 - 12/94 **Corrective actions being implemented from MRC and PR94-0267**

- o Counselled all operators
- o Reviewed other operating curves for operation close to curve
- o After-the-fact test procedure developed by Shift Supervisor
- o Reviewed Curve 8 basis
- o Reviewed operator burden
- o Reviewed 25 cc/kg limit

11/16/94 **Curve 8 determined to be Design Basis Curve and reported in LER94-009**

- o As a result of PR94-0267 corrective action to review curve basis
- o For LB LOCA of core flood line break, LOOP, and opposite EDG
- o NRC notified by 1 hour report and LER written

11/22/94 **FPC - NRC Management Meeting conducted**

- o To review recent issues including MUT evolution

12/02/94 **FPC corrective actions to address 09/05 MUT test reported to NRC in letter**

- o In follow up to FPC - NRC Management Meeting

FPC initiated management self-assessment

- o To address issues identified and discussed at FPC - NRC meeting
- o Led by NGRC member

CHRONOLOGY OF EVENTS (continued)

12/94 - 03/95 **First OI investigation conducted**

- o Talked to crew which performed evolution and MNPO

02/95 **Issue Manager for MUT technical issues assigned**

- o All remaining corrective actions on MUT technical issues pulled together in Action Plan
- o Included PR94-0149 and PR94-0267

02/95 **49 step Management Corrective Action Plan (MCAP) established**

- o Based on management self-assessment results of December 1994 and other input
- o MCAP is pertinent - actions address underlying factors reflected in the apparent violations
- o Focus on safety and human performance

03/95 **First FPC - NRC MCAP meeting conducted**

- o Initiated by NRC
- o Series of periodic meetings
- o Four (4) meetings conducted to date

07/07/95 **NRC Inspection Report 95-13 for Predecisional Enforcement Conf. issued**

07/13/95 **FPC management alerted to 09/04/94 evolution and notified NRC**

- o Bargaining unit operators raised issue through attorney to FPC attorney to PMB
- o System Engineer raised issue through CR-3 management
- o Plant Manager confirmed with Shift Supervisor that September 4, 1994 evolution had been performed
- o Why Management didn't know before? - Refer to below

08/95 **FPC investigation initiated as a result of learning of 09/04/94 evolution**

- o 4 personnel with experience in plant management, operational, investigative, and QA & employee concern
- o Interviewed many personnel
- o Reviewed 1994 logs and strip chart for any inappropriate MUT evolutions and alarms
- o Conclusions of report
  - Unauthorized test was conducted on 09/04/94
  - No other unauthorized test conducted on MUT in 1994
  - Evidence that NSS and ANSS withheld information
  - Bargaining unit operators could have been more forthcoming
  - 3 engineers knew of test
  - No evidence that management knew of test
  - Other issues - no root cause; NSS authority adequately defined

CHRONOLOGY OF EVENTS (continued)

08/95 - 10/95 **Additional corrective actions resulting from investigation implemented**

- o Two personnel - terminated, two personnel - licensed revoked, one person - written reprimand, one person - verbal counseling
- o Based on time lapse of finding out about 09/04/4 evolution - integrity
- o Six additional corrective actions
  - Broadened focus of situations that defined as infrequently performed tests
  - Checklist for infrequently performed tests approved by DPNO
  - Ensured intent of procedure is considered by NSS and follow CAPS:
    Communicate
    Approve
    Plan
    Schedule
  - Expanded MRP process
  - Reinforced log keeping practice
  - Developed specific examples of evolutions within and not within NSS authority and conducted training on examples and on guidance in applicable AIs

08/95 - 12/95 **Second OI investigation conducted**

- o Interviewed crew that performed evolutions, other licensed operators, and management

12/08/95 **Additional MUT alarm events identified**

- o **Investigation conducted**
  - Reviewed computer logs of available data and identified no alarm conditions after September 9, 1994
- o **Additional corrective actions implemented**
  - Strengthened alarm response
  - Strengthened alarm training
  - Reviewed past corrective action

12/27/95 **FPC reported results of investigation to NRC**

03/08/96 **NRC Inspection Report 95-22 with 4 apparent violations issued**

PROBLEM REPORT

PR 94 - 0149

PART 1: INITIATION, REVIEW, AND ISSUANCE OF THE PROBLEM REPORT BY THE ORIGINATING ORGANIZATION

(1) Title / Subject: MUV-60 STUCK OPEN

SUPPORTING INFORMATION

(2a) Method of Discovery (e.g.; procedure/work request performance, routine activities, inspection, walkdown, etc.):	DURING THE PERFORMANCE OF SP-630, MUP/HPI CHECK VALVES FULL FLOW TEST, AN UNEXPLAINED LEVEL DECREASE IN THE MUT WAS OBSERVED. WORK REQUEST NU0319210 WAS WRITTEN.
(2b) Plant Condition (e.g., outage, normal operation, unusual evolution, etc.):	REFUELING OUTAGE 9R IN PROGRESS WITH NO FUEL IN THE CORE.
(2c) Date/Time of Occurrence :	Date: 05/10/94 Time: APPROXIMATELY 0600
(2d) Plant Location (if applicable; required for radiological safety concern):	Building: AUXILIARY Elevation: 95' Area/Room: 308P
(2e) Equipment Tag Number(s): MUV-60	(2f) Vendor Name (if Known): UNKNOWN

(3) Description of the Condition/Event: WHILE PERFORMING SP-630, MUP-1C WAS IN SERVICE AT 500 GPM. AFTER THREE MINUTES AT THIS FLOW RATE, MUT LEVEL DECREASED FROM 35" TO 29" FOLLOWED BY EACH LOOP FLOW DECREASING FROM 125 GPM TO 100 GPM. THE OPERATOR IMMEDIATELY TRIPPED MUP-1C. WHEN MUV-58 WAS FIRST OPENED, THERE WAS A NOTICEABLE DECREASE IN MUT LEVEL INDICATING REVERSE FLOW THROUGH MUV-60 CHECK VALVE. MUV-60 SUBSEQUENTLY CLOSED AND SEATED.

Is this problem a Radiological Safety Concern: [ ] YES [X] NO If YES, immediately contact HP Supervisor for proper documentation.

(4) Requirement(s) Violated (required field): PER THE RESPONSE TO REA 91-0862, THE SAFETY FUNCTION OF MUV-60 IS TO CLOSE TO PREVENT PUMPING LPI DISCHARGE FLOW TO THE BWST IN THE EVENT MUV-58 FAILS TO CLOSE. MUV-60 PREVENTS THIS SINGLE ACTIVE FAILURE FROM BYPASSING FLOW TO THE BWST DURING LOCA CONDITIONS WHICH WOULD RESULT IN A REDUCTION IN TOTAL CORE COOLING FLOW. THIS CHECK VALVE ALSO PREVENTS A PATH FOR POTENTIALLY HIGHLY CONTAMINATED WATER FROM THE RB SUMP TO EXIT THE REACTOR BUILDING BOUNDARY.

(5) Associated/Related Documents (if any; e.g.: LER Number, Procedure Number, Work Request, NRC Violation Number, previous Problem Reports, etc.): DRAWING FD-302-661, WORK REQUEST NU0319210, REA 91-0862, PROCEDURE SP-630, MUP/HPI CHECK VALVES FULL FLOW TEST, SHIFTER'S LOG DATED TUESDAY, MAY 10, 1994.

(6) Immediate Actions Taken (if any): (1) SECURED MUP-1C. (2) RE-VENTED THE MUP-1C SUCTION PIPING. (A) VENT PUMP AND FOUND NO AIR. (B) VENTED THROUGH MUV-286 AND FOUND SOME AIR. (3) MUV-60 FINALLY SEATED AND SP-630 WAS COMPLETED SATISFACTORILY.

(7) Suspected Causes (check all that appear to apply): [ ] Design Error [ ] Personnel Error [ ] Inadequate Procedure/Document [X] Equipment Failure/Malfunction [ ] Unknown [ ] Other (describe):

(8) Recommendations for Resolving the Problem (if any): NONE AT THIS TIME.

(9) Originator (print name): K. O. VOGEL Date: 05/10/94

(10) Originating Department Supervisor/Manager Review:

PR is: [ ] a KNOWN Design Basis Issue (if checked, Classify PR as Significant)
[ ] SUSPECTED Design Basis Issue (if checked, Classify PR as Significant)
[X] Not a Design Basis Issue

PR is Classified as:
[X] SIGNIFICANT
[ ] NONSIGNIFICANT

(11) Recommended Responsible Org:	NUCLEAR PLANT TECHNICAL SUPPORT	Accepted By: L. W. MOFFATT/BY DMC Date: 05/10/94 (May be left blank if acceptance is not obtained)
Responsible Org. Manager:	L. W. MOFFATT	CAP Assignment (if applicable):

(12) Originating Supv/Mgr (print & sign): K. O. VOGEL Ken Vogel

(15) PR Issue Date: 05/10/94

IF THE PROBLEM REPORT IS CLASSIFIED AS SIGNIFICANT, THEN TRANSMIT TO THE SOTA.

IF THE PROBLEM REPORT IS CLASSIFIED AS NON-SIGNIFICANT, THEN TRANSMIT TO THE DIRECTOR, QUALITY PROGRAMS.

(13) DIRECTOR, QUALITY PROGRAMS: R. F. McGee Date: 5/10/94

PROBLEM REPORT TRANSMITTED TO THE RESPONSIBLE ORGANIZATION [ ] By: ________ Date/Time: ________

PROBLEM REPORT

PR 94 - 0149
Page: 2

PART 2 - SECTION A1: REVIEW BY THE SOTA

(1) This Problem Report is:
REPORTABLE: [X] NO [ ] YES (Section B of this attachment is required if YES)
A TECHNICAL SPECIFICATION VIOLATION: [X] NO [ ] YES
AN UNPLANNED RELEASE: [X] NO [ ] YES
The failure of MUV-60 is considered a single failure which is addressed by design

SOTA (print & sign): WKBandhauer WKBandhauer Date/Time: 5/10/94 1245

IF REPORTABLE, THEN COMPLETE PART 2 - SECTION B.

PART 2 - SECTION A2: PLANT CONDITIONS AND IMMEDIATE NOTIFICATIONS BY THE SOTA (if required)

(1) Plant Conditions:
Mode: ____ RX PWR: ____ MWe: ____ RCS Temperature: ____ Pressure: ____

Occurrence Date: ____ Occurrence Time: ____ Identified Date/Time: ____

Other (describe):

(2) Redundant Equip Available:

(3) SP/Maint:

(4) Tech Spec Affected:

(5) Action Statement Summary:

(6) Action Entry Date: Time:

(7) Evaluate Immediate Notification (use EM-202 if Emergency Declared)

Emergency Plan Implemented: NO ____ YES ____ Classification ____

(8)

CP-111 Reference	Phone Call Required YES	NO	Time Limit	Organization
a. 10CFR50.72	____	____	1 HOUR OR 4 HOUR	NRC OPERATIONS CENTER
b. 10CFR20.1906	____	____	IMMEDIATE	NRC REGION II
10CFR20.2201	____	____	IMMEDIATE	NRC OPERATIONS CENTER
. 10CFR20.2202	____	____	IMMEDIATE OR 24 HOUR	NRC OPS CENTER/DHRS
e. 10CFR50.36	____	____	1 HOUR	NRC OPS CENTER
f. NPDES PERMIT	____	____	IMMEDIATE	FPC SUPERVISOR, WATER PROGRAMS
g. TS 2.2.5	____	____	24 HOUR	NRC OPS CENTER/FPC SR.VP/NGRC
h. EPP	____	____	24 HOUR	NRC REGION II/FPC ENVIRONMENTAL SERVICES
i. ANI/FPC RISK	____	____	IMMEDIATE	NRC OPERATIONS CENTER/ANI/FPC RISK
j. 10CFR70.52a	____	____	1 HOUR	NRC OPERATION CENTER
k. 29CFR1904.8	____	____	IMMEDIATE	FPC NUCLEAR SAFETY SPECIALIST
CP-141 Reference				
a. 10CFR73.71	____	____	1 HOUR	NRC OPERATIONS CENTER

(9) NOTIFICATIONS:

	NAME	TITLE	DATE/TIME	EVENT #
a. SSOD				
b. STATE				
c. NRC(ENS)				
d. NRC (REG II)				
e. FPC				
f. DHRS				
g. OTHER				

(10) NOTIFICATION OF THE DNPO COMPLETED: [ ] YES [ ] NO Performed by (Initial): Date:

(11) SOTA (print & sign): Date & Time:

PART 2 - SECTION B NSM Comments/Recommendations

) Nuclear Shift Manager (print & sign): W. Marshall Date/Time: 5/10/94 1250

WARD THIS SECTION TO THE DIRECTOR, QUALITY PROGRAMS

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PART 3 - SECTION A: PROBLEM INVESTIGATION AND CAUSE ANALYSIS

(1) **Method of Performing Cause Analysis:** [ ] Structured Analysis [XX] Deductive Logic

(2) CHECK ALL CAUSES THAT APPLY:

Human Performance

[ ] Verbal Communication [ ] Work Schedule [ ] Supervisory Methods [ ] Environmental Conditions
[ ] Written Communication [ ] Work Organization/Planning [ ] Managerial Methods [ ] Interface Design or Equipment Condition
[ ] Training/Qualification [ ] Work Practices [ ] Change Management
[ ] Resource Management

Equipment Performance

[X] Plant/System Operation [ ] Maintenance/Testing [ ] External [ ] Design Configuration/Analysis
[ ] Equipment Spec/Mfg/Construction

(3a) **Primary Cause(s):**
The primary cause for MUV-60 to stick open has been attributed to the valves limited use. This valve was rebuilt in June of 1992. Until the recent performance of SP-630, this valve had not been completely cycled since the July 1992 performance of SP-614. It is believed that contaminants in the hinge pin area were present which caused the valves to initially hang open. Based on REDAS BWST and Make-Up Tank level indications during SP-630, MUV-60 was initially open at the start of SP-630. This implies that MUV-60 could have been in the open position since the 1992 performance of SP-614. As indicated in Part 1, Step 4 of this PR, MUV-60 has a safety function to close during the piggyback mode of operation. In the event MUV-58 failed to close during the piggyback line-up where LPI is taking suction from the RB sump, MUV-60 would prevent LPI flow from being diverted back to the BWST. However, the main difference in the recent failure of MUV-60 to initially close and its closure in the piggyback line-up is as follows: During the recent performance of SP-630, the differential pressure (DP) available to check or close MUV-60 was approximately 7 PSIG. This is based on the existing MUT-1 level and over pressure, the BWST level present at the start of SP-630 for MUP-1C and head losses at 100 GPM. In a piggyback line-up where closure of MUV-60 is critical, the DP would be greater than 140 psig or 20 times higher than the 7 PSIG DP that did not seat the valve at the start of SP-630. Based on this difference, the probability of MUV-60 closing upon initiation of piggyback is considered very high. As indicated in Part 1, Step 3, MUV-60 eventually closed with the 7 psig DP present after MUV-58 was stroked several times.

In order to ensure a problem did not exist with MUV-60, WR319210 was written to open and inspect the valve internals. This WR was completed May 12, 1994, i.e. two days after the performance of SP-630. This inspection concluded that the overall condition of MUV-60 is good and no binding of the valve disc was evident.

(3b) **Secondary Cause(s):**
This problem report also addresses the rapid decrease in make-up tank level and an unexpected reduction in each HPI loop flow during the performance of SP-630 for MUP-1C. Although this is not considered to be secondary cause for the failure of MUV-60 to close, it was an unexpected occurrence which warrants further evaluations and discussion. In addition to these concerns Operations reported that MUP-1A appeared to cavitate during SP-630 while DHP-1A was in service. Each of these unexpected conditions were evaluated. For details, please see Attachment #1.

(3c) **Contributing Factor(s) :**
As indicated in the Secondary Cause section, the rapid drop in Make-Up tank level which occurred at the start of SP-630 for all three Make-Up pumps is a normal condition. However, based on a comparison made by Operations personnel of the actual drop in Make-Up tank level to the "Maximum Make-Up Tank Over-pressure" curve (OP-103B, Curve #8), it appeared that a curve plotted with the actual data points trended toward the unacceptable region of curve #8 as make-up tank level dropped (See Attached Procedure Discrepancy Report, Attachment #3). Although the plotted curve did not enter the unacceptable region, the initial over-pressure in the make-up tank was below the maximum allowable pressure per curve #8 by approximately two pounds. The concern is: If the maximum allowable pressure had been used would the actual plotted curve have entered the unacceptable region. Based on this concern, the subject curve has been revisited. See Attachment 2 for the results of this evaluations.

(4) **SUPPORTING INFORMATION (IF APPLICABLE):**

LER No:	NA	PROCEDURE No:	SP-630	WR No:	319210	NRC VIOLATION No:	NA
OTHER:	NA						

(5) **Nuclear Safety Consequences Analysis:** Not applicable because failure was not reportable.

(6) **Previous Similar Events/Conditions:** None known

(7) **Manufacturer/Nameplate Data:** MUV-60 is a Crane Co. 6", 300 LB cast swing check valve (Ref. Dwg: FPC M-3522).

(8) **Nonconforming Equipment/Material Disposition:**
[XX] N/A (no nonconforming equipment or material involved) [ ] Accept-As-Is* [ ] Repair* [ ] Rework
[ ] Other (describe): ______
* Engineering Justification and Approval Required for these Dispositions (obtain documentation and attach)

(9) **Maintenance Preventable Functional Failure (MPFF):**
[XX] No [ ] INITIAL [ ] REPETITIVE

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PROBLEM REPORT

PR 94-0149

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PART 3 - SECTION B: Corrective Action Plan (CAP)

(1) Corrective Action Plan:

ACTIONS	SCHEDULED COMPLETION DATE	ASSIGNED ORGANIZATION/INDIVIDUAL
1) Open and inspect MUV-60.	Completed May 12, 1994	Mechanical Maintenance Shop/Len Clewatt, per WR 319210
2) Revise OP-402 to add a section to fill and vent the BWST suction piping to MUP-1A and MUP-1C.	Completed May 23, 1994	Operations/Dave Jones Ref: OP-402, Rev. 75
3) Generate an REA to add a vent valve in each of the BWST supply lines to the Make-Up pump suction header. Per Operations request, this REA should also add drain valves as well. The vent valves will ensure complete venting of the subject piping is possible.	Completed June 14, 1994	NPSE/Pat Hinman Ref: REA94-0747
4) Based on the inspection of MUV-60, perform an evaluation of MUV-60 failing to close. This evaluation should consider the valves safety function.	Completed June 14, 1994	NPSE/Pat Hinman Ref: PR Part 3a.
5) Based on actual plant data recorded during SP-630 for MUP-1C, evaluate the rapid decrease in Make-Up tank level and unexpected drop in HPI loop flow.	Completed June 14, 1994	NPSE/Pat Hinman Ref: Attachment #1
6) Based on actual plant data recorded during SP-630 for MUP-1A, evaluate the proposed cavitation which occurred when DHP-1A was in service.	Completed June 14, 1994	NPSE/Pat Hinman Ref: Attachment #1
7) Evaluate the actual Make-Up tank level and overpressure drop which occurred during SP-630. Determine if OP-103B, Curve #8 is acceptable.	Completed June 14, 1994	NPSE/Pat Hinman Ref: Attachment #2
8) Provide the technical bases for a BWST swap-over point considering NPSH requirements, vortexing and Make-Up tank level and over-pressure per OP-103B, Curve #8. (including transition times).	Sept. 9, 1994	NOE/Brian Gutherman OK per telecon w/BG DMC
9) Evaluate REA 94-0747 for the installation of vent valves. Present to PMRG if a MAR is required.	April 1, 1995	SNES/Tony Petrowsky [signature] for AP 6/15/94

(2) ADDITIONAL CAP INFORMATION

(3) Developed by (print & sign): Pat Hinman Pat Hinman Date: June 14, 1994

(4) Responsible Organization Approval by (print & sign): D M Czufin (D.M.Czufin) 6/15/94 J.H.Terry [signature] Date: 6/15/94

IF THE PROBLEM IS CLASSIFIED AS REPORTABLE OR A TECHNICAL SPECIFICATION VIOLATION, THEN OBTAIN THE FOLLOWING APPROVALS

(5) PRC: MTG No:

(6) DNPO: Date:

WHEN COMPLETE, TRANSMIT TO SUPERVISOR, QUALITY SYSTEMS.

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PROBLEM REPORT

PR 94 - 0149

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PART 3 - SECTION B: Corrective Action Plan (CAP)

(1) Corrective Action Plan: ACTIONS	SCHEDULED COMPLETION DATE	ASSIGNED ORGANIZATION/INDIVIDUAL
10) DEVELOP MAR TO INSTALL VENT/DRAIN VALVES UPSTREAM OF MUV-58 AND MUV-73 (MAR 95-02-17-01)	9/30/95	NED/J.R. MASEDA (GUTHERMAN)
11) INSTALL MAR 95-02-17-01 FROM CORRECTIVE ACTION #10 DURING 10R OUTAGE	6/1/96	PROJECTS/K.F. LANCASTER
12) UTILIZE SP-630 DURING THE 10R OUTAGE (CONTINGENT ON THE INSTALLATION OF MAR 95-02-17-01) TO ASSESS THE EFFECTIVENESS OF CORRECTIVE ACTIONS #2 AND #11 AND TO VALIDATE THE EVALUATION/CONCLUSIONS ARRIVED AT IN CORRECTIVE ACTIONS #5 AND #6. PLANT CONDITIONS UNDER WHICH SP-630 WAS CONDUCTED DURING THE 9R OUTAGE WILL BE REPRODUCED AS CLOSELY AS POSSIBLE.	6/30/96	NPTS/J.W. CAMPBELL (SALTSMAN)
13) RECORD MUT LEVEL VERSUS PRESSURE DATA DURING CONDUCT OF SP-630 IN 10R OUTAGE AND APPLY CORRECTIVE ACTION #7 TO THE REVISED OP-103B, FIGURE 8 CURVE ARRIVED AT VIA CORRECTIVE ACTION #1C OF PR 94-0267.	6/30/96	NPTS/J.W. CAMPBELL (SALTMAN)
NOTE: THE ABOVE CORRECTIVE ACTIONS CONSTITUTE A REVISION OF THE ORRIGINAL CAP FOR PR 94-0149 WHIC WAS DEVELOPED BY J.P. HINMAN ON 6/14/94 AND APPROVED BY J.H. TERRY ON 6/16/94.		

(2) ADDITIONAL CAP INFORMATION:

(3) Developed by (print & sign): PHILIP E. SALTSMAN — Date: MARCH 6, 1995

MWDonovan for PES

(4) Responsible Organization Approval by (print & sign): M. W. DONOVAN — Date: MARCH 13, 1995

MWDonovan 3/13/95 MWDonovan for JWC 3/16/95

(5) NSM CAP Approval: (print & sign): — Date:

PART 3C: FINAL REVIEW OF COMPLETED CORRECTIVE ACTIONS BY THE TTG

Comments:

(2) TTG Final Package Review (print & sign): Date:

WHEN COMPLETE, TRANSMIT TO TTG.

To: *JOURNAL
From: GHALNON
Subject: Journal
Date: 08-09-94 Time: 2:00p

****
***
There is an ongoing discussion on the issue of H2 pressure in the MUT. I have talked to Mark V. and understand the concerns. I discussed this with Bruce and Jerry Campbell and will be working to resolve the questions. It is important, and Bruce has asked, if anyone has a concern, please write it down and send it to me. Even if it is not new, I need to get all perspectives of this issue so we can address the right areas. It appears what has been addressed has not satisfied the concerns to date, so I need to be absolutely clear on the questions.
****

Florida Power Corporation

INTEROFFICE CORRESPONDENCE

NUCLEAR OPERATIONS ADMINISTRATION — Office | A7E — MAC | 231-5682 — Telephone

SUBJECT: Management Review Panel

TO: R. M. Bright
B. J. Hickle
L. C. Kelley
P. F. McKee
D. C. Poole

DATE: December 2, 1994
VPNP94-0051

You are hereby designated a Management Review Panel member, with the task of reviewing the concerns expressed by the NRC at a meeting on November 16, 1994. Dan Poole will act as Chairman of the panel.

The concerns expressed by the NRC were categorized as safety sensitivity, credibility of information, commitment management, and procedure adherence. The specific examples noted by the NRC will be provided to you. You are to review these examples and any other information available in plant records as deemed appropriate. You may also interview FPC personnel as needed.

Based on your review, you are to provide me a report by December 31, 1994, with conclusions regarding the NRC concerns and any recommendations for management action beyond those already planned or in progress to address specific examples.

Pat

P. M. Beard, Jr.

PMB:lss

***************** NOTE *****************
PLEASE DESTROY PREVIOUS COPY OF THE ENCLOSED CORRESPONDENCE. THE ATTACHMENTS TO THAT LETTER HAVE BEEN REVISED.
****

Florida Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

Post-it® Fax Note 7671	Date	# of pages ▶ 46
To Mr Pat Beard	From Licensing / [illegible]	
Co./Dept.	Co.	
Phone #	Phone # 240-3546	
Fax #	Fax #	

December 8, 199-
3F1294-15

Mr. Stewart Ebneter
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, N.W., Suite 2900
Atlanta, GA 30323

Subject: FPC to NRC Letter 3F1294-09, dated December 2, 1994
Unresolved Item 94-22-01, Makeup Tank Operation

Dear Mr. Ebneter:

On December 2, 1994 Florida Power Corporation (FPC) submitted the subject letter which provided information associated with Unresolved Item No. 94-22-01, Make-up Tank Operation. Some of the information in the attachments to that letter dealt with the actions and performance of individuals at FPC. FPC inadvertently included their names which potentially conflicts with their rights to reasonable privacy.

We have produced a copy with the names of those inviduals below the manager level removed to protect the privacy of the individuals involved. A revised copy is enclosed. FPC will also redistribute the revised copy internally.

Sincerely,

P. M. Beard, Jr.
Sr. Vice President
Nuclear Operations

PMB:JBC
Attachment

xc: Document Control Desk
NRR Project Manager
Senior Resident Inspector
J. M. Taylor

Florida Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

December 2, 1994
3F1294-09

Mr. Stewart Ebneter
Regional Administrator, Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, N.W., Suite 2900
Atlanta, GA 30323

Reference A: NRC to FPC letter, 3N1194-02, dated November 4, 1994

Subject: Unresolved Item 94-22-01, Makeup Tank Operation

Dear Mr. Ebneter:

The purpose of this letter is to follow up on the meeting of November 22, 1994 and specifically to provide additional information regarding resolution of unresolved item 94-22-01, makeup tank operation. You were particularly concerned about the operations shift conducting an unauthorized evolution and the length of time it has taken us to address the technical issues involved. Based on feedback from the meeting, we perceive that you were also concerned whether or not FPC management recognized the importance of the principle involved in the operator actions and what management action had been taken. I can assure you that we fully recognized the importance and (as listed below and reflected in the attachments), we have taken appropriate management action. We regret that this specific issue was not personally communicated promptly to you. Our FPC and NRC contacts have and will continue to discuss how to improve future communications on such issues. We remain committed to candid, timely and thorough communications.

Attachment 1 provides details of the operational evolution which occurred on September 5, 1994. Subsequent follow-up actions taken include the following:

1. On September 7, a Problem Report (PR94-0267) was generated to document that the makeup tank operating curve appeared to be non-conservative.

2. In order to provide immediate response to accommodate the potentially non-conservative curve which included the possibility of operating outside the design basis, a short term instruction was issued on September 9, which provided a temporary reduced operating limit of 2 psig below the current operating curve. This instruction was further revised on September 14 to include an additional 0.5 psig margin. (see Attachment 2)

3. On September 13, FPC management recognized that the method of obtaining the data constituted an unauthorized evolution. The following day the Plant Manager and Nuclear Licensing Manager initiated communications with the resident inspectors and Region II staff to discuss the evolution and the results. This is reflected in page 2 of the summary section of Reference A. Copy provided as Attachment 3.

4. The Shift Supervisor and Assistant Shift Supervisor of the shift involved were administratively restricted from shift duties until they could meet with a Management Review Committee which was convened to address the issue.

5. The Management Review Committee met on September 15, 1994 and laid out a series of actions which are reflected in Attachment 4. Actions included Operations Management meeting with each Shift Supervisor and discussing the principle involved in this evolution. Each Shift Supervisor then subsequently discussed the issue with his shift.

6. Following the Management Review Committee meeting, the Plant Manager counselled the Shift Supervisor and Assistant Shift Supervisor. Once satisfied with their understanding of the issue and after being assured of their commitment to improve overall shift performance, the administrative restriction was lifted.

7. In a continuing assessment of the shift's competency the Plant Manager observed them in simulator training on October 25. This assessment confirmed that their performance was satisfactory to continue in these positions. The Plant Manager's observation notes are included as Attachment 5.

8. At a meeting with all Shift Supervisors on October 14, 1994, I discussed the principle involved in conducting this evolution and made it clear what management's position and expectations are.

I believe it is evident from the above that management took appropriate action to address this issue.

With respect to your concern about the length of time to resolve the technical (design basis) issue, this issue is quite complex as reflected in Attachment 6. Attachment 7 identifies the initial corrective action plan developed on September 21, and also provides a revised plan to incorporate actions developed from the Management Review Committee meeting.

On November 16, 1994, I attended a meeting to review the calculational basis for the curve and although there was some justification for taking the position that the curve, (although non-conservative) was not a design basis issue, we elected to conservatively declare it so and make a report as reflected in Attachment 7. It is to be noted, however, that with the issuance of the short term instruction on September 9th, the plant subsequently has remained within the design basis.

We also acknowledge your staff's concern on the topics of safety sensitivity, credibility of information, commitment management, and procedures and changes. To conduct additional review and follow up on these areas, I am appointing a Review Panel chaired by a member of our offsite safety review committee. The panel will be charged with reviewing your staff's examples and other related information and providing a report with conclusions and any recommended actions by December 31. We will then arrange a meeting and share the results with you.

Sincerely,

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/PVF:ff

Attachments
Enclosures

xc: Document Control Desk
NRR Project Manager
Senior Resident Inspector
J. M. Taylor

U. S. Nuclear Regulatory Commission
3F1294-09

ATTACHMENT 1

On September 5, 1994 the Operations crew on duty performed a makeup and purification system evolution for the purpose of gathering data to verify the relationship of makeup tank (MUT) hydrogen pressure to MUT water level. This relationship is defined by an operating curve, which administratively limits MUT hydrogen pressure for a given water level in the MUT. The MUT hydrogen pressure -vs- water level curve is provided as Enclosure 1 to this attachment. The operating shift believed that this evolution was bounded by existing guidance provided in the Operation of the Makeup and Purification System procedure (OP-402). See applicable sections of OP-402 included in Enclosure 2.

The following summary describes each element of this evolution, performed in accordance with OP-402: (1) Raise MUT level and MUT hydrogen pressure to the operating curve limit. (2) Divert letdown flow to a holding tank resulting in a MUT level decrease. (3) Plot MUT hydrogen pressure against the lowering MUT level on a copy of the operating curve. Upon reaching the low level operating limit the evolution was terminated. MUT hydrogen pressure and level were returned to normal. The highest pressure deviation from the curve was approximately 1.7 psig. The following table provides a chronology of the above actions:

Time	Action
0419	MUT level raised to 83". MUT pressure increased to curve limit.
0425	Level raised to 86"
0447	Level reduction initiated.
0501	Level decrease stopped at 55". MUT pressure = 1.7 psig above curve.
0518	Level increase started.
0522	MUT pressure back within curve. MUT level at 59".
0533	Level increase is stopped at 80".

It was anticipated that hydrogen pressure would drift into the unacceptable operating region with respect to MUT level. Therefore, an operator was stationed at the MUT vent header and an additional operator was used in the Control Room to plot the data. A pre-job briefing was held to ensure responsibilities were clearly understood by the operators.

U. S. Nuclear Regulatory Commission
3F1294-09

ENCLOSURE 1
TO ATTACHMENT 1

Rev. 12

Effective Date 03/12/94

OPERATING PROCEDURE

OP-103B

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

PLANT OPERATING CURVES

THIS PROCEDURE ADDRESSES SAFETY RELATED COMPONENTS

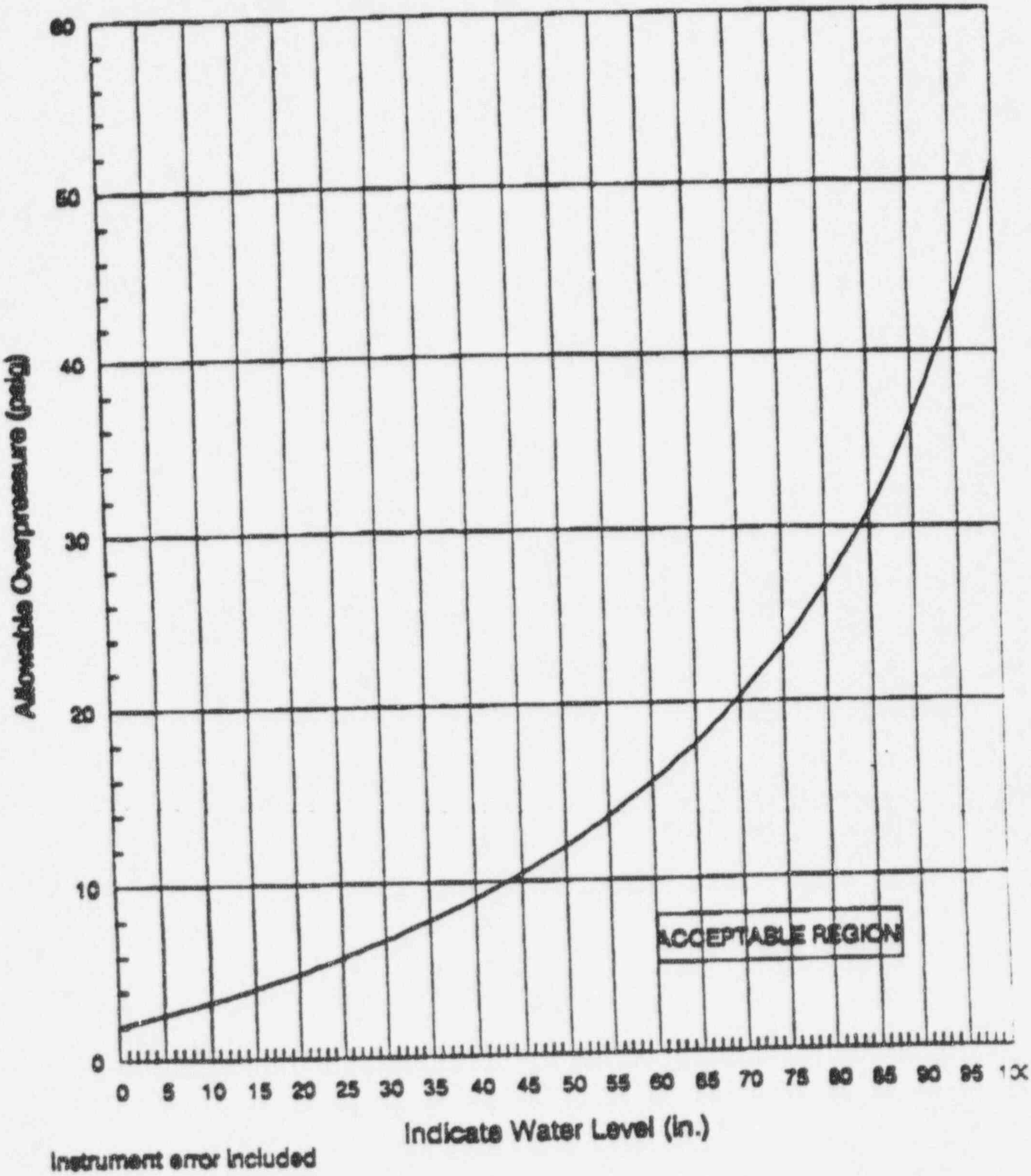
APPROVED BY: Interpretation Contact

(SIGNATURE ON FILE)

DATE: ______________________

INTERPRETATION CONTACT: Manager, Nuclear Plant Operations

MAXIMUM MAKEUP TANK OVERPRESSURE



Instrument error included

U. S. Nuclear Regulatory Commission
3F1294-09

Enclosure 2
To Attachment 1

Rev. 75

Effective Date 5/23/94

OPERATING PROCEDURE

OP-402

FLORIDA POWER CORPORATION

CRYSTAL RIVER UNIT 3

MAKEUP AND PURIFICATION SYSTEM

THIS PROCEDURE ADDRESSES SAFETY RELATED COMPONENTS

THIS PROCEDURE ADDRESSES ENVIRONMENTALLY QUALIFIED (EQ) COMPONENTS

APPROVED BY: Interpretation Contact

(SIGNATURE ON FILE)

DATE: 5/23/94

INTERPRETATION CONTACT: Supervisor, Nuclear Operations Administrative Shift

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TABLE OF CONTENTS

1.0 PURPOSE

| 1.1 Provide instructions for operation of Makeup and Purification System

3.0 PERSONNEL INDOCTRINATION

DESCRIPTION	VALUE
3.1 SETPOINTS	
3.1.1 Makeup Tank	
a. MUT High Level Alarm	86 inches
b. MUT Low Level Alarm	55 inches
c. MUT Low-Low Level Interlock	21 inches positions MUV-112 to MUT
d. MUT Low-Low Level Interlock and Alarm	18 inches Opens MUV-58 and MUV-73
e. MUT High Temperature Alarm	135°F
f. MUT Low Temperature Alarm	95°F
g. MUT High Pressure Alarm	Emulates curve 8 of OP-103B
h. MUT Low Pressure Alarm	3 PSIG
3.1.2 Makeup Pumps	
a. MUP Radial Bearing HI Temp Alarm	170°F
b. MUP End Bearing HI Temp Alarm	170°F
c. MUP End Gear Bearing HI Temp Alarm	165°F
d. MUP End Center Bearing HI Temp Alarm	165°F
e. MUP and Motor Lube Oil Low Pressure Alarm	5 PSIG
f. MUP Motor Inboard Bearing HI Temp Alarm	180°F
g. MUP Motor Outboard Bearing HI Temp Alarm	180°F
h. MUP Motor Stator HI Temp Alarm	260°F
i. MUP Gear Oil Pressure Low Alarm	7 PSIG

3.2 LIMITS AND PRECAUTIONS (Cont'd)

	LIMIT	BASIS
3.2.14	Whenever MUP-1A or MUP-1C is out of service, its respective suction crosstie valve (MUV-69 for MUP-1A or MUV-62 for MUP-1C) shall be open with its associated breaker locked in lock/reset	Appendix R commitment to ensure a makeup flow path with MUP-1A or MUP-1C out of service
3.2.15	Maintain purification flow less than the most restrictive of the following: o One M.U. Demineralizer and one Pre/Post filter, 80 gpm o One M.U. Demineralizer and two Pre/Post filters, 125 gpm o Two M.U. Demineralizers and two Pre/Post filters, 140 gpm	Prevent exceeding the maximum design of components
3.2.16	Maintain purification flow greater than 25 gpm	Prevents channeling of demin bed reducing effectiveness
3.2.17	When BWST level is < 25 ft., do not operate more than 1 MUP from a single BWST suction	To ensure adequate MUP NPSH when BWST level is < 25 ft.

4.4 SYSTEM BLEED

ACTIONS	DETAILS
NOTE: Changes in purification line ups while on Decay Heat can effect vessel level and the operation of the Decay Heat System.	
4.4.1 Select "BLEED MODE" selector switch to desired RC Bleed Tank AND Pull Handle Up	o ___ RCBT-3A o ___ RCBT-3B o ___ RCBT-3C ___/___ Initial/Date
4.4.2 Select MUV-112 Control switch to BLEED	___/___ Initial/Date
4.4.3 WHEN MUT decreases to low level alarm, OR desired letdown is completed, THEN select MUV-112 to NORMAL	___/___ Initial/Date
4.4.4 Place "BLEED MODE" selector switch in the pushed in position	___/___ Initial/Date

4.5 **SYSTEM FEED**

ACTIONS		DETAILS
	NOTE: Changes in purification line ups while on Decay Heat can effect vessel level and the operation of the Decay Heat System.	
4.5.1	Determine required amount of Feed	o Refer to OP-304 ___/___ Initial/Date
4.5.2	Align Batch Controller	1. ___ Select 'Start/Stop' switch to STOP ___ Depress 'Clear' pushbutton ___ Adjust 'Batch Size' thumbswitch to desired flow ___ Adjust 'Preshutdown' thumbswitch to desired preshutdown setpoint 2. ___ Select 'Start/Stop' switch to START ___/___ Initial/Date
4.5.3	Select "FEED MODE" selector switch to desired feed Source <u>AND</u> Pull Handle Up	___/___ Initial/Date
4.5.4	<u>IF</u> selected feed source is a BAST, <u>THEN</u> Open discharge valve and start an CAP	o ___ OPEN, CAV-57 o ___ START CAP-1A <u>OR</u> o ___ START CAP-1B ___/___ Initial/Date
4.5.5	Place both postfilters in service	o Open postfilter isolation valves ___ MUV-90 ___ MUV-91 ___ MUV-97 ___ MUV-96 ___/___ Initial/Date

4.5 SYSTEM FEED (Cont'd)

ACTIONS		DETAILS
4.5.6	Open Makeup and Purification Feed POV	o ___ OPEN MUV-103 ___/___ Initial/Date
4.5.7	Adjust flow rate using VALVE LOADING CONTROL on the Batch Controller to desired flow	___/___ Initial/Date
4.5.8	WHEN MUT level reaches desired level, THEN CLOSE MUV-103	o ___ CLOSE MUV-103 ___/___ Initial/Date
4.5.9	IF CAV-57 was opened, THEN CLOSE CAV-57 AND STOP running CAP	o ___ CLOSE CAV-57 o ___ STOP CAP-1A or CAP-1B ___/___ Initial/Date
4.5.10	Place the "FEED MODE" selector switch in the pushed in position	___/___ Initial/Date
4.5.11	Restore postfilter lineup as desired	___/___ Initial/Date

4.19 MUT VENTING AND GAS ADDITION

	ACTIONS	DETAILS
4.19.1	IF MUT N_2/H_2 addition is desired THEN GO TO Step 4.19.8 OR continue with next step to vent MUT to WGDT	
4.19.2	Ensure no other draining or venting operations are in progress in the Waste Gas system	o No other Waste Gas system operations in progress while venting MUT to WG header Initial/Date
4.19.3	Select WDT 1A OR desired Waste Gas Decay Tank as directed by Chem. Dept.	o Selected WGDT ___ WDT-1A (Preferred) ___ WDT-1B ___ WDT-1C Initial/Date
4.19.4	Perform Valve Alignment for Venting MUT	1. ___ CLOSE WDV-381 2. ___ OPEN WDV-952 Initial/Date
4.19.5	Vent MUT	1. ___ START WDP-1A(1B) and HOLD in 'START' position 2. ___ OPEN MUV-134 3. ___ Vent MUT to 6 PSIG or as desired 4. ___ Stop WDP-1A (1B) 5. ___ CLOSE MUV-134 6. ___ CLOSE WDV-952 7. ___ OPEN WDV-381 8. ___ START WDP-1A (1B) Initial/Date
4.19.6	WHEN approximately 2 minutes have elapsed, THEN STOP WDP-1A(1B)	1. ___ STOP WDP-1A(1B) Initial/Date

4.19 MUT VENTING AND GAS ADDITION (Cont'd)

	ACTIONS	DETAILS
4.19.7	Remove Waste Gas Decay Tank selected in Step 4.19.3 from service	o Place selector switch in OVERRIDE o Place desired tank in service and ensure Gas Sample Analyzer WDGA-1 lined up to in service Waste Gas Decay Tank ___/___ Initial/Date
4.19.8	Establish H_2 pressure in MUT if desired, otherwise N/A	1. ___ Refer to Curve 8 of OP-103B for maximum MUT overpressure 2. ___ OPEN MUV-143, MCB Control switch 3. ___ <u>WHEN</u> MUT is at desired pressure, <u>THEN</u> CLOSE the following: ___ MUV-143 ___/___ Initial/Date
4.19.9	<u>IF</u> H_2 addition with the manual bypass is desired <u>THEN</u> perform the following <u>OTHERWISE</u> N/A	1. ___ Determine maximum MUT overpressure using Curve 8 of OP-103B 2. ___ Locally open MUV-492, regulator bypass 3. ___ Open MUV-143 on MCB 4. ___ Add desired amount of H_2 while ensuring MUT pressure limit is not exceeded 5. ___ Close MUV-143 on MCB 6. ___ Locally close MUV-492 ___/___ Initial/Date
4.19.10	<u>IF</u> N_2 overpressure is desired, <u>THEN</u> perform the following, <u>OTHERWISE</u> N/A	1. ___ Determine maximum MUT overpressure using curve 8 of OP-103B 2. ___ Locally open MUV-467 3. ___ OPEN MUV-141 on MCB 4. ___ Add desired amount of N_2 while ensuring MUT pressure limit is not exceeded 5. ___ Close MUV-141 on MCB 6. ___ Locally close MUV-467 ___/___ Initial/Date

U. S. Nuclear Regulatory Commission
3F1294-09

ATTACHMENT 2

SHORT TERM INSTRUCTION

DOCUMENT NO.: 94-~~027~~ 081

LENGTH OF EFFECT: FROM: 9/14/94 TO: 12/14/94

INSTRUCTION: Problem Report 94-267 documented that MUT pressure curve (curve 8 of OP-103B) is non conservative and requires updating based on new calculations. Previous Short Term Instruction 94-019 required MUT pressure to be maintained approximately 2 psig below the limit shown on curve 8 of OP-103B. Operations has been notified by System Engineer that the calculated error is greater than 2 psig at MUT levels below 55 inches. This would occur during accident conditions when BWST level is drawn down to approximately 5 feet (EOP-08 for example). For this reason, Operations has been asked to maintain MUT pressure approximately 2.5 psig below the limit of curve 8 of OP-103B. This Short Term Instruction cancels STI 94-019 and STI 94-020

ISSUED BY: Ricky E. Rawls 9/15/94

	A	B	C	D	E	F	STA	OTHERS
NSS								
ANSS				BT.				
CNO					WGC			
CNO								
NO							WKB	KOV
ANO	PT	PDS			JT			
NAO								GWB
ANAO	RR			KS				WKB
ANAO								REP

Note: REISSUED TO CORRECT TYPO'S

KOV

U. S. Nuclear Regulatory Commission
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ATTACHMENT 3

Plant Operations:

- Within the scope of this inspection, the inspectors determined that the licensee continued to demonstrate satisfactory performance to ensure safe plant operations.

- Unresolved Item** 50-302/94-22-01: Make-up tank operation outside the acceptable operating region while conducting an unauthorized test. The test was performed to verify that the procedural curve was incorrect and nonconservative, and was performed without prior review and approval. This event demonstrated a lack of sensitivity to procedural compliance. The concern of the Operators with the accuracy of the procedure in question was commendable. (paragraph 3.a)

Engineering:

- Unresolved Item 50-302/94-22-02: Non-conservative trip setpoints for safety related equipment. Licensee identification of conflicts in reactor protection system setpoints between two existing engineering calculations was an alert observation and was considered a strength. (paragraph 8)

- Inspector Followup Item 50-302/94-22-04: Followup of Instrument Air System Corrective Action Plan. A licensee audit identified that one compressor is not capable of supporting instrument air system demand, as specified in the FSAR. However, there are three air compressors in addition to those described in the FSAR. The licensee has evaluated these findings and developed a corrective action plan. (paragraph 7)

Plant Support: (Radiation Controls, Emergency Preparedness, Security, Chemistry, Fire Protection, Fitness for Duty, and Housekeeping Controls)

- Licensing management initially stated that it was the licensee's position that when as-found trip setpoints exceed the Technical Specification allowable value, the equipment would not be considered inoperable as long as engineering calculations indicate the actual safety analysis limit would not be exceeded. This indicated a lack of understanding of the proper use of allowable values in Technical Specifications and was considered a weakness (Subsequently, the licensee's position changed when Operations and the site Vice President became involved). (paragraph 8)

**Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.

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ATTACHMENT 4

INTEROFFICE CORRESPONDENCE

Nuclear Plant Operations NA2C 240-3401

SUBJECT: Management Review Committee Meeting Notes

TO: [redacted]
G. H. Halnon
S. G. Johnson
J. R. Maseda
P. R. Tanguay

DATE: October 4, 1994
PM94-0037

A management review committee was convened on September 15, 1994, to discuss PR-94-0267, Make-Up Tank Pressure Limit Curve Technical Basis Inadequate. Messrs. Hickle, Halnon, Davis, McKee, Widell, Tanguay and Maseda were present at the meeting. The purpose of the meeting was to conduct an overview of open issues relative to the subject problem report and to review a test that was performed by the operating shift to determine the validity of the make-up tank hydrogen overpressure curve in OP-103B.

As a result of the meeting, the committee recommends the following actions be taken.

1. Discuss the importance of adherence to operating curves and other limits and expected response to alarm conditions with all operating shifts. **Action Hickle and Halnon, due 12/31/94.**

2. Review all operating curves in OP-103 to identify other instances where operating crews may be required to operate to close to limit, i.e. too little margin exists between normal administrative limit and operating limit. **Action Halnon, due 12/31/94.**

3. Provide counseling for shift that performed test stressing importance of avenues for resolving issues, importance of maintaining operating limits, correct methods for performance of evolutions, abnormal evolutions, and consequences of repeat performance. **Action Hickle - Complete.**

4. Generate procedure or work instructions as appropriate after the fact for make-up tank overpressure test. **Action [redacted] due 10/31/94.**

5. Counseling of reactor operators on the shift that performed the make-up tank test. **Action Halnon - Complete.**

6. Validate the make-up tank hydrogen overpressure curve and reissue. Action **Tanguay, due 10/31/94.**

7. **Review plant modifications to ensure that operator burden is minimized. Action - Management Review Committee, due 12/31/94.**

8. **Revisit the technical justification for 25cc/kg. dissolved hydrogen** in the **reactor coolant system to determine whether or not there is technical justification for lowering the limit. Action - Johnson and Maseda,** due **12/31/94.**

Bruce J. Hickle /ah

Bruce J. Hickle

cc: G. L. Boldt
R. W. Davis
P. F. McKee
R. C. Widell

U. S. Nuclear Regulatory Commission
3F1294-09

ATTACHMENT 5

Observer B. Hickle	SS [redacted]
Title DNPO	ANSS [redacted]
Date 10/25/94	CNO [redacted]
Instructor [redacted]	NO [redacted]
Instructor [redacted]	CNO [redacted]
SOTA [redacted]	ANO

OBSERVATION	RATING	REMARKS
Annunciator or Alarm Response	2	Annunciators were acknowledged promptly. ARs were used effectively. Usually annunciators were verbally acknowledged. Proper alarm response was taken without exception.
Procedural Use and Compliance	3	The ANSS performed procedure reading function very interactively. He maintained awareness of control board activities and provided instructions to control board operator at the right times. AR usage was very good.
Teamwork and Communications	3	Communications were excellent without exception (best example of team communication to date). Repeat backs were used where appropriate. Critical information was communicated timely, clearly and concisely. Control board operators coached one another to enhance performance.
Diagnostic Skills	3	Off normal conditions (e.g. OTSG tube leak, stuck open pre-spray valve) were diagnosed quickly. Plant control was within expected limits. Pressure level control was excellent. Self-checking was directly observed in several instances.
Systems and Procedures	3	Procedures were adequate to handle casualty. The simulator responded as expected.
Training Effectiveness	3	Critiques were thorough and professional. The SSOD assumed a leadership role in the critique, thoroughly summarizing events in a self-critical manner. A licensed operator was used as a peer evaluator (Scott Stewart) with good results. We should consider this practice for future drills.

OBSERVER Brent J. Hickle/ai

* Rating Criteria *

(3) Performance in this area is satisfactory and meets or exceeds expectations.
(2) Performance in this area is satisfactory but some weaknesses are evident.
(1) Performance in this area is unsatisfactory and should be resolved by the SSOD promptly

Remarks are required for all items not marked NA

Reviewed by:
Shift Supervisor: [redacted]
MNPO: [signature]

xc: NSTS: ____
NLOTS: ____
NOPE: ____

ATTACHMENT 6

Florida Power CORPORATION

INTEROFFICE CORRESPONDENCE

Nuclear Engineering Design
OFFICE

C2I
MAC

231-4440
TELEPHONE

SUBJECT: Crystal River Unit 3
PR 94-0267, MUT-1 Level/Hydrogen Pressure
CAP Item 94-0267-2, Design Basis Issue Determination
File: SP 94-077

TO: [redacted]

DATE: November 16, 1994
NEA94-0859

The purpose of this IOC is to document the design basis issue evaluation for the subject problem. The evaluation considered both the accuracy of the existing curve and operation to the left of the curve shown in procedure OP-103B (see Attachment 1). The existing curve in OP-103B was developed to provide MUT pressure/level limits which ensure HPI pump integrity during the BWST drawdown phase of a Large Break LOCA (LBLOCA) accident. CR3 has frequently operated on the curve and, in one instance, operated in the unacceptable region of the curve.

Preliminary analyses have shown that the current curve is non-conservative due to incorrect assumptions in the calculation which developed the curve. The correct curve will be located below the existing curve. Currently, Operations is operating the plant on or below an administrative curve which is parallel to and 2.5 PSIG less than the OP-103B curve. At this time there is reasonable assurance that this administrative operating limit will envelope the new curve when the calculations are complete. The basis for deciding that operation on or to the left of the OP-103B curve constitutes operation outside the design basis is as follows:

The worst case LBLOCA accident analyzed for CR3 from a core cooling and containment integrity standpoint is a cold leg break. Operation in the unacceptable region of the OP-103B curve at the onset of a LBLOCA would result in damage to the HPI pumps due to hydrogen entrainment from the makeup tank. HPI is not modelled as an essential system for core cooling in these LBLOCA analyses (see Attachment 2). However, one unique LOCA deserving of specific discussion is a postulated break in a core flood line. Since LPI injects to the reactor vessel through the core flood lines, any cooling water from LPI in the train containing the break would not reach the vessel. Considering a single failure of the power source in the other train, no LPI would be available for core cooling and HPI would be used to mitigate this event in the short term (see Attachment 3 - excerpts from BAW-10064, *Multinode Analysis of Core Flooding Line Break for B&W's 2568-MW, Internals Vent Valve Plants*).

Although the core flood line nozzles have inserts which limit the break size to 0.44 ft^2 (considered an intermediate break size), the blowdown rate for this LOCA is rapid enough to prompt systems to respond as they would in a LBLOCA. Therefore, suction piping head losses would be comparable to those for a classic LBLOCA. The suction piping head losses are a critical parameter in determining the initial conditions defined by the curve. This, in turn, makes the OP-103B curve a design limit for this event because it ensures protection of equipment needed to mitigate the event.

In conclusion, operation on or to the left of the OP-103B curve at the onset of a LBLOCA or core flood line LOCA would have resulted in HPI pump damage. This is considered operation outside the design basis of the plant per 10CFR50.72(b)(1)(ii)(B). Please contact me at 231-4440 if you require additional information.

[redacted]

[redacted], Supervisor
Nuclear Engineering Design - [redacted]

cc: J. R. Maseda
P. R. Tanguay
[redacted]
P. W. Campbell
[redacted]
K. B. Baker
G. H. Halnon
K. R. Wilson
[redacted]
Shift Manager
File
Records Management

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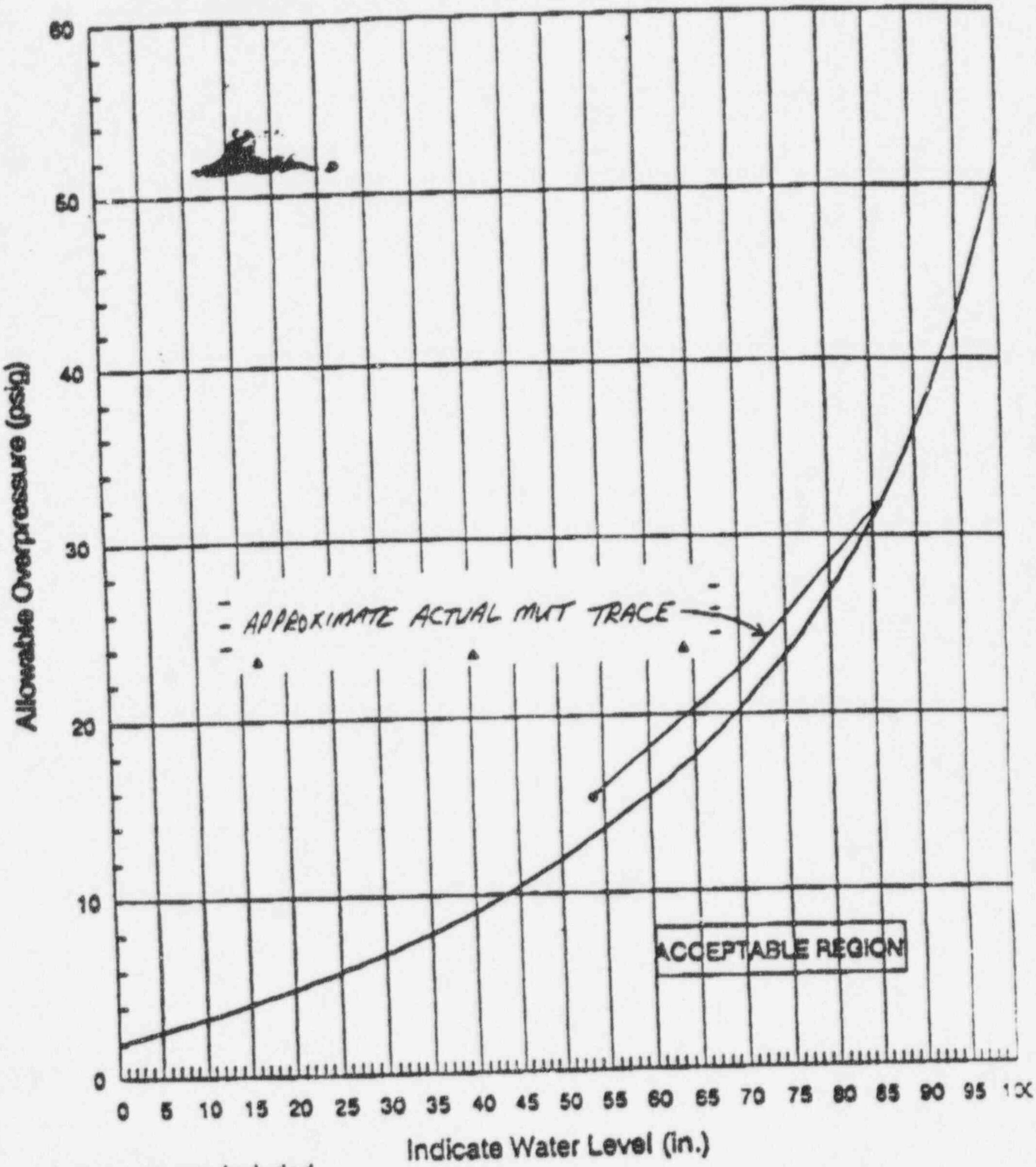
1 of 1

MAXIMUM MAKEUP TANK OVERPRESSURE



Instrument error included

3.0 SYSTEM AND COMPONENT PARAMETERS

In the analysis of the LOCA, certain systems and components were assumed not to function. To provide conservatism, certain systems and components which performed mitigative functions were not modelled in the event. On the other hand, certain systems and components were never actuated because predicted event conditions never warranted their use.

The PORV, pressurizer safety valves (PSVs), and pressurizer spray were not modelled in the LOCA accident analysis. Since the LOCA is primarily a depressurization event, pressurizer valves were not modelled in the analysis because valve setpoints are not exceeded during the transient. The pressurizer spray was not modelled since it is a control function, and, even if it had been modelled in the analysis, it would not have actuated since the LOCA results in depressurizing the RCS. In addition, pressurizer heaters were not modelled in the analysis since their actuation would be too slow to have a significant effect on the dynamics of the transient.

The Emergency Safaguards Actuation System (ES) provides emergency reactor cooling during primary depressurization events. ES actuates the ECCS to provide injection to the core. The ECCS includes HPI which operates through the Makeup and Purification System, LPI which operates through the Decay Heat Removal System, and the Core Flood System which is passive and injects into the core at pressures below 600 psig. During all LOCA analyses it is required to include a single failure assumption. For LOCA analyses, it is assumed that one of the emergency diesels fails to start and that one entire train of ECCS components are unavailable to provide injection fluid to the RV. This includes one HPI pump, one LPI pump, one RB fan cooler, and one RB spray pump. A delay time of 35 seconds for ECCS injection is included from the ES actuation to account for the starting of the remaining emergency diesel and the sequencing of loads on to it. Normal makeup and letdown were not modeled in the LOCA analyses. During LBLOCA analyses, HPI injection is not modeled. No credit was taken for the addition of boron through the ECCS injection in order to control reactivity. This is conservative since boron addition would provide negative reactivity addition to core, and this would decrease the likelihood of a return to criticality. LOCA analyses assume adequate shutdown margin exist when the control rods drop during SBLOCA analyses and from core voiding during LBLOCA analyses.

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3. METHOD OF ANALYSIS

3.1. Codes and Usage

The method of analysis used to determine the cladding temperature response is an improved version of the small-leak evaluation model presented in topical report BAW-10052, "Multinode Analysis of Small Breaks for B&W's 2568-MWt Nuclear Plants."[3] The use of this model is consistent with the interim policy statement because the flow from the reactor vessel is limited by an insert in the core flooding tank (CFT) nozzle with a cross-sectional area of 0.44 ft^2.

The core flooding line break is characterized by a rapid blowdown during which a large amount of water in the reactor coolant system is expelled from the primary system. Following the rapid blowdown, a slow blowdown ensues and a quiescent situation exists in the core with core water being boiled off. Eventually, a stable situation exists and makeup equals boiloff.

The CRAFT[1] code is used to analyze the hydrodynamics during the rapid blowdown phase and to calculate the liquid inventory of the core during the quiescent phase. The noding scheme used in the CRAFT analysis is shown in Figure 4-1. There are 12 nodes for the primary system, one for the secondary system, and one for the containment. The break is located in the downcomer, approximately in the center of node 14. The following assumptions are made:

1. The plant is operating at a steady-state power level of 102% of 2568 MWt.
2. The leak is instantaneous (discharge coefficient of 1.0).
3. The reactor trips at a primary system pressure of 2050 psig.
4. Offsite power is lost at the time of the accident.
5. Safety rods begin entering the core one-half second after the reactor trip signal is generated.

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6. The reactor coolant pumps trip and coast down at the time of reactor trip.

7. One complete train of the emergency safeguards system - that containing the unbroken CFT line - fails to operate. This failure leaves one core flooding tank and one high-pressure injection system to provide coolant to the reactor vessel.

8. A phase-separation model is used in CRAFT during the entire transient.

9. Other than that calculated by CRAFT, no water is arbitrarily assumed to be lost from the break during CFT injection.

The size of the break, along with the proximity to the vent valves, limits fluid velocities in the loops, lower head, and downcomer to values that preclude entrainment of droplets. Furthermore, since the intact tank is injecting coolant around the vessel 180 degrees from the break, the flow of steam - whether from the vent valves or from the loops - does not cross the injecting nozzle on its way to the break. Steam flow entering the vessel from the loops mixes with water in the downcomer, causing high mixture heights and a flow of mixture out of the break. In this way, CFT water is lost from the primary system.

The FOAM code is used to calculate swell levels during the quiescent period of analysis. The development and the experimental verification of the code are presented in sections 3.2 and 3.3. Input for the FOAM code consists of the power shape, power level, pressure, inlet subcooling, and quiescent water level. Each of the three power shapes considered is divided into 36 axial nodes for FOAM usage. The pressure and the quiescent water level are taken directly from the CRAFT analysis. Because of primary metal heating, the water entering the bottom of the core will be saturated. Therefore, zero inlet subcooling is used. This is substantiated by the CRAFT analysis. Since higher power levels create higher swell levels, the power level of the average channel, rather than the level of the hot channel, is used to determine the swell level. This use is conservative because the swell level will be somewhat higher in the hot bundle.

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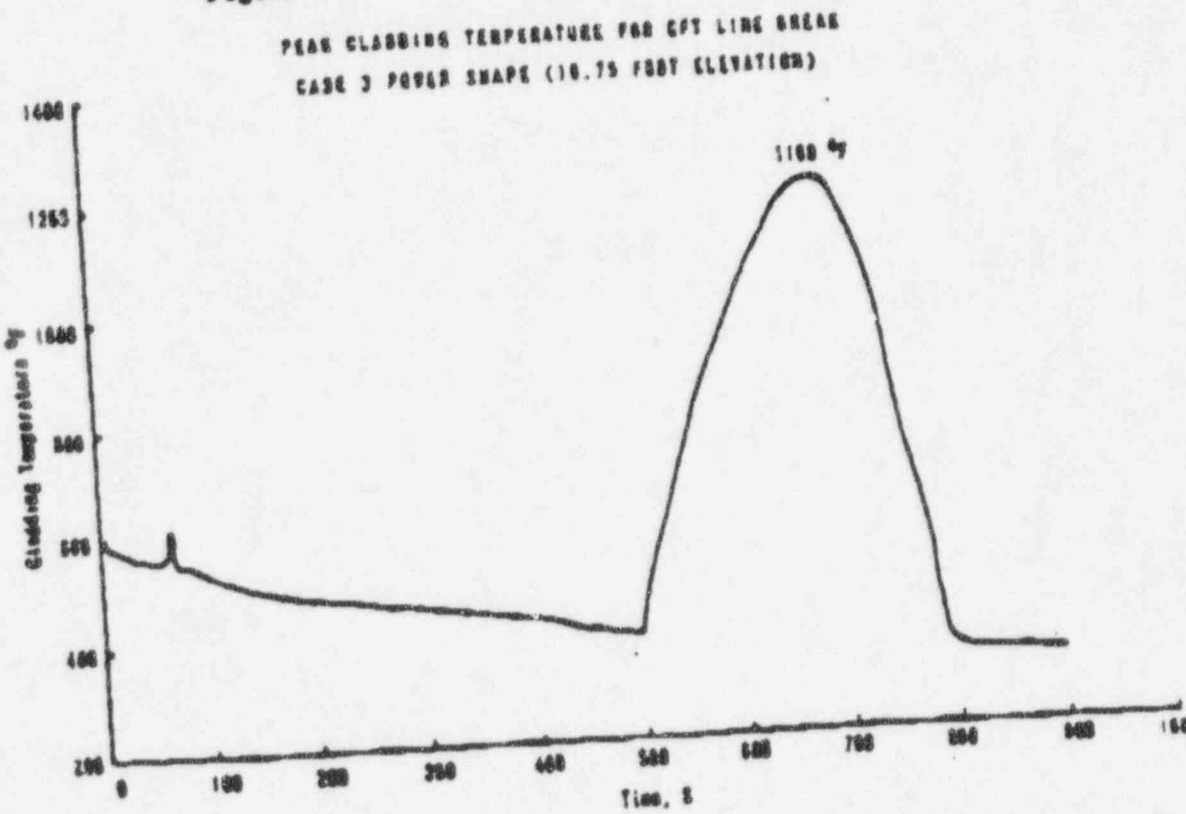
Figure 4-11. Case 3 Cladding Temperature Transient



ATTACHMENT 7

NUC LICENSING CR

PROBLEM REPORT

PART I: INITIATION, REVIEW, AND ISSUANCE OF THE PROBLEM REPORT BY THE ORIGINATING ORGANIZATION

(1) Title: MUT Pressure Limit Curve Technical Basis Inadequate

REPORTING INFORMATION

(2a) Discovery Method:	1. Review of Calculation 190-0026 Rev 5. 2. Observation of MUT pressure response to decreasing level.		
(2b) Plant Condition:	Mode 1 100% Power Normal Operation		
(2c) Occurrence Date:	9/7/94	Time: 0319	
(2d) Plant Location	Building: N/A	Elevation: N/A	Area/Room: N/A
(2e) Equipment Tag Number(s):	MUT-1	(2f) Vendor Name:	Buffalo Tank Corporation

(3) Description of the Condition/Event:

OP-103B, Curve 8-"Maximum MUT Overpressure" limits the maximum amount of hydrogen overpressure that may be maintained on the Make-up Tank (MUT-1). The curve is derived from data generated by Calculation 190-0026 Rev 5. This calculation determines a "safe" overpressure at 55" MUT level that will ensure that gas entrainment in the Makeup Pump's suction will not occur. The curve is then generated by expanding and compressing the "safe" overpressure over the 0 to 100 inch range utilizing the Ideal Gas Law.

1. Calculation 190-0026 Rev 5 Assumption 3 states that the BWST levels used to calculate static pressure in the suction line at the switchover point are based on switchover to RB Sump suction based on RB level and not BWST level. The assumption states that this is valid through Refuel 8. The calculation has not been updated for our current EOP switchover point of 25' BWST level when running 2 MUPs on the suction header (EOP-8 step 3.11). The calculation does not address the case of running one makeup pump on the suction header down to a BWST level of 5' as required by EOP-8 step 3.35.

2. Use of the Ideal Gas Law to generate the limit curve is nonconservative in this case. Observations of MUT pressure response during level decreases reveal that the pressure decreases at a slower rate than the limit curve does. The attached graph illustrates this response. MUT pressure was placed on the limit curve at a MUT level of 64". The system was allowed to stabilize for approximately 30 minutes. MUT level was then bled down to the low level setpoint of 55". During the bleed, MUT pressure entered the unacceptable region, and the difference between the limit and actual pressure increased throughout the entire level decrease. At a MUT level of 55", MUT pressure was 1.7 psig above the limit curve. This equates to approximately 3.9 feet of water. Calc 190-0026 Rev 5 only ensures a column of water in the MUT line 2.27' high. The observed error in the limit curve is therefore larger than the margin provided by the calculation.

(4) Is this problem a Radiological Safety Concern?

[✓] NO
[ ] YES *Immediately contact HP Supervisor for proper documentation.*

(5) Requirement(s) Violated: Unknown

(6) Associated/Related Documents: Calc 190-0026 Rev 5 EOP-8 Rev 2 OP-103B Rev 12

(7) Immediate Actions Taken: Vented MUT to lower pressure to be within the acceptable region of the MUT pressure limit curve.

(8) Recommendations for Resolving the Problem: Update Calc 190-0026 assumptions and data to be consisted with EOP-8 actions and observed MUT pressure response.

(9) Originator (print name): [redacted] Date: 9/7/94

Originating Department Supervisor/Manager Review, DBI Review and PR CLASSIFICATION DETERMINATION:

(10) PR is:
[ ] a KNOWN Design Basis Issue [✓] SUSPECTED Design Basis Issue [ ] Not a Design Basis Issue

(11) Recommended Responsible Organization:	Site Nuclear Eng	Accepted By: [redacted] Date: 9-7-94
Responsible Manager:	JW Campbell	CAP Assignment (if applicable): [redacted]
(12) Originating Supv/Mgr (print & sign): [redacted]		(13) PR Issue Date: 9/7/94
(14) [✓] SOTA review required		(Deliver to SOTA and notify SSOD)
[ ] SOTA review NOT required.		(Send to Director, Quality Programs)
(15) DIRECTOR, QUALITY PROGRAMS:	SL Robinson for P.F. McKee	Date: 9/7/94

PROBLEM REPORT TRANSMITTED TO THE RESPONSIBLE ORGANIZATION [ ] By: ________ Date/Time:

3/94 RET: Life of Plant RESP: Quality Programs

PART 2 - SECTION A1: REVIEW BY THE SOTA

(1) This Problem Report is: Reevaluated 11/16/94

REPORTABLE:	[X]	NO	[X]	YES (Section B of this attachment is required if YES)
A TECHNICAL SPECIFICATION VIOLATION:	[X]	NO	[ ]	YES
AN UNPLANNED RELEASE:	[X]	NO	[ ]	YES

* The reportability determination must be re-[redacted] of the design basis review done by configuration management. K.Baker notified on 9-7-94.

TA (print & sign): [redacted] Date/Time: 9-7-94 1004

IF REPORTABLE, THEN COMPLETE PART 2 - SECTION B.

PART 2 - SECTION A2: PLANT CONDITIONS AND IMMEDIATE NOTIFICATIONS BY THE SOTA (if required)

(1) Plant Conditions:
Mode: 1 RX PWR: 100% Mwe: 882 RCS Temperature: 579 Pressure: 2155

Occurrence Date: 9/7/94 Occurrence Time: 0319 Identified Date/Time: 11/16/94 / 17:15

Other (describe):

(2) Redundant Equip Available: NA

(3) SP/Maint: None

(4) Tech Spec Affected: None

(5) Action Statement Summary: None

(6) Action Entry Date: NA Time:

(7) Evaluate Immediate Notification (use EM-202 if Emergency Declared)

Emergency Plan Implemented: NO X YES ___ Classification NA

(8)

CP-111 Reference	Phone Call Required YES	NO	Time Limit	Organization
a. 10CFR50.72	X		1 HOUR OR 4 HOUR	NRC OPERATIONS CENTER
b. 10CFR20.1906		X	IMMEDIATE	NRC REGION II
c. 10CFR20.2201			IMMEDIATE	NRC OPERATIONS CENTER
d. 10CFR20.2202			IMMEDIATE OR 24 HOUR	NRC OPS CENTER/DHRS
e. 10CFR50.36			1 HOUR	NRC OPS CENTER
NPDES PERMIT			IMMEDIATE	FPC SUPERVISOR, WATER PROGRAMS
.. TS 2.2.5			24 HOUR	NRC OPS CENTER/FPC SR.VP/NGRC
h. EPP			24 HOUR	NRC REGION II/FPC ENVIRONMENTAL SERVICES
i. ANI/FPC RISK			IMMEDIATE	NRC OPERATIONS CENTER/ANI/FPC RISK
j. 10CFR70.52a			1 HOUR	NRC OPERATION CENTER
k. 29CFR1906.8			IMMEDIATE	FPC NUCLEAR SAFETY SPECIALIST
CP-161 Reference				
a. 10CFR73.71			1 HOUR	NRC OPERATIONS CENTER

(9) NOTIFICATIONS:

	NAME	TITLE	DATE/TIME	EVENT #
a. SSOD	[redacted]	SSOD	11/16/94 / 1715	
b. STATE	NA			
c. NRC(ERS)	Bill Huffman		11/16/95 / 1755	28038
d. NRC (REG II)	NA			
e. FPC	W.M.Marshall	NSM	11/16/94 / 1314	
f. DHRS	NA			
g. OTHER	R. Butcher	NRC Resident	11/16/94 / 1865	Notified R.W. Davis fo

(10) NOTIFICATION OF THE DNPO COMPLETED: (X) YES ( ) NO Performed by (initial): [redacted] Date: 11/16/94 @ 7..

(11) SOTA (print & sign): [redacted] Date & Time: 11/16/94 1958

PART 2 - SECTION B NSM Comments/Recommendations

Note: Reevaluated reportable based on engineering evaluation 11/16/94. LER will be required. WM 11/16/94

(1) Nuclear Shift Manager (print & sign): W. MARSHALL W. Marshall Date/Time: 11/16/94 2200

FORWARD THIS SECTION TO THE DIRECTOR, QUALITY PROGRAMS

REF: Life of Plant RESP: Quality Programs 900 ...

3/94

PROBLEM REPORT

(1) Method of Performing Cause Analysis: [X] Structured Analysis [ ] Deductive Logic

(2) CHECK ALL CAUSES THAT APPLY:

Human Performance

[ ] Verbal Communication	[ ] Work Schedule	[ ] Supervisory Methods	[ ] Environmental Conditions
[ ] Written Communication	[ ] Work Organization/Planning	[ ] Managerial Methods	[ ] Interface Design or Equipment Condition
[ ] Training/Qualification	[ ] Work Practices	[ ] Change Management	
		[ ] Resource Management	

Equipment Performance

[ ] Plant/System Operation	[ ] Maintenance/Testing	[ ] External	[X] Design Configuration/Analysis
[ ] Equipment Spec/Mfg/Construction			

(3a) Primary Cause(s):
Part 1 of this PR addresses two separate conditions with regard to Curve 8 of OP-103B. The first condition identified is presently being resolved by Corrective Action 8 from Part 3 - Section 8 of PR 94-0149. This action was originally scheduled for completion on 09/09/94, however, the due date has been extended to 09/30/94. The assigned organization for this corrective action is NOE[redacted] The second condition identified in this PR calls into question the validity of the calculation used to generate Curve 8 and offers evidence that would seem to indicate that the curve may not be conservative in preventing gas binding of a Makeup Pump during a LOCA. At present, the validity of the existing "Maximum MUT Overpressure" limitation curve is uncertain. The corrective action assigned in Part 3B will identify any errors that might have been introduced when generating this limit curve. If errors are discovered, the reasons for these errors will be addressed at that time.

(3b) Secondary Cause(s): N/A

(3c) Contributing Factor(s): N/A

(4) SUPPORTING INFORMATION, IF APPLICABLE:

LER Number	N/A	Procedure Number	OP-103B	WR Number	N/A	NRC VIOLATION Number	N/A
Other	N/A						

(5) Nuclear Safety Consequences Analysis:
Not applicable because identified conditions were determined to be not reportable. The corrective action associated with this PR could determine that a design basis issue exists. At that time, it would become necessary to revisit the issue of reportability and to address the impact, if any, to the level of safety of the plant.

(6) Previous Similar Events/Conditions: None known.

(7) Manufacturer/Nameplate Data: Not applicable.

(8) Nonconforming Equipment/Material Dispositions
[X] N/A (no nonconforming equipment or material involved) [ ] Accept-As-Is* [ ] Repair* [ ] Rework
[ ] Other (describe):
* Engineering Justification and Approval Required for these Dispositions (obtain documentation and attach)

(9) Maintenance Preventable Functional Failure (MPFF):
[X] No [ ] INITIAL [ ] REPETITIVE

REF: Life of Plant: NQAP Quality Programs

(1) Corrective Action Plans

ACTIONS	SCHEDULED COMPLETION DATE	ASSIGNED ORGANIZATION/INDIVIDUAL
1) Evaluate/validate Curve 8 of OP-103B, "Maximum HUT Overpressure," to determine if the curve is technically correct and provides useful and meaningful guidance to the Control Room operators. a. Evaluate Calc. I90-0026 Rev. 5 to determine if technical errors exist. Identify reasons for observed errors. b. Revise the calculation to reflect the current plant configuration for HPI, including the transition point from the BWST to the RB sump. c. Issue revised/updated version of OP-103B, Curve 8.	10/30/94	NOE/Joe Rhoads 9/21/94
2) Determine if the guidance provided by the existing Curve 8 of OP-103B resulted in operation outside the Design Basis of the plant at any time. If this PR is determined to be a Design Basis issue, ensure reportability of the identified conditions is revisited by Nuclear Operations.	11/30/94	NCR/Ken Baker KRB 9-21-94

(2) ADDITIONAL CAP INFORMATION: None

(3) Developed by (print & sign): [redacted] Date: September 21, 1994

(4) Responsible Organization Approval by (print & sign):
9/21/94 9/21/94

IF THE PROBLEM IS CLASSIFIED AS REPORTABLE OR A TECHNICAL SPECIFICATION VIOLATION, THEN OBTAIN THE FOLLOWING APPROVALS

(5) PRC: NTG No:

(6) DNPO: Date:

WHEN COMPLETE, TRANSMIT TO SUPERVISOR, QUALITY SYSTEMS.

RET: Life of Plant FREP Quality Programs

Rev 3/94

PART 4: EVALUATION OF CAUSE, CAP, AND COMPLETION SCHEDULE BY THE QUALITY PROGRAMS TECHNICAL REVIEWER

(1) Comments:

Based on a review of the Cause Analysis described in Part 3 Section A and a discussion with involved personnel. the Corrective Action Plan described in Part 3 B is considered acceptable.

Please forward documentation of the completion of each of the Corrective Plan Items to Quality Programs.

(2) Quality Programs Review (print & sign): [redacted]

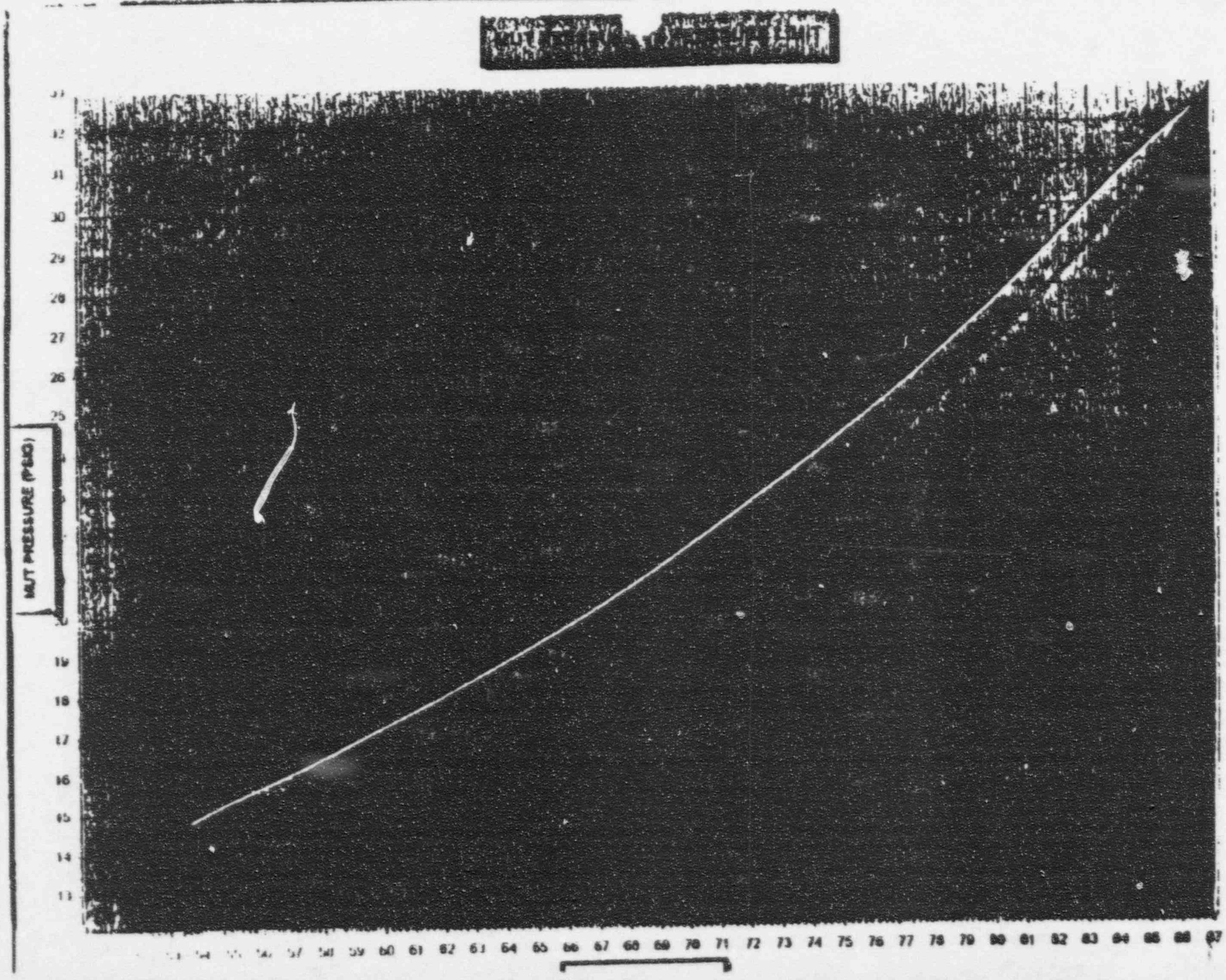
Date: 10/5/94

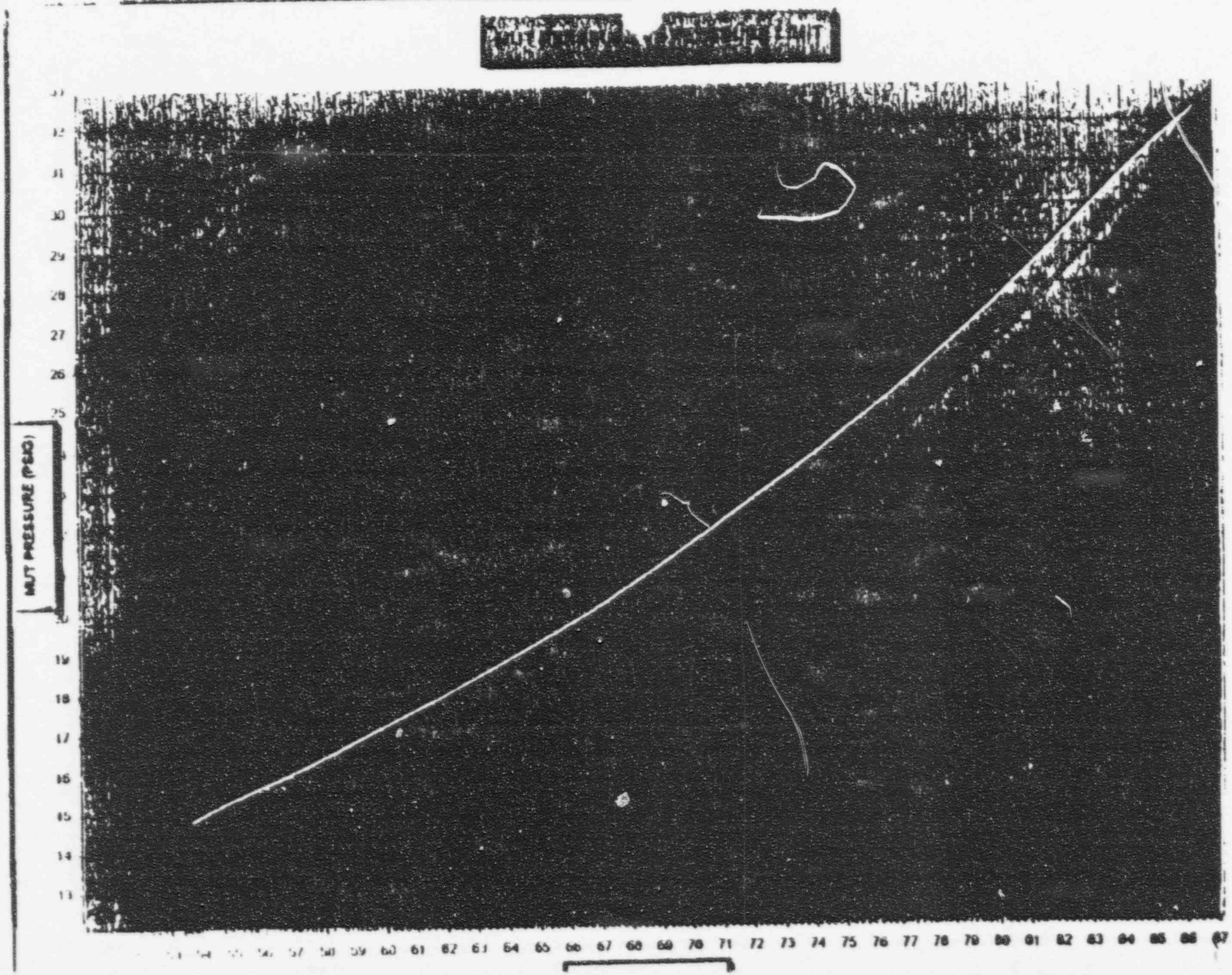
PART 5: FINAL REVIEW OF COMPLETED CORRECTIVE ACTIONS BY THE QUALITY PROGRAMS TECHNICAL REVIEWER

(1) Comments:

(2) Quality Programs Final Package Review (print & sign):

Date:


MUT PRESSURE (PSIG)


LIMIT
MUT PRESSURE (PSIG)
13 14 15 16 17 18 19 20 25 26 27 28 29 30 31 32
60 61 62 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 82 83 84 85 86 87

(1) Corrective Action Plans

ACTIONS	SCHEDULED COMPLETION DATE	ASSIGNED ORGANIZATION/INDIVIDUAL
NOTE: This revised CAP replaces the existing CAP for this PR.		
1) Evaluate/validate Curve 8 of OP-103B, "Maximum RVT Overpressure," to determine if the curve is technically correct and provides useful and meaningful guidance to the Control Room operators. a. Evaluate Calc. I90-0024 Rev. 5 to determine if technical errors exist. Identify reasons for observed errors. b. Revise the calculation to reflect the current plant configuration for HPI, including the transition point from the BWST to the RB sump. c. Issue revised/updated version of OP-103B, Curve 8.	12/15/94	NOE/Joe Maceda
2) Determine if the guidance provided by the existing Curve 8 of OP-103B resulted in operation outside the Design Basis of the plant at any time. If this PR is determined to be a Design Basis issue, ensure reportability of the identified conditions is revisited by Nuclear Operations.	11/10/94	NCM/Ken Baker
3) Challenge the validity of the 25 cc/kg limit on dissolved H_2 in the RCS. A 5 cc/kg reduction in this value could significantly reduce the complexity of this issue and the difficulty the Operators are experiencing in trying to maintain this limit while simultaneously meeting the LBLOCA and Appendix R concerns.	11/18/94	ChemRad/Sarah Johnson
4) Determine if a plant modification is needed to minimize operator burden. This will be accomplished with input from NPSE, Licensing, Operations and Design Engineering personnel. The final recommendation will be reviewed and concurred with by the Management Review Committee.	1/13/95	NOE/Joe Maceda

(2) ADDITIONAL CAP INFORMATION: Prior to the issuance of this PR, efforts had been ongoing to investigate strategies for enhancing CR3's ability to meet the minimum dissolved hydrogen requirement of 25 cc/kg while simultaneously reducing the operator burden. This revised CAP reflects the decision to utilize this PR to consolidate all efforts associated with this issue and to establish a point of accountability for tracking all elements of an overall problem resolution to acceptable endpoints.

(3) Developed by (print & sign): [redacted] Date: October 20, 1994

(4) Responsible Organization Approval by (print & sign): [redacted] for J. Campbell Date: 10-20-94

IF THE PROBLEM IS CLASSIFIED AS REPORTABLE OR A TECHNICAL SPECIFICATION VIOLATION, THEN OBTAIN THE FOLLOWING APPROVALS

(5) PRC: [redacted] 11-3-94 MTG No: 94-44

(6) DNPO: [signature] Date: 11/7/94

WHEN COMPLETE, TRANSMIT TO SUPERVISOR, QUALITY SYSTEMS.

REF: Life of Plant RSSP: Quality Programs 60-2-5

'94

JJB 11/9/94

PART 4: [illegible] CAP, [illegible] BY THE QUALITY PROGRAMS TECHNICAL REVIEWER

(1) Comments:

Based on a meeting/discussion with the Developer of the REVISED CAP (dated 10/20/94), the four Corrective Actions are considered adequate to resolve the problem identified and the CAP is therefor accepted.

It is understood that the CAP revision will be forwarded to the PRC and DNPO for their review/concurrence as required by CP-111.

It is also understood that CAP item 2 (Design Basis Review) may result in a re-evaluation of the initial Reportability Determination. If the DBI evaluation results in a conclusion that plant operations was outside the Design Basis, a new reportability determination will need to be made by Nuclear Operations.

Documentation of the completion of each of the four Corrective Actions should be forwarded to Quality Programs.

(2) Quality Programs Review (print & sign): [redacted] Date: 10/21/94

PART 5: FINAL REVIEW OF COMPLETED CORRECTIVE ACTIONS BY THE QUALITY PROGRAMS TECHNICAL REVIEWER

(1) Comments:

(2) Quality Programs Final Package Review (print & sign): Date:

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	SABE
[illegible]	NA2C
DOCKET FILE	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	NA2C
[illegible]	[illegible]
[illegible]	[illegible]
J.M. McGARRY III	W/S
P.F. McKEE	NA2G
NCRC SUBCOMM. [illegible]	[illegible]
[illegible]	[illegible]
RECORDS CENTER	INPO
RECORDS MGMT	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible] WILLIAMS	FMPA
[illegible] WILSON	NA2I

Florida Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

December 19, 1994
3F1294-20

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: Licensee Event Report (LER) 94-009-00

Dear Sir:

Attached is Licensee Event Report (LER) 94-009-00 which is submitted in accordance with 10 CFR 50.73.

Sincerely,

P. M. Beard
Senior Vice President
Nuclear Operations

PMB/JAF:ff

Attachment

xc: Regional Administrator, Region II
Project Manager, NRR
Senior Resident Inspector

NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

EXPIRES 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
CRYSTAL RIVER UNIT 3 (CR-3)	0 5 0 0 0 3 0 2	1 OF 0 6

TITLE (4)
Makeup and Purification System Evolution Confirms Unacceptable Makeup Tank Hydrogen Pressure/Level Limits Which Constituted Operation Outside Design Basis

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
									N/A	0 5 0 0 0
1 1	1 6	9 4	9 4	0 0 9	0 0	1 2	1 9	9 4	N/A	0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 1 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (CHECK ONE OR MORE OF THE FOLLOWING) (11)

[ ] 20.402(b)	[ ] 20.405(c)	[ ] 50.73(a)(2)(iv)	[ ] 73.71(b)
[ ] 20.405(a)(1)(i)	[ ] 50.36(c)(1)	[ ] 50.73(a)(2)(v)	[ ] 73.71(c)
[ ] 20.405(a)(1)(ii)	[ ] 50.36(c)(2)	[ ] 50.73(a)(2)(vii)	[ ] OTHER (Specify in Abstract below and in Text, NRC Form 366A)
[ ] 20.405(a)(1)(iii)	[ ] 50.73(a)(2)(i)	[ ] 50.73(a)(2)(viii)(A)	
[ ] 20.405(a)(1)(iv)	[X] 50.73(a)(2)(ii)	[ ] 50.73(a)(2)(viii)(B)	
[ ] 20.405(a)(1)(v)	[ ] 50.73(a)(2)(iii)	[ ] 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (AREA CODE)
J. A. Frijouf, Nuclear Regulatory Specialist	9 0 4 5 6 3 - 4 7 5 4

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

[ ] YES (If yes, complete EXPECTED SUBMISSION DATE) [X] NO

EXPECTED SUBMISSION DATE (15): MONTH | DAY | YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On November 16, 1994, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE ONE (Power Operation), operating at 100% reactor power and generating 880 megawatts. FPC determined insufficient margin existed in the Makeup Tank (MUT) pressure/level operating curve, causing CR-3 to periodically exceed design basis (DB) conditions. On September 5, 1994, data was collected by control room operators conducting an evolution in which MUT pressure was set at high level limits and MUT level was decreased from high to low level limits. The data caused FPC to question the validity of the operating curve (operators believed this evolution was bounded by existing procedures, but later management review recognized it constituted a "test" requiring a dedicated procedure and review as required by 10CFR50.59). Reanalysis of the calculation which generated the curve led to a determination that the operating curve contained incorrect assumptions and was slightly nonconservative relative to intended design margins. The curve was not recognized at the time as a design limit curve (it was considered to be an administrative limit). A series of corrective actions, including re-evaluation of both calculations and hydrogen concentration requirements is being conducted. Operator actions are addressed in FPC letter to the NRC 3F1294-09 dated December 2, 1994.

EVENT DESCRIPTION:

On November 16, 1994, Florida Power Corporation's (FPC) Crystal River Unit 3 (CR-3) was in MODE ONE (Power Operation), operating at 100% reactor power and generating 880 megawatts. At 1755, FPC notified the Nuclear Regulatory Commission (NRC), under 10CFR50.72(b)(1)(ii)(B), that operation outside the Design Basis relative to the Makeup Tank (MUT)[CB TK] hydrogen pressure had been identified following a design review. The possibility of such a determination had been informally reported to the NRC and was addressed by NRC Unresolved Item 94-22-01.

The review comprised a re-analysis of the calculational basis for the MUT hydrogen pressure/level operating curve and the operating data recorded on September 5, 1994 (see below). The review determined that the combination of MUT level and hydrogen pressure allowed by the curve (and the instruction used to maintain compliance with it), were non-conservative for certain design basis safety injection scenarios, and was therefore outside the design basis for the plant. This was due to errors in the calculation of the curve. It was exacerbated by the fact that the curve was an administrative limit and was not recognized at the time as being a design basis limit.

The MUT serves as a receiver for Reactor Coolant System (RCS) letdown, seal return, chemical addition and system makeup. It acts as a surge tank to accommodate small changes in RCS volume, and provides a suction source to the running makeup pump (MUP)[CB, P]. During normal operation, RCS makeup fluid is sprayed into the top of the MUT. The Makeup fluid will absorb hydrogen from the tank chamber which then acts to remove dissolved oxygen in the RCS. This is the primary means of controlling the dissolved oxygen concentration in the RCS during power operation. Curve 8, Maximum MUT Overpressure (MUT Pressure Limit Curve), contained in Operating Procedure OP-103B, Plant Operating Curves, provides the administrative limit for establishing proper hydrogen pressure versus MUT level.

On September 5, 1994, control room licensed operators, suspecting the curve to be inaccurate, performed a makeup and purification system evolution for the purpose of gathering data to verify the relationship of MUT hydrogen pressure versus water level. Believing this evolution was bounded by existing procedural guidance, but anticipating that the hydrogen pressure might drift into the unacceptable operating region with respect to the MUT hydrogen pressure/level operating curve (viewed as an administrative limit), an operator was stationed at the MUT vent header and an additional operator was used in the control room to plot the data (In hindsight, management review of the evolution performed recognized that it constituted a "test" requiring a dedicated procedure and review as required by 10CFR50.59). Following a pre-job briefing to ensure responsibilities were clearly understood, the operators raised the MUT level to the high level limit of 86 inches and adjusted the hydrogen pressure in the MUT to the Limit Curve (See Figure 1). As the MUT water level was decreased to the low level set point of 55 inches, the hydrogen pressure was observed to move into the unacceptable region. At the 55

TEXT (If more space is required, use additional NRC Form 366A's) (17)

inch MUT level, hydrogen pressure was observed to be 1.7 pounds per square inch gauge (psig) pressure greater than that allowed by the MUT Pressure Limit Curve. The MUT was then vented to within the acceptable region of the MUT pressure limit curve.

This report is submitted in accordance with 10CFR50.73(a)(2)(ii)(B) for operation in a condition that was outside the design basis of the plant. Additionally, the operator's failure to perform a 10CFR50.59 review prior to the performance of a "test" is also documented. Operator actions relative to this event are more fully addressed in FPC letter to the NRC 3F1294-09 dated December 2, 1994.

EVENT EVALUATION

The MUT is a 600 cubic foot (nom. 4488 gallons) capacity tank. During power operation, normal tank levels vary between 55 inches and 86 inches (1694 and 2649 gallons). As previously described, RCS makeup is sprayed into the hydrogen atmosphere of the MUT and absorbs hydrogen. The absorbed hydrogen then acts to remove dissolved oxygen from the RCS. The MUT Pressure Limit Curve provides operator guidance in establishing proper hydrogen pressure versus MUT levels and limits the hydrogen pressure in the MUT to prevent the tank from being emptied and hydrogen gas entering the suction of the High Pressure Injection (HPI) pumps, following an Engineered Safeguards (ES) actuation for certain specific event scenarios. This hydrogen entrainment could cause damage to the HPI pumps.

The worst case Large Break (LB) Loss of Coolant Accident (LOCA) analyzed for CR-3 from a core cooling and containment integrity standpoint is a cold leg break. Operation in the unacceptable region of the MUT Pressure Limit Curve at the onset of a LBLOCA could result in damage to the HPI pumps due to hydrogen entrainment from the MUT; however HPI is not an essential system for core cooling in the LBLOCA analyses.

One LOCA scenario, a postulated break in a core flood line, requires further consideration. Low Pressure Injection (LPI) enters into the reactor vessel through the core flood lines; any cooling water from LPI in the train containing the break would not reach the vessel. A single failure in the other train would mean no LPI would be available for core cooling. HPI would then be required to mitigate this event. The core flood line nozzles have inserts which limit the break size to 0.44 square feet which is considered an "intermediate" break size. The blowdown rate for this LOCA is rapid enough to prompt systems to respond as they would in a LBLOCA. Therefore, HPI/MUT suction piping head losses would be comparable to those in a classic LBLOCA. The suction piping head losses are a critical parameter in determining the initial conditions defined by the MUT Pressure Limit Curve. Therefore, since it ensures protection of equipment necessary to mitigate the event, the MUT Pressure Limit Curve constitutes a design basis limit for this event.

It should be noted that the calculation used to develop the MUT hydrogen pressure/level operating (administrative limit) curve contains several conservatisms which provide a buffer against MUP damage in the event the design basis accident would occur coincident with plant operation marginally in the unacceptable operating region of the MUT Overpressure curve. Under these circumstances, no hydrogen entrainment and subsequent vapor binding of the MUPs would be evidenced. These conservatisms include assumed instrument string error, flow rates in excess of procedural guidance, and a column of water above the common suction header supplying the pumps.

Level 1/IPE -Core Damage Frequency (CDF) calculations have been conducted to qualify the relative safety significance of this evolution. A pipe break in the "A" core flood line concurrent with a loss of offsite power, and a start failure of the "B" emergency diesel generator was evaluated. This break concurrent with this power failure would be expected to result in a reactor coolant system blowdown and unavailability of both trains of low pressure injection, as well as HPI unavailability due to hydrogen gas binding. No credit was taken for successful, operator mitigation. The calculated CDF of 3.0E-11/year indicates that this event is insignificant when compared to the current total CDF of the CR-3 Probabalistic Safety Analysis (PSA) of 1.08E-5/year. Therefore, this event did not compromise the health and safety of the general public.

CAUSE

The non-conservatism in the MUT Pressure Limit Curve resulted from: (1) incorrect assumptions used in the calculations which developed the curve, and (2) a lack of understanding by engineering and operations that the curve was actually a design basis limit curve instead of its intended use as an administrative limit curve (which should provide operating margin from the design basis). Periodic operation of the MUT pressure at or above the design basis was a result of efforts to maintain hydrogen concentration of the reactor coolant system within specification. This required operators to place the pressure level point on or near the curve as a routine evolution. Each time the operating point was on or near the curve as indicated by the main control board instrument, the MUT could have been operating outside the design basis.

The cause of the operators not recognizing that the evolution they conducted required a 10CFR50.59 review was due to their understanding that the evolution was bounded by established proceedures.

CORRECTIVE ACTION

Corrective actions for this event include the following:

1. An interim administrative Limit Curve was established on September 9, 1994, which is 2.5 psig less than Curve 8, Maximum MUT Overpressure (MUT Pressure Limit Curve), contained in Operating Procedure OP-103B, Plant Operating Curves.

2. A reevaluation of the calculation used to generate the MUT Pressure Limit Curve was conducted. The calculation is being revised to correct nonconservative assumptions and to reflect the current plant configuration. A revised administrative limit curve with appropriate error adjustment and operational margin will be constructed and incorporated into OP-103B.

3. An evaluation of the current Hydrogen concentration requirements will be conducted to determine if a reduction in the current value would reduce operator burden while still maintaining an acceptable level of dissolved hydrogen in the reactor coolant.

4. Human performance corrective actions for the operators are detailed in the previously referenced correspondence (FPC letter of December 2, 1994 3F1294-09). In Summary, control room operators were counselled, a test procedure was written, a 10CFR50.59 review was performed and management discussions with operations shifts were conducted.

5. The calculational error made by engineering will be reviewed with all appropriate engineering personnel for lessons learned.

6. All other operating curves in OP-103 have been reviewed for similar problems and corrective actions are in progress (no design basis issues were identified).

PREVIOUS SIMILAR EVENTS

There has been one previous reportable event involving MUT Hydrogen overpressure..

ATTACHMENT

Figure 1 illustrates the Maximum MUT Overpressure Curve.

NRC FORM 366A
(6-89)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES 4/30/92

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

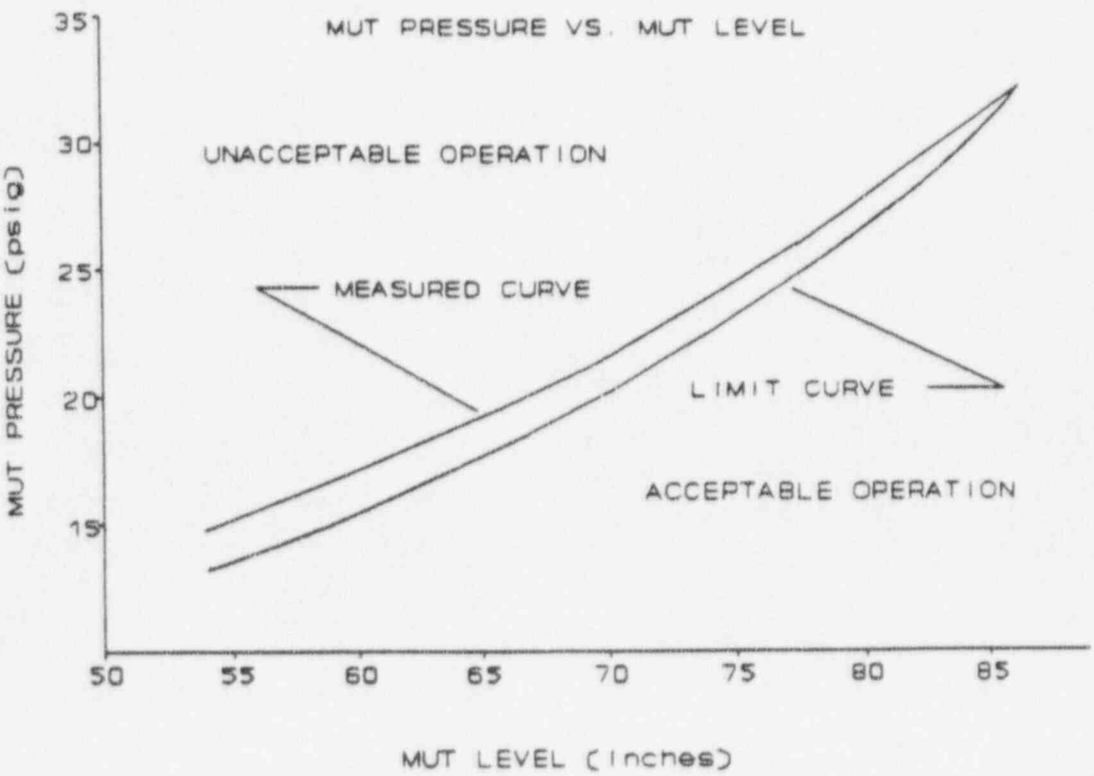
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HOURS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
CRYSTAL RIVER UNIT 3 (CR-3)	0 5 0 0 0 3 0 2	9 4	— 0 0 9 —	0 0	0 6 OF 0 6

TEXT (If more space is required, use additional NRC Form 366A's) (17)

ATTACHMENT

FIGURE 1



NRC Form 366A (6-89)

TO: P. M. Beard, Jr. December 31, 1994

FROM: Dan Poole

SUBJECT: Management Review Panel

Reference: VPNP94-0051

In accordance with your request in the referenced memo, the Management Review Panel (MRP) has reviewed the concerns expressed by the NRC at the meeting on November 16, 1994. In addition the MRP reviewed numerous documents which may have provided additional insight to the NRC concerns.

The results of the MRP's efforts are attached in the following report. If you have any questions about the report, its conclusions or recommendations, please contact me, or any of the other members, at your convenience.

Sincerely,

Dan Poole,
Chairman, Management Review Panel

Enc: 1

Management Review Panel Report

Executive Summary

This Management Review Panel (MRP) was chartered by the Senior Vice President, Nuclear Operations by Memorandum VPNP94-0051. The objectives of the MRP were:

- Identification of any area of Florida Power Corporation nuclear operation that is contrary to FPC's nuclear mission statement, and provide recommendations for remedial or corrective actions if appropriate; and

- Identification of potential contributors to the apparent recent erosion of NRC confidence in the management of Crystal River #3 operation and support, and provide recommendations for remedial or corrective actions if appropriate.

The MRP approached this assignment by assuming each NRC concern was valid, and then tried to develop information to support action recommendations. If insufficient supporting data could be found to support the NRC concern, then we tried to identify how the NRC could perceive the situation as a concern.

In order to seek out additional detail, the MRP reviewed numerous NRC Inspection Reports, FPC Responses to Violations, NGRC Minutes, Problem Reports, Internal Correspondence, and Licensee Event Reports pertinent to the NRC expressed concerns. Attachment 1 to this report provides a complete compilation of documents reviewed.

The MRP also held discussion with members of the CR#3 staff, and some of the MRP members had an opportunity to have discussions with members of the NRC staff, either in group or individual sessions.

The MRP found sufficient examples in our review of documents pertaining to operations in the 1993 and 1994 time frame to justify the NRC's concerns. There were some differences in the categorization, and perhaps characterization, of particular instances or events, but taken as a whole they represent evidence of some needed actions by FPC management to ensure the nuclear mission is met and to restore the NRC's confidence in our operation.

The recommended actions can be summarized as:

- Intitiating an aggressive effort to improve, from the top down, internal communication of the safety culture, including legal compliance aspects, of nuclear power operations.

- Expand existing management procedural initiatives, including additional emphasis on procedure adherence. This should include efforts to improve ownership and the quality of procedure maintenance by users, making them more simple and usable. This should be done consistent with the communication of safety culture.

- Increase the management attention devoted to managing change. This includes configuration management, procedures and processes, and organizational change. Ineffective, or incomplete management of changes was a significant contributor to many of the events or conditions reviewed by the MRP.

- Enhance the current initiatives to improve the working relationship with the NRC, by development of a more comprehensive plan. This plan would address philosophy and expectations as well as mechanics. It should stress recognition of the value added by the regulator in each interaction. Once developed, thorough internal and external communication will be required for it to be effective.

It should be emphasized that no single aspect of the recommendations would, by itself, be sufficient to accomplish the objectives of ensuring the mission statement can be met and restoring NRC confidence in our operations.

Assessment Methodology

The documents reviewed are listed in Attachment 1 to this report. Each member was provided copies of the documents and afforded an opportunity for thorough review. Most members of the Panel met on December 12 and December 16 to discuss and identify additional document requirements. These were provided prior to the full MRP meetings of December 19 and 20. During the meeting of December 16 members were briefed by the Senior Vice President, Nuclear Operations on his concerns and expectations for the Panel. These clarifications were factored into the Panel's effort.

During the full MRP meeting, the NRC Inspection Reports, FPC Responses to Violations, and LERs were discussed by the group. Each violation, cited weakness, and general statements of concern made by the NRC were written on separate pieces of paper to be further discussed and categorized. The same approach was used to characterize the cause of events reported in LERs not covered by Inspection Reports.

The individual items were then arranged into groupings under the general areas of concern cited by the NRC in the November 16, 1994 meeting. These were: Safety Sensitivity; Credibility of Information; Commitment Management; Procedure Revision Process. Efforts were then made to subdivide each NRC concern category such that more specific information about cause or corrective action might be derived. As an example, Safety Sensitivity was subdivided into:

- Lack of questioning attitude by field implementor.
- Lack of questioning attitude by technical support.
- Improper value judgement by field implementor.
- Improper value judgement by technical support.
- Failure to follow a procedure.

Each of the individual items was forced to fit into one or more of the categories.

The results of these efforts were then compared to informal feedback obtained by discussion with members of the NRC staff over the past several weeks.

The MRP then placed a consensus value judgement of the significance of each condition represented by an individual item. This was significant or insignificant, in terms of expectations for an excellently run power plant.

Each member then developed their own list of actions they would recommend to senior management to reduce the likelihood of recurrence of these types of conditions. The listed items were then discussed by the group and a consensus list developed.

Conclusions

The MRP found sufficient examples in their review of documents pertaining to operations in the 1993 and 1994 time frame to justify the NRC's concerns. There were some differences in the categorization, and perhaps characterization, of particular instances or events, but taken as a whole they represent evidence of some needed actions by FPC management to ensure the nuclear mission is met and to restore the NRC's confidence in our operation.

Recommendations

The recommended actions can be summarized as:

- Intitiating an aggressive effort to improve, from the top down, internal communication of the safety culture, including legal compliance aspects, of nuclear power operation

  There were instances in fact, or statement, where "safety" and "legality" of operation were not equated. If compliance with a technical specification was perceived as being safety significant, then the need for compliance was not questioned at all. However, if it were perceived as not safety significant, there might be some willingness to bend the rules. Additionally, one instance existed where lack of knowledge of requirements was a significant contributor to the condition.

  There were undertones that the emphasis on production and efficiency may have eroded conservative thinking.

Therefore it is the MRP's consensus that the message on the Daily Plant Status Report, "Safe, Legal, Efficient", needs more emphasis placed on the "Safe" and "Legal", and that this should come from the top of the organization down. In addition, whenever possible, it should be placed in the context of activities that the receiving audience are likely to encounter.

- Expand existing management procedural initiatives, including additional emphasis on procedure adherence. This should include efforts to improve ownership and the quality of procedure maintenance by users, making them more simple and usable. This should be done consistent with the communication of safety culture.

  There were definitely instances noted where insufficient quality of procedures contributed to not adhering to the procedure. When procedures are not of a quality that they can be performed efficiently by the performer, the situation is ripe for "work-arounds" or variations, i.e., not adhering to procedures. Procedures constantly need upgrading and correction. The best source of this is the user. When users own their procedures, adherence will come more naturally.

  The safety culture message should encourage questioning attitudes and "real compliance" versus "blind obedience" to procedures.

- Increase the management attention devoted to managing change. This includes configuration management, procedures and processes, and organizational change. Ineffective, or incomplete management of changes was a significant contributor to many of the events or conditions reviewed by the MRP.

  Significant events were tied to the failure to effectively manage change to the plant configuration. The most common problem is effective linkage of physical modifications to procedure changes. However, changes to design bases by updating calculations or other software changes to design data need better management as well.

  Frequent management or supervisory personnel changes not being adequately thought through their entire implementation, or less than total information transfer (almost a certainty in any turnover) also contributed to some conditions.

Changes in the NRC organization may not have been responded to effectively by FPC. Changes in NRC personnel may necessitate changes in FPC's approach to what, and how, information is reported.

- Enhance the current initiatives to improve the working relationship with the NRC, by development of a more comprehensive plan. This plan would address philosophy and expectations as well as mechanics. It should stress recognition of the value added by the regulator in each interaction. Once developed, thorough internal and external communication will be required for it to be effective The MRP believes the plan should:

  - include a philosophy which acknowledges the value added by the regulator.
  - clearly delineate FPC management's expectations of FPC employees in their relationship with regulators.
  - emphasize communications that are straight forward, timely, and complete.
  - emphasize the involvement of line management in interaction with regulators.
  - emphasize frequent and open communication.
  - address relationships and communication with all levels of NRC management.
  - address processing of NRC feedback.

  There were clearly indications that the absence of an effectively implemented plan contributed to exacerbating some of the events or conditions reviewed by the MRP.

The MRP also recommends improving the timeliness of design engineering response to plant needs. There is definitely a perception by the NRC, perhaps created by statements from members of the plant staff, that design engineering is slow to respond to the plant's needs. This may be alleviated in part by the relocation of all engineering functions to the site. This should simplify internal communications and help in maintaining a unified set of priorities. The communication plan recommended above may also aid in alleviation of this concern.

It should be emphasized that no single aspect of the recommendations would, by itself, be sufficient to accomplish the objectives of ensuring the mission statement can be met and restoring NRC confidence in our operations.

Approved By:

R. M. Bright, MRP Member

B. J. Hickle, MRP Member

L. C. Kelley, MRP Member

P. E. McKee, MRP Member

D. C. Poole, MRP Chairman

Period of Review: December 12, 14, 16, 19, & 20, 1994

NRC Inspection Reports (and FPC responses where applicable):

93-08
93-11
93-13
93-16
93-17
93-18
93-20
93-21
93-27
93-29
93-31
94-07
94-11
94-14
94-16
94-19
94-20
94-22
94-24
94-25 (R.L. McLaughlin Memo to File dated Dec. 5, 1994)
1994 NRC Trending Report Sorted by Inspection
1993 NRC Trending Report Sorted by Inspection

Generic Letter 89-13 Matrix

NGRC Meeting Minutes for 1993 & 1994: (#213, 214, 215, 216, 217, 218, 219, 220, 221, 222, & 223)

Problem Reports:

94-0200
94-0247
94-0272
94-0267 (including P.M. Beard letters to NRC dated 12/2/94 and 12/8/94, Subject: Unresolved Item 94-22-01, Makeup Tank Operation)

Licensee Event Reports:

94-001-00
94-002-00
94-003-00
94-004-00
94-005-00
94-006-00
94-007-00
94-008-00

USNRC CR-3 SALP (Meeting April 13, 1994)

Ken Wilson memo, undated, Subject: FPC/NRC Meeting

Ken Wilson E-mail of 12/9/94, Subject: NRC Feedback

Agenda for FPC/NRC Management Meeting November 16, 1994

R.C. Widell IOC dated 11/23/94, Subject: Region II Meeting - November 22, 1994

P.M. Beard IOC dated 11/29/94, Subject: Follow up to NRC Concerns

P.M. Beard IOC dated 12/2/94, Subject: Management Review Panel

P.M. Beard IOC dated 12/13/94, Subject: Feedback from NRC Staff

Breakdown of Personnel Reductions for Nuclear Operations

S.L. Robinson E-mail of 12/14/94, Subject: Management Rev. Committee

B.J. Hickle's overheads from Plant Supervisors Meeting

AMB

Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

March 10, 1995
3F0395-15

Mr. Stewart D. Ebneter, Administrator
Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street N.W. - Suite 3100
Atlanta, GA 30323

Subject: Management Meeting To Discuss Performance at Crystal River Unit #3 on March 1, 1995

Reference: A. NRC to FPC letter, 3N0295-01, dated February 1, 1995

Dear Mr. Ebneter:

In follow up to the subject meeting, the purpose of this letter is to forward the various documents that Florida Power Corporation (FPC) referenced and used during the meeting. These include Gary Boldt's Report (Attachment 1) to me on actions taken and planned in response to the Management Review Panel Report of December 31, 1994 which I forwarded to you prior to the meeting, a description of our event free operation program (Attachment 2), and copies of the overheads used by FPC (Attachment 3).

As noted in Reference A, the purpose of the meeting was to discuss reviews that both FPC and the NRC had conducted associated with events that had occurred over the past several months. We appreciated the opportunity to meet with you and have a constructive discussion on issues. As noted during the meeting, although the methods used to perform the analyses were somewhat different, we believe the results were generally quite compatible and the actions that we are taking will address the collective issues.

As discussed during the meeting and as shown in the Attachments, the actions that we are taking include: 1) new sources of information, 2) improved processing of information, 3) new programs and 4) enhanced information sharing, both internally and with NRC staff. Also, as discussed during the meeting, we have had clear objectives and methods of measuring plant production, equipment performance, cost, radiation exposure, etc., and have made substantial progress in these areas, but we needed to establish similar clear objectives and monitoring methods for human performance and safety/regulatory performance. This has been accomplished through our event free operations program and our enhanced program for safety/regulatory performance as reflected in the Attachments 2 and 3. Additionally, based on feedback during the meeting, we will review our commitment tracking program and take any necessary actions to ensure that: 1) priorities are kept updated and communicated to all involved and, 2) employees understand the importance of meeting commitments.

Working with Mr. Jon Johnson, we will keep you apprised of our progress and will arrange a mutually convenient time for a follow on meeting. In this regard, it is important that we reach a shared understanding of the methods to be used to monitor the pro~~cess~~. gress.

Sincerely,

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/mf

Attachments: (1) Gary Boldt's report of February 21, 1995
(2) Event Free Operation Program description
(3) Overheads used by FPC staff

xc: Document Control Desk
Senior Resident Inspector
NRR Project Manager
Mr. J. R. Johnson, Deputy Director, DRSS
Mr. David Matthews, Project Directorate II-3 Director

ATTACHMENT

INTEROFFICE CORRESPONDENCE

Florida Power
CORPORATION

NUCLEAR PRODUCTION	SA2C	240-4594
Office	MAC	Telephone

3/2/95
Noted and actions approved
[initials]

SUBJECT: **Response to the Management Review Panel Report**

TO: **P. M. Beard, Jr.**

DATE: **February 21, 1995**
VPNP95-0018

On January 31, 1995, I formed a response team consisting of B. J. Hickle, P. R. Tanguay, J. W. Campbell, and L. C. Kelley to address the recommendations of Dan Poole's Management Review Panel Report dated December 31, 1994. Attachment 1 is a summary of our actions taken, in progress, or proposed, to address each of the recommendations of that report.

Although the report provided five recommendations, it did not explicitly identify what it believed to be the root cause(s) of the deficiencies noted. Therefore, we conducted an additional analysis (including a review of the NRC letter of February 1, 1995) to determine the root cause(s) so as to ensure that they will be addressed by our actions. Attachment 2 provides the results of this analysis.

At this time, it appears that the actions in Attachment 1, coupled with the actions in our 1995 Nuclear Operations Plan, are sufficient to address the issues raised. However, after we share our evaluation with the NRC at the March 1 meeting, we may propose additional actions.

If you have any questions, please call.

Gary Boldt
G. L. Boldt, Chairman
Management Review Panel Response Team

GLB:lss

MANAGEMENT REVIEW PANEL REPORT

RECOMMENDED ACTIONS

I. **Initiate an aggressive effort to improve, from the top down, internal communication of the safety culture, including legal compliance aspects, of nuclear power operations.**

Actions Taken, In Progress, or Proposed:

- The Mission Statement was revised to place primary emphasis on nuclear safety.
- The Long Range Plan identifies safety culture as the top priority and has established actions to go with it. This was also stressed in the 1995 plan.
- Safety and conservative decision-making was emphasized by senior management at the "all hands" meetings in January. This will be continued in subsequent quarterly meetings.
- A change was made to the plan of the day to remove the number of continuous days on line.
- The Plant Manager wrote a bulletin describing the nuclear safety and event free operations program which was distributed to all Nuclear Operations personnel.
- Specific presentations were made to "all hands" on the event free operations program. This program will be implemented by the departments reporting to the Plant Manager by April 1, 1995. Each supporting department will fully implement this program by July 1, 1995.
- Line management directed that future audits include an assessment of safety culture in the departments audited. Performance criteria for this portion of the assessment will be based on FPC management expectations developed, in part, from consideration of IAEA bulletin 75-INSAG-4.
- A letter documenting FPC senior management commitment to (and role in achieving) conservative decision-making was sent from FPC (Allen Keesler) to INPO (Zack Pate).
- An event response checklist for the Nuclear Shift Manager to use in responding to and investigating significant plant events has been

implemented. This approach is one of several initiatives intended to emphasize the lead role of line (especially plant) management in nuclear safety and legal compliance.

II. **Expand existing management procedural initiatives, including additional emphasis on procedure adherence. This should include efforts to improve ownership and the quality of procedure maintenance by users, making them more simple and usable. This should be done consistent with the communication of safety culture.**

Actions Taken, In Progress, or Proposed:

- Implementation of the event free operations program in all departments by July 1, 1995.

- A formal business process improvement (BPI) evaluation will be performed on the procedure change process in 1995.

- "All hands" meetings presented and discussed event free operations and procedure compliance policies.

- Procedure ownership is being transferred to end users on a trial basis (beginning in the I&C shop). The purpose of this effort is to enhance ownership and accountability among procedure users and to assure the level of procedure detail (or simplification) is commensurate with user needs. Such efforts, however, must maintain a proper balance of quality of technical input. Therefore, system engineering will remain a close partner in review and approval.

- A computer program (NUPOST) for recording and tracking procedure change recommendations was implemented. Operations led the development and implementation of this product.

- A training initiative to intentionally fault (or fail) a procedure during simulator exercises to verify that operators will use the procedure change process is being implemented.

- When appropriate, new procedures and key changes to existing procedures are tested on the simulator.

- All I&C surveillance procedures are being re-validated by the I&C shop.

- To simplify procedures and place more accountability on the performer and performing departments, some "hold points" have been replaced with "witness points" (second party verification), and some new witness points have been added.

- To further clarify procedure intent and improve procedure usability, "independent verification" and "concurrent verification" have been re-defined (in CP115).

- To improve line ownership of the problem report and precursor processes, program and procedure responsibility was moved from the QA director to the plant manager.

III. **Increase the management attention devoted to managing change. This includes configuration management, procedures and processes, and organizational change. Ineffective, or incomplete, management of changes was a significant contributor to many of the events or conditions reviewed by the MRP.**

Actions Taken, In Progress, or Proposed:

- The project manager/team approach to plant modifications was significantly strengthened, including operations representation.

- Formal action plans (using a specific format) were implemented for significant issues.

- A computerized Ful/Text search capability was implemented to help manage change in procedures.

- The System Engineering Manual was updated to include instructions for use of CMIS and Ful/Text and other available tools to verify documents requiring change.

- A check-list was added to the MAR closure process to assure all documents requiring change are completed.

- Maintenance of system histories in the Tech Support area will assist with continuity through organizational change. Some examples are the quarterly report, action plans, system libraries, and system outage critiques.

- A check-list for discussion items to be included in screening and selection of new supervisor candidates was implemented. This provides for senior managers to emphasize change management, safety culture, and conservative decision-making with new supervisory candidates prior to organizational change.

- The 1995 goals include reviewing the AI's and NOD's and other administrative procedures to make sure they are current. A portion of that review was completed in 1994.

- Computer software controls are being audited with the purpose of improving change management.

- Nuclear Operations is taking over the in-processing and fitness for duty programs from Human Resources and has established a project team with a designated transition manager.

- The Master Schedule, the fuel cycle action plan, the 90-day, weekly and daily schedules, have been implemented as instruments to regulate and control the rate of change.

- A new section has been added to the quarterly performance indicators to look at changes occurring in fifteen different areas to arrive at an overall assessment of safety impact.

- Changes recently made to the FPC QA Plan will allow the Nuclear General Review Committee (NGRC) and the Plant Review Committee (PRC) to focus on more safety significant (as opposed to routine) issues.

- NGRC-led targeted assessments (similar to the Management Review Panel Report) will be regularly performed.

- Management directed that a quality audit be performed on the engineering process for making and changing engineering calculations and that the audit team include NGRC and/or other independent engineering calculation expertise.

- Future significant change projects will require prior completion of an action plan, schedule, <u>and</u> contingency plan for potentially negative outcomes.

IV. Enhance the current initiatives to improve the working relationship with the NRC, by development of a more comprehensive plan. This plan would address philosophy and expectations as well as mechanics. It should stress recognition of the value added by the regulator in each interaction. Once developed, thorough internal and external communication will be required for it to be effective.

<u>Actions Taken, In Process, or Proposed:</u>

- A revised plan regarding communication with the NRC was issued on January 6, 1995. It recognized the NRC's mission and value added by the regulatory process; however, further strengthening of this aspect is planned when the plan is converted to a nuclear operations directive (NOD).

- Senior management participation has increased in face-to-face phone conversations with Region II and NRR counterparts to share information and clarify expectations.

- Each executive direct report is increasing the frequency of contact with their NRC counterpart.

- The Senior Vice President has emphasized improvement in the timeliness, directness, and completeness of NRC communications with licensing management.

- The Senior Vice President has emphasized the need for line management involvement in the NRC communication plan.

- FPC will establish routine meetings between licensing and Region II staff similar to those we continue to hold with headquarters staff.

- FPC will strengthen the participation of line management in safety, operability, and regulatory compliance discussions/meetings with the NRC. We must continue to emphasize, however, that licensing remains the single point of contact to arrange and facilitate FPC/NRC communications.

- FPC will increase contact between mid- and upper-level management and their NRC counterparts.

- Clear objectives for safety/regulatory performance are being developed, as well as methods to monitor performance against these objectives.

V. The MRP also recommends improving the timeliness of design engineering response to plant needs.

- Internal communications were enhanced to press issues to the forefront earlier. An example is the establishment of an operator workaround list in response to the Salem event.

- Engineering established an initiative to assure their customers have direct input to project priority setting.

- Design engineering is in the process of relocating to, and consolidating all engineering employees and appropriate technical records at, the Crystal River Site.

- Managers in both design and system engineering functions have begun to increase the frequency of communication with the NRC. It has been particularly emphasized that they do so at the start of new projects and initiatives in order to communicate action plans, schedules, and contingency plans (for potentially negative results) prior to implementation.

ROOT CAUSE ANALYSIS

I. PROBLEM STATEMENT

A review of the recent FPC/NRC management meetings, management review panel (MRP) reports, INPO evaluation, LER history, NRC inspection reports, department and QA self-assessment reports, problem reports and precursors has led to development of the following problem statement relating to the need for human performance and safety culture improvement:

Human performance has resulted in a number of "events" not commensurate with our standard for excellence in nuclear operations. While the majority of these events have not impacted plant operation, some have. Additional corrective action is needed to maintain a decreasing trend in human error and achieve event-free operation.

II. FACTORS SPECIFIC TO CR-3:

A. Degree and Rate of Change (See also APPENDIX A)

An attempt to step back and take a wide view of the massive change taking place at CR-3 has not been made to date. While every nuclear plant is attempting to improve its performance to address a rapidly changing competitive environment, CR-3 has been able to improve at a rate which is gaining ground over the others as partly evidenced by a move up the performance (three year average capacity factor) charts from position 78 (out of 107 plants) to position 30 (current) and possibly into the top 10 by year end 1995. This may result in several potentially significant impacts: (a) the need for a good prioritization of projects is evermore crucial to success (incidentally, not everyone will concur with the judgements made in this regard); (b) it is possible to become self-satisfied or complacent with the substantial progress made to date relative to a number of our peers; (c) the uncertainty inherent in rapid change will create anxiety within the workforce, potentially causing distraction from the task at hand; and (d) the magnitude of change occurring at CR-3, and fueling the ability to advance at a faster rate, is more difficult to manage successfully.

B. Initial Gap in Performance

The initial difference between actual performance and expected performance was large enough to be overwhelming had CR-3 not focused on a few key areas essential to survival. Unfortunately, some other areas may have suffered from inattention and lack of follow-through as a result. The basic improvement cycle followed the steps below. Although presented in sequence, all of the steps are actually addressed in parallel; however, highest priority is given to each in the sequence shown:

1. Improve plant and equipment materiel condition, reliability and safety of operations to support a low forced outage rate (annually).

2. In concert with (a), levelize safe plant operation for consistency and dependability over the long term (cycle to cycle). A primary focus in this phase is placed on scheduled outage performance.

3. Improve human performance and enhance conservative (safety) decision making to sustain (a) and (b) for the remainder of plant life.

By most measures, CR-3 has advanced to step (c) of this improvement plan.

C. <u>Communication Quality and Frequency</u>

A lesson learned from past experience is that the quality and frequency of communication with our employees must increase at a rate faster than the rate of change introduction. By independent feedback, we appear to be doing well in this regard. However, our external communications, especially with the NRC, have not kept pace. In fact, with respect to NRC communications, our relationship has been more reactionary than informative. An additional factor has been the recent substantial turnover in our Region II and NRR Project management teams.

D. <u>Maintaining Critical Industry Interface</u>

Maintaining an active interface with outside organizations is critical to achieving and sustaining excellent performance. This becomes even more vital to a single unit nuclear utility in avoiding isolation from industry practice, improvements, and events. However, from time-to-time, proper prioritization, and assignment of appropriate time (in relation to priority), needs to be re-addressed for: Florida Power, NRC, INPO, B&WOG, NEI, ANI, Code Committees, EPRI, and other(s). As plant performance improvement has been recognized by the industry, increasing peer pressure is being applied to spend even more time on outside activities in industry leadership roles.

III. ROOT CAUSE:

Inattention to detail (at multiple levels, including management) with several contributing causes:

A. Significant and rapid change without, in several cases, effective change management, including contingency planning (the following is a small subset of changes described in Appendix A that relate to NRC violations and LER's cited as examples of their concerns):

- changed ATWAS/AMSAC setpoints
- new ITS on diesel fuel oil particulate (combined with industry problems related to EPA required dyes)
- large scale roof replacement contract
- 18 to 24 month surveillance change request
- new RB penetration test valves
- new limits on RCS dissolved hydrogen
- removed valve position indication from main control board
- ITS change revised FLUR's testing

B. Some internal and external information shortfalls coupled with (one or more of) "cockpit" isolationism, inadequate communication, inadequate teamwork, and/or inadequate information source (e.g., memory, procedure, training material).

C. In some cases, insufficient use of: 1) independent reviewers, and 2) an integrated approach, in station self-assessment activities. The 1991 Reactor Trip(s) report, the 1994 Management Review Panel report, the SWSOPI self-assessment, and the engineering calculation process review are examples of good self-assessments but have all been reactionary rather than proactive.

D. Insufficient integration in managing human performance until recent initiation of the Event Free Operations program. Prior to this point, there was lack of a clear objective, a consistent definition of "event(s)", and an effective method for increasing (and measuring) performance. Additionally, reinforcement of self-checking, expectations regarding procedure use and quality, use of a questioning attitude, and conservative decision-making were not frequently re-addressed.

OVERVIEW OF SIGNIFICANT CHANGES SINCE 1990

- Reduced contractor dependence (including total elimination of the on-site maintenance/construction contractor and significantly reduced dependence on design engineering contractors/AE's).

- Reduction in FPC staffing.

- Buildup/strengthening of system managers/engineers and separation of system engineering and design engineering.

- Implementation of improved technical specifications (culmination of 10 year effort).

- New leadership in most director, manager, and supervisory positions -- some tuning of organizational alignment (such as waste department move from chem/rad to maintenance, and security move from plant to site support).

- Changing surveillance intervals from 18 months to 24 months.

- Implementation of system outage concept (and creation of AI-255 process).

- Implementation of major programs/inspections

  89-10 MOV program
  89-13 SW program
  EOP upgrade program
  EDSFI
  Configuration Management
  OSRE

- Implementation of the Master Schedule and project management controls.

- Substantial facility upgrades

  Electrical system and switchyard
  Safety and non-safety batteries
  Security systems
  Outage support facilities
  Reactor vessel head equipment
  Fuel transfer canal seal plate
  Main turbine upgrades
  Reactor power upgrade
  Main condenser retubing
  Installation of the RB chiller system
  Battery chargers and inverters
  I&C obsolescence

- Implementation of leadership (empowerment) training and practices for managers, supervisors, and employees.

- Changes in NRC-FPC project management

    Kerry Landis
    Dave Virelli
    "Rags" Ragshaven
    Dave Mathews (and several others on temporary assignment replacing Herb Berkow)
    Ross Butcher
    Todd Cooper
    Roy Zimmerman
    Bill Russel

- Taking over fitness for duty and in-processing from human resources.

- Strengthened implementation of the problem report and (especially) the precursor tracking and trending program:

    1993 - 50 precursors
    1994 - 600 precursors
    1995 - 2000 to 3000 precursors expected

- Taking an outage every year (in the form of midcycle outages between refuelings) to improve materiel condition, then eliminating midcycles when no longer necessary to sustain improved performance.

- Business process improvement reviews and resulting changes in:

    Front end of the modification process
    Work control system
    Scheduling (including new PC-based software)
    Procurement and warehousing of materials

- Consolidation of St. Petersburg and site engineering design groups into one on-site organization.

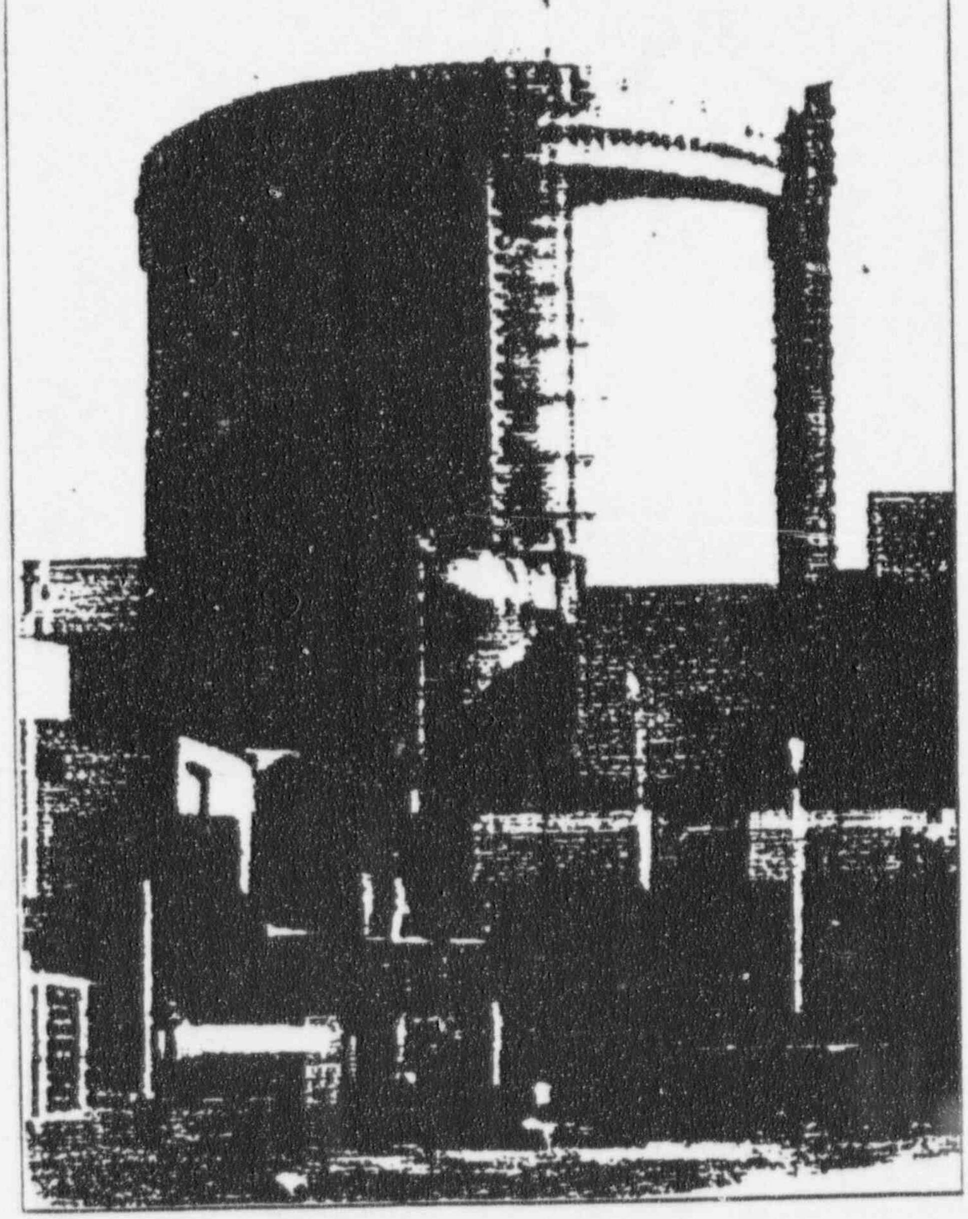
- Government and consumer pressures to deregulate and increase competition in the utility industry.

- Moved the balance of licensing and nuclear fuels groups from St. Petersburg to Crystal River. Combined nuclear licensing and compliance groups.

- Resolution of the Thermo-Lag (TSI) issue.
- Utilizing the simulator for emergency preparedness exercises.
- Changing the security contractor from Burns to SBI.
- Resolution of SE Waste Compact uncertainties.
- Sharing of technicians between utilities to augment the outage labor force.

ATTACHMENT

Crystal River Unit 3
Event-Free Operations
Program Description



B J Hickle 2/28/95
Director Nuclear Plant Operations Date

Rev. 0

Table of Contents

Program Overview

The Challenge

Human errors have the potential to negatively impact plant safety, outage durations, cost of operations, regulatory posture and morale of the work force. Our challenge is to instill a safety culture within the organization such that all individuals exhibit a questioning attitude, conservative decision-making, and accept personal responsibility for the safety of the plant. Furthermore, our challenge is to improve human performance reducing the impact of human errors on plant operations.

Description and Application

This Event-Free Operations program provides an integrated approach to human performance improvement and safety culture enhancement. The program is owned by the Director Nuclear Plant Operations and applies to all personnel, including contractors, who work within Nuclear Operations. Each functional area (for example: operations, engineering, maintenance, etc.) is expected to use this program description to creatively implement the concepts within their respective working groups. Event-Free Operations is a living program which will be enhanced as operating experience is gained.

Event-Free Operations Definition and Objective

"The expectation that human errors can be controlled such that they will not result in an undesirable event." This term recognizes that whenever humans are involved in a process it is unreasonable to expect "error-free" operations, however, aspects of errors such as frequency, significance and acceptance can be controlled.

The objective of Event-Free Operations is to ensure all personnel are properly equipped with and utilize the "tools" necessary to perform their job function with the result being an ever-decreasing frequency and significance of errors to the point that operations is event free.

Program Elements

Significant and lasting improvement in human performance can be achieved through organizational commitment to the following elements:

- Establishing **clear expectations** for human performance, including short and long term goals, and continually reinforcing these expectations in the workplace and in the training environment.

- Promoting a **questioning attitude**, emphasizing **conservative decision-making**, and encouraging consistent **self-checking** practices in the work place through the use of "tools" for human performance improvement.

- Effectively utilizing a **corrective action system** which includes problem identification, investigation, root cause analysis and corrective actions; and establishing line management ownership of these processes.

- Analyzing and **assessing program effectiveness** by using a **tracking and trending system** which can effectively identify barriers to exemplary human performance and adverse trends at a precursor level.

The Event-Free Operations Program addresses each of these elements with specific information and examples provided in the following sections.

Key Expectations and Responsibilities

Safety and Quality

Work must be performed safely and correctly first and foremost. There are no good reasons for short-cutting safety or quality.

To achieve this expectation all employees must work together to create an environment where personnel routinely exhibit the following behaviors at the job site:

- **Focuses on the task at hand** (Concentrates and does not allow distractions to interrupt focus)
- **Always uses self-checking--STAR** (And expects to be checked by others)
- **Approaches work in a cautious, questioning manner** (Particularly when faced with uncertain or degrading conditions involving reactor safety or other critical tasks. Does not hesitate to call "time out" and call for help.)
- **Takes the time needed to do the job right**
- **Determines where errors could most likely occur and prepares for these** (Usually in pre-job briefings but also through self-questioning.)
- **Never places generation goals ahead of safety** (Thinks "safety first" with all actions taken.)
- **Maintains awareness and uses job-site "tools" of Event-Free Operations program**

These behaviors will be fostered when line management accepts responsibility for their team's human performance.

Specifically management must:

- **Observe and assess work of subordinates and peers**

- **Identify and eliminate performance barriers** (Such as distractions, poor procedures, improper tools, etc.)

- **Question and stop work that has led to uncertain conditions**

- **Provide coaching and other assistance to help workers do the job right**

- **Communicate experience and share lessons learned** (From events involving human performance problems)

- **Reinforce desired behaviors and promptly correct improper ones** (Taking every opportunity to instill a cautious questioning approach in workers and themselves)

- **Accept responsibility for corrective action system**

- **Ensure a proper balance of supervision, training and skills, and procedures.**

- **Maintain awareness and use management tools of Event-Free Operations program.**

Procedure Use:

Procedures will be followed exactly as written. When a procedure cannot be followed as written, work will be stopped and the procedure will be interpreted or changed.

All manipulations, equipment alterations and evolutions will be performed with an approved procedure, work instruction or tagging order.

Inherent in this expectation is the intention that inadequate procedures not be used to perform work. If during the performance of a task a procedure is determined to be technically inadequate or cannot be used as intended, it will be revised prior to subsequent use. On no occasion shall procedures be "worked around" as opposed to being changed.

The intent of the second part of this expectation regarding changes to installed equipment position is to ensure that configuration of both safety and non-safety related equipment and systems is strictly controlled. Any changes to such equipment or systems must be made using methods which assure acceptable and safe system response and "as left" configuration. Procedural controls may be step-by-step or generic as the situation warrants, taking into consideration (with each case) appropriate balance of training and skills, procedures and verification techniques.

Human Performance Improvement Commitment:

All personnel are expected to make a personal commitment to improving human performance.

All personnel must take the time to continually practice and reinforce the behaviors, expectations and concepts presented in this plan. Improved teamwork, questioning attitude, operating event reduction and safety are all out-growths of personal commitment to improve human performance.

Tools for Human Performance Improvement

Discussion:

Human performance tools are the intangible and tangible factors an employee uses to complete a task and prevent the occurrence of errors. They can be viewed as barriers to error occurrence when they are used correctly in performing work. Additionally, they serve to promote questioning attitudes, conservative decision making and self-checking to the extent that they are consistently utilized to plan and perform a task. These tools are the focal point of the entire Event-Free Operations program. Success of the program requires that all personnel be familiar with the tools and consistently keep them in mind and use them for every job that is done. They also serve as a basis for analyzing human performance problems; for example, to understand what went wrong an understanding must be reached as to what tool failed. In this regard, they are used for root cause evaluations and to trend problem reports and precursor events.

Human Performance Tools

Job Site Tools:	Safety Knowledge/Skill Procedures/Instructions Communications Performance Verification Questioning Attitude Pre-Job Briefings Teamwork
Management Tools:	Observation and Assessment Coaching Accountability Rewards Expectations/Standards Corrective Action System Organizational Resources

Tool Definitions - The following list provides a definition of each tool.

Accountability-	understanding and being responsible for the consequences of actions taken
Assessment-	to provide a rating based on performance
Coaching-	providing encouragement and guidance
Communication-	the act of sharing information and developing an understanding
Corrective Action System-	systematic approach used to prevent recurrence of a particular incident
Expectations-	desired outcome based on policies or guidelines
Instructions-	directions used to accomplish a task
Knowledge-	the level of information one knows without the use of external references
Organizational Resources-	human and non-human assets available for use in the organization
Observation-	information gained by watching the actions of others
Performance Verification-	the act of ensuring appropriate steps have been taken to achieve the desired result. Includes self-checking, peer checking and other forms of independent verification.
Pre-Job Briefing-	preliminary discussion of work to be accomplished with emphasis on safety, responsibilities and contingency planning
Procedures-	formal instructions used to perform a task
Questioning Attitude-	behavior exemplified by asking questions about unknown or uncertain circumstances and seeking clarification before proceeding forward.
Rewards-	what is given as recognition of a job well done
Safety-	freedom from danger, hurt or loss. Includes personal safety (industrial and radiation) as well as nuclear safety.
Skill-	the ability to use knowledge and aptitude to perform a given assignment
Standards-	criterion used to establish principles and expectations
Teamwork-	the act of working together towards a common goal

Corrective Action System

Discussion:

The corrective action system used to address human performance issues consists of the following activities: problem/issue identification; investigation; root cause analysis; and determination of corrective actions. Both precursor cards and problem reports are used to document human performance issues with the problem report reserved for more significant problems. Generally, all events that impact plant operations are considered significant enough to warrant a problem report. Examples of these types of events are provided in the Appendix 1 to this program description. Specific guidance for the use of the corrective action system is contained in procedure CP-111. Changes have been made to the system to ensure its usefulness in addressing human performance issues. These are summarized below.

- Line management has assumed responsibility for the corrective action system with the Director Nuclear Plant Operations owning the applicable procedures. This change was made to improve ownership and use of these systems throughout the organization.

- The process was simplified, eliminating multiple reports, removing non-value added reviews and generally making it more user friendly.

- The Nuclear Shift Manager (NSM) was established as the point of process control for precursor cards and problem reports which includes: receipt, review, prioritization, action assignment and corrective action plan approval. The NSM is also in charge of event response using the event response checklist (see Appendix 2).

- Accountability for corrective actions was moved down in the organization, generally at the shop manager level.

- Various changes were made to facilitate root cause evaluation and trending.

Assessment of Program Effectiveness

Discussion:

Effectiveness of the Event-Free Operations program is assessed by a variety of methods including the following:

- Direct observation of work in progress--This method provides an opportunity to assess tool use on a case-by-case basis.

- Periodic independent audits and surveillances--Every QA audit incorporates a section which will look at program implementation and effectiveness. Additionally, periodic QA surveillances will assess program implementation.

- Independent Review Group Oversight--This includes assessment by the Nuclear General Review Committee and the Plant Review Committee.

- Tracking, trending and analysis of data from the corrective action system--Data is compiled monthly and quarterly and included in performance indicator reports. Also, shop specific information is distributed to each shop on a monthly basis.

- Management "Aggregate" Assessment--This routine assessment is led by the Senior Vice President Nuclear Operations using information from a variety of sources.

Performance Indicators:

Performance indicators are used to assess program effectiveness. The following parameters are routinely trended which indirectly or directly measure program effectiveness:

- Human Performance Success Index - Used as a station pulse point and included in performance indicator reports. This indicator measures the number of problem reports and precursor cards that fall into human performance categories against the number of opportunities for events to occur (number of hours worked). The problem reports and precursor cards included in the report are from all nuclear operations areas. Problem reports are assigned a severity level based on the Severity Level Classification for Operations Significant Incidents listed in CP-111, Initiation and Processing of Precursor Cards and Problem Reports.

- Human Performance Trends - Direct measure used in performance indicator report and provided with supporting documentation to each shop on a monthly basis. This indicator uses a standard deviation calculation to show improving or declining trends in the number of problem reports and precursor cards written that fall into the indicated human performance areas.

- Equipment Mispositioning Events - Direct measure used in performance indicator reports. This indicator tracks the number of problem reports and precursor cards that are directly attributable to equipment mispositioning.

- Human Performance Cause Codes - Direct measure used in performance indicator reports. This indicator trends cause codes assigned to problem reports and precursor cards to identify the principal and contributing causes for an occurrence using the five most frequently occurring cause categories.

- Industrial Safety Accident Rate - Indirect measure used in performance indicator reports.

- Collective Radiation Exposure - Indirect measure used in performance indicator reports.

- Precursor Card Generation Rate - Indirect measure used in management reports.

- Operating Events Rate - Direct measure used in management reports.

- CR-3 Safety Performance - Indirect measure used in performance indicator report.

Examples of performance indicators are provided in Appendix 3 of this program description.

Examples of Events Which Impact Plant Operations

Unexpected System Actuations--Events considered under this category include system actuations caused by human error which present a challenge to nuclear safety or to plant operators to regain control. Usually these are full system actuations not half-trips of control systems. Initiation of HPI, fire system actuation, loss of power to electrical buses and connected equipment are examples. Also, any system actuation that requires entry into EOPs falls under this category as does an actuation which causes injury, equipment damage or significant cost to recover.

Unplanned Releases and Spills--Events considered under this category include unplanned releases of radioactivity that have the potential to exceed or have actually exceeded the limits of Technical Specifications or regulations. Also included are chemical releases from the plant which are of sufficient quantity to cause environmental impact assessment, violations of regulations or significant clean-up expense. Spills in the plant or on the grounds which cause injury, equipment damage or significant clean-up expense also are considered under this category.

Serious Injury--Any injury resulting in extended lost time, disability or death are considered under this category.

Technical Specification Violations--This category includes Technical Specification violations caused by human error and applies to risk significant deviations and generally not to missed surveillances, small errors in setpoints, or other administratively inoperable conditions. (All Technical Specification violations are considered adverse and are recorded on problem reports.)

Operation Outside of Operating Limits--Events considered under this category involve unevaluated intentional or unintentional operation outside of operating limits which causes a reduction in safety margin or causes a condition outside of design basis.

Degradation of Plant Safety Margins--Events considered under this category include conditions which significantly degrade safety margins but do not fall under other applicable categories such as Technical

Specification violations, unexpected system actuations, etc. Also included under this category are events that had the potential to reduce or actually reduced the operational capability of equipment important to safety. Also included are situations in which changes in reactor parameters represent unanticipated reductions in margins of safety.

Destruction of Equipment--Events in this category include errors which lead to destruction or degradation of equipment important to safety or power production. Significant degradation of fuel integrity, primary coolant pressure boundary and important associated structures is included. Also included is degradation or destruction of equipment which requires significant cost to repair or replace.

Plant Trips--Any plant trip caused by human error is included in this category.

Excessive Radiation Dose--Events in this category involve radiation doses in excess of administrative limits or significant breakdowns in radiation controls such that a radiation dose in excess of regulatory limits was possible.

Mismanagement of Reactivity Control--Events considered under this category include unanticipated reactivity additions, start-up rates in excess of limits, incore temperatures in excess of limits, violation of rod insertion limits, or any other condition including administrative, which leads to or could potentially lead to a loss of reactivity control.

Appendix 2

NSM Event Response Checklist

Definition of Event:

- Unexpected system actuations/plant trips
- Significant spills
- Serious injuries
- Technical Specification Violations
- Operation outside of operating limits
- Degradation of plant safety margins
- Destruction of equipment
- Excessive radiation dose
- Management discretion

1. Verify that the plant is in a safe, stable condition

   - Perform VP-540/580
   - Stop any on-going evolutions which contributed to the event and return equipment to safe status
   - Perform relevant OPs
   - Perform AI-704 if the reactor tripped or run back has occurred. ______ Date ______ Time

2. Make notifications

   - Use AI-210 and AI-500
   - Call out shop manager and area manager to perform investigation

   ______ Date ______ Time

3. Generate a problem report

   - Collect relevant data/evidence for root cause analysis including statements from:
     - involved workers
     - involved supervisors
     - involved operators

   - Consider sequestering physical evidence (to avoid losing valuable data)

   ______ Date ______ Time

4. Ensure performance of root cause analysis

   - Perform HPES (for human errors) within 24 hours
   - Identify any tools which failed and why they failed
   - Identify immediate and interim corrective actions

   ______ Date ______ Time

5. Review and approve immediate and interim corrective actions ______ Date ______ Time

6. Restrict personnel involved (as applicable) from performing any activity which could potentially influence plant safety or stability.

Date Time

7. Authorize resumption of evolution upon approval of immediate and interim corrective actions

Date Time

8. Ensure statements are obtained from involved personnel regarding their actions to prevent making similar errors in the future:

- involved workers
- involved supervisors

Date Time

9. Ensure department personnel and all nuclear operations personnel are familiar with lessons learned from event. Describe methods used.

Date Time

10. Ensure involved personnel are recertified before work is performed that can affect safety or plant stability.
- obtain supervisor recommendation,
- manager approval, and
- NSM approval in writing.

Date Time

11. Ensure recent shop precursor history is reviewed to identify trends and that appropriate corrective actions are taken.

Date Time

12. Ensure applicability of event to opposite trains or similar equipment is evaluated.

Date Time

13. Describe, with attachment, any additional measures to be taken to assure defense in depth.

Date Time

Checklist completed satisfactorily ______________________
Nuclear Shift Manager Date

Reviewed for adequacy by PRC ______________________
Meeting No. Date

Approved for closure ______________________
DNPO Date

Examples of Performance Indicators

Human Performance Success Index 1995

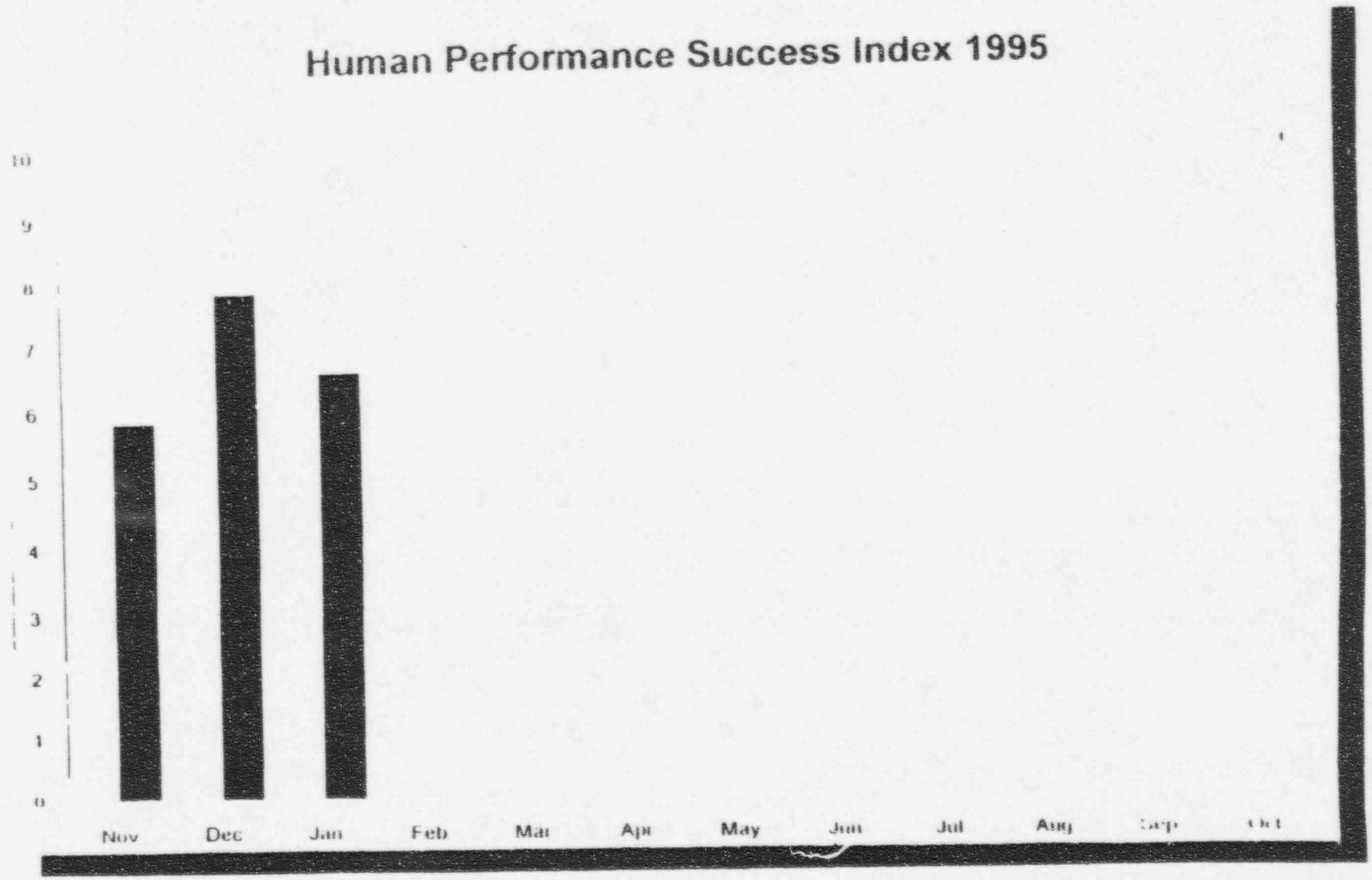
Human Performance Trends - Nuclear Operations January 1995

Equipment Mispositioning Events - Fourth Quarter 1994

Trends in Human Performance from Problem Report and Precursor Cause Codes - Fourth Quarter 1994

Industrial Safety Accident Rate - Fourth Quarter 1994

Collective Radiation Exposure - Fourth Quarter 1994


Human Performance Success Index 1995
10
9
8
7
6
5
4
3
2
1
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Nov
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Jan
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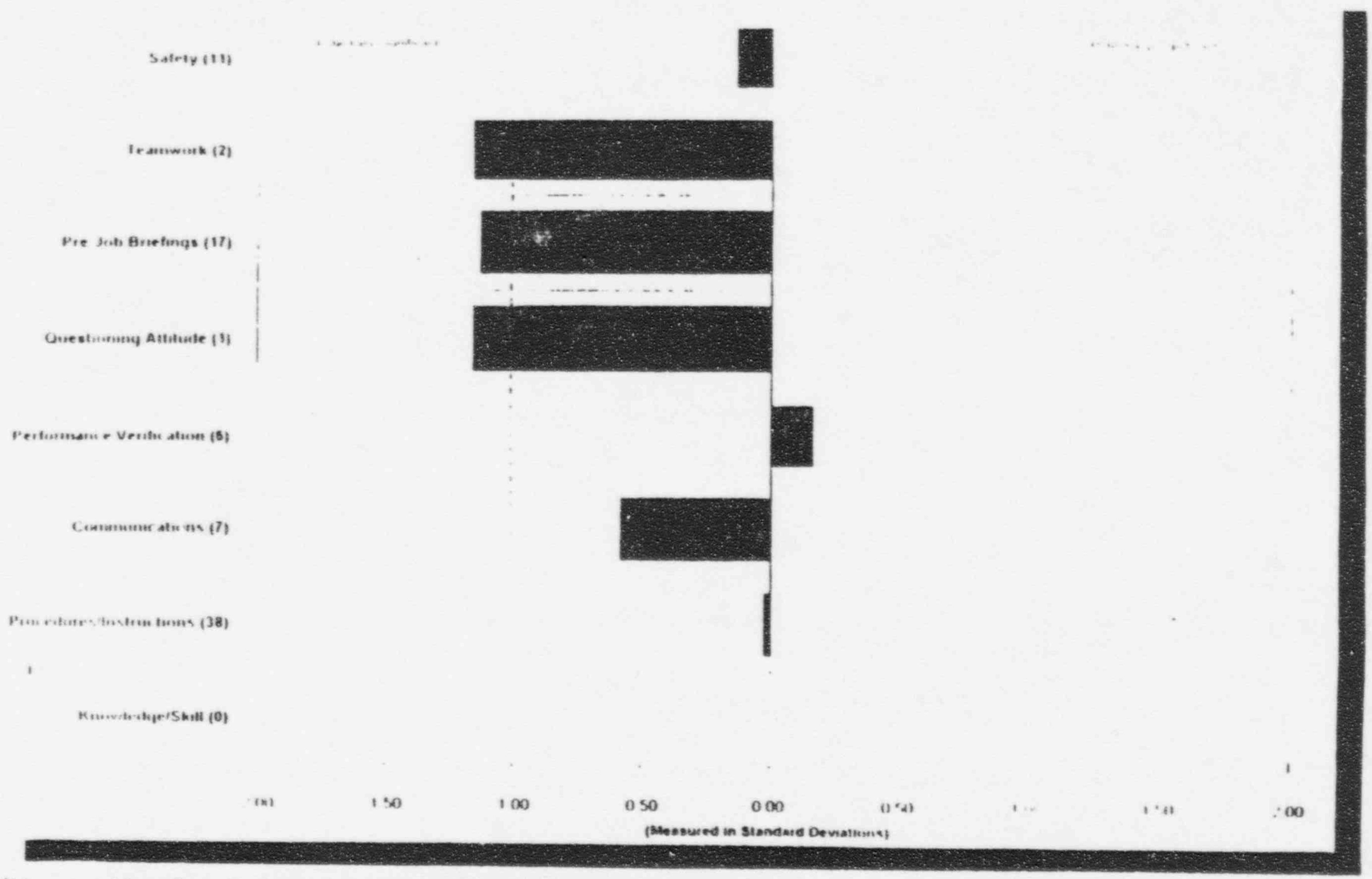
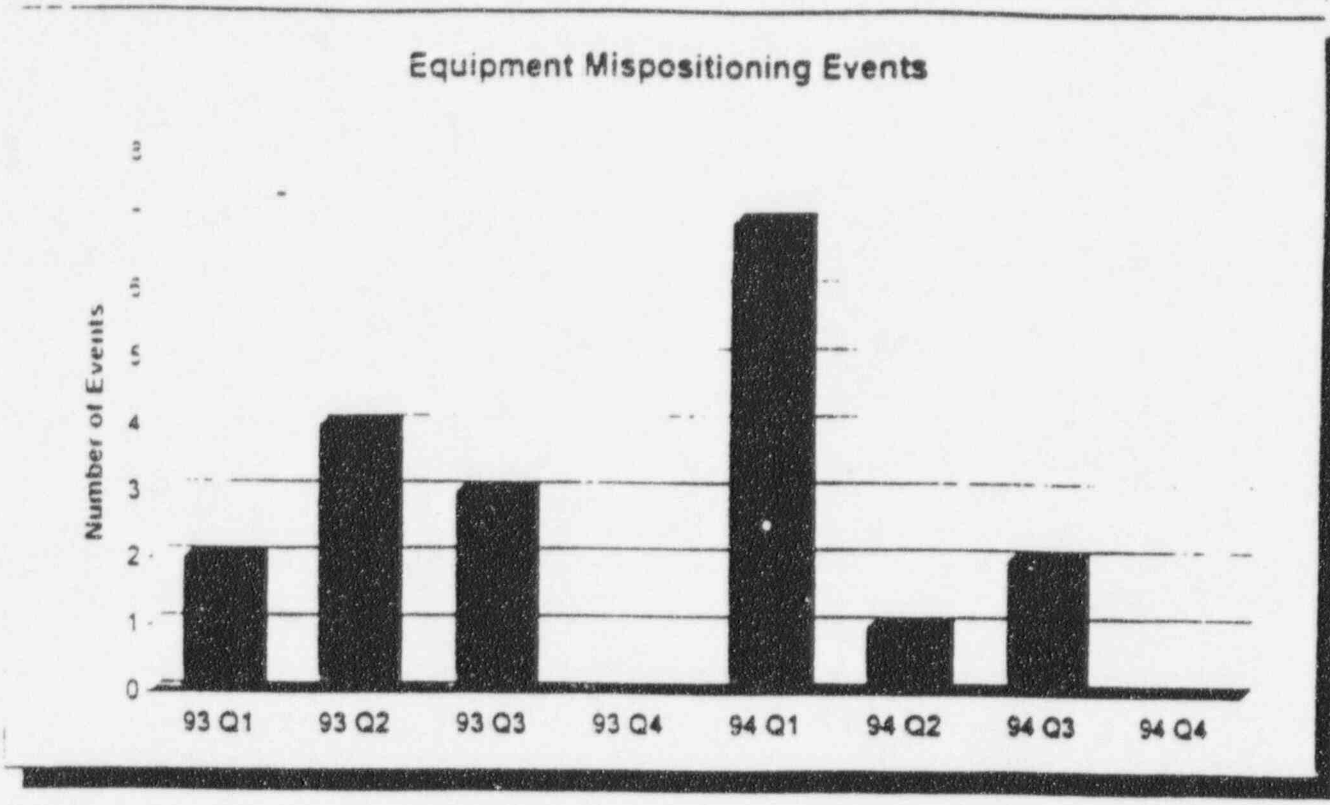
Oct

Human Performance Trends - Nuclear Operations
January1995



... influenced by the recent increase in use of Precursor Cards by non plant organizations



Definition of the Performance Indicator

This indicator has replaced the Operations Personnel Errors performance indicator at the request of the Director, Nuclear Plant Operations. This is being done to increase the focus on equipment mispositionings due to their potential serious consequences.

Performance Measurement / Target

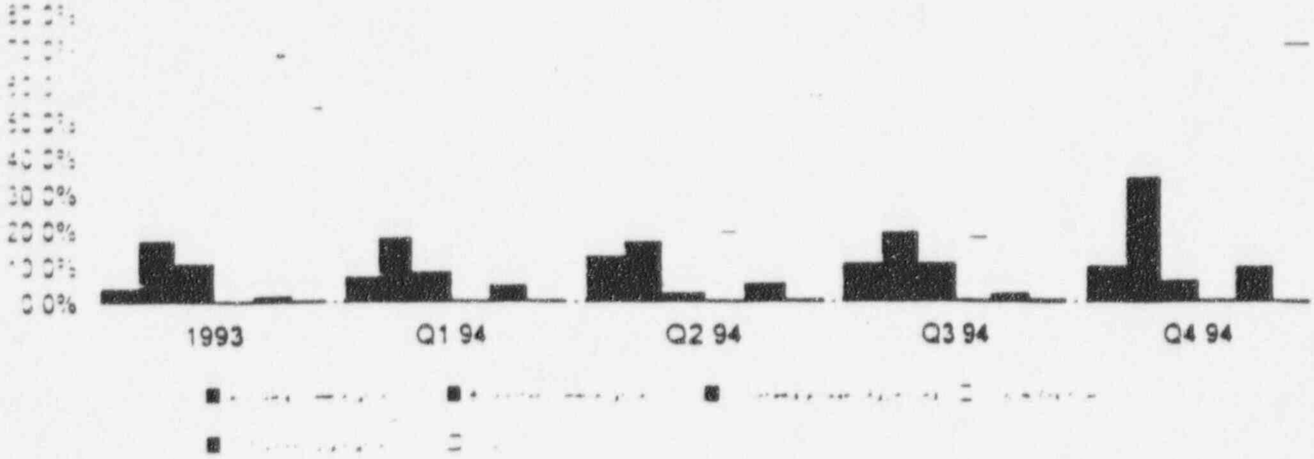
No numeric target has been established for this indicator. A reduction in the number of mispositioning events during the year and into the future is required.

Analysis / Summary

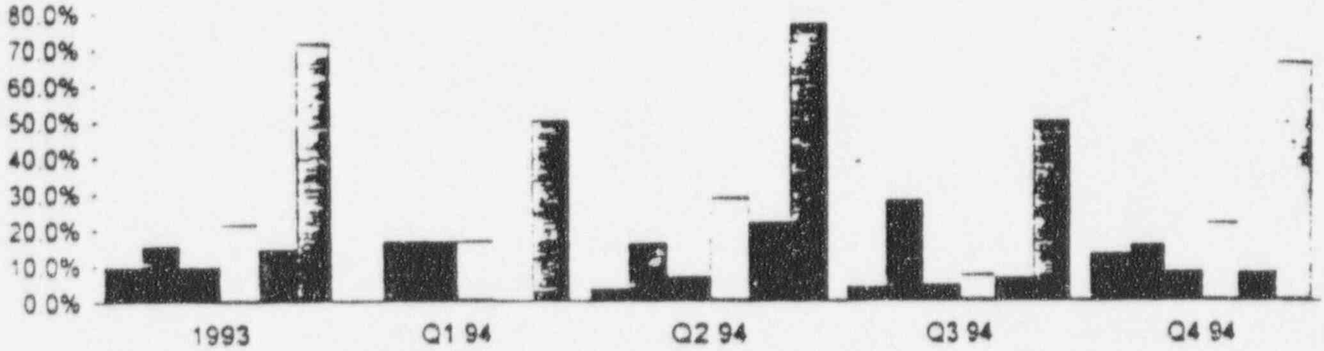
There were no mispositioning events reported during the fourth quarter.

Trends in Human Performance from Problem Report and Precursor Cause Codes

Problem Reports



Precursor Cards



Definition of the Performance Indicator

Cause codes are assigned to Problem Reports (PR) and Precursor Cards (PC) to identify the principal and contributing causes for an occurrence. An individual PR or PC may have one or several causes assigned. For this indicator all are counted equally. The causes charted here are the 5 most frequently occurring cause categories of the 12 possible human performance categories.

Performance Measurement / Target

No performance target will be established for this indicator since it is a mechanism to assess trends and identify areas requiring management attention. The values are the percentage occurrence of a cause code compared to the total number of cause codes assigned during the reporting period.

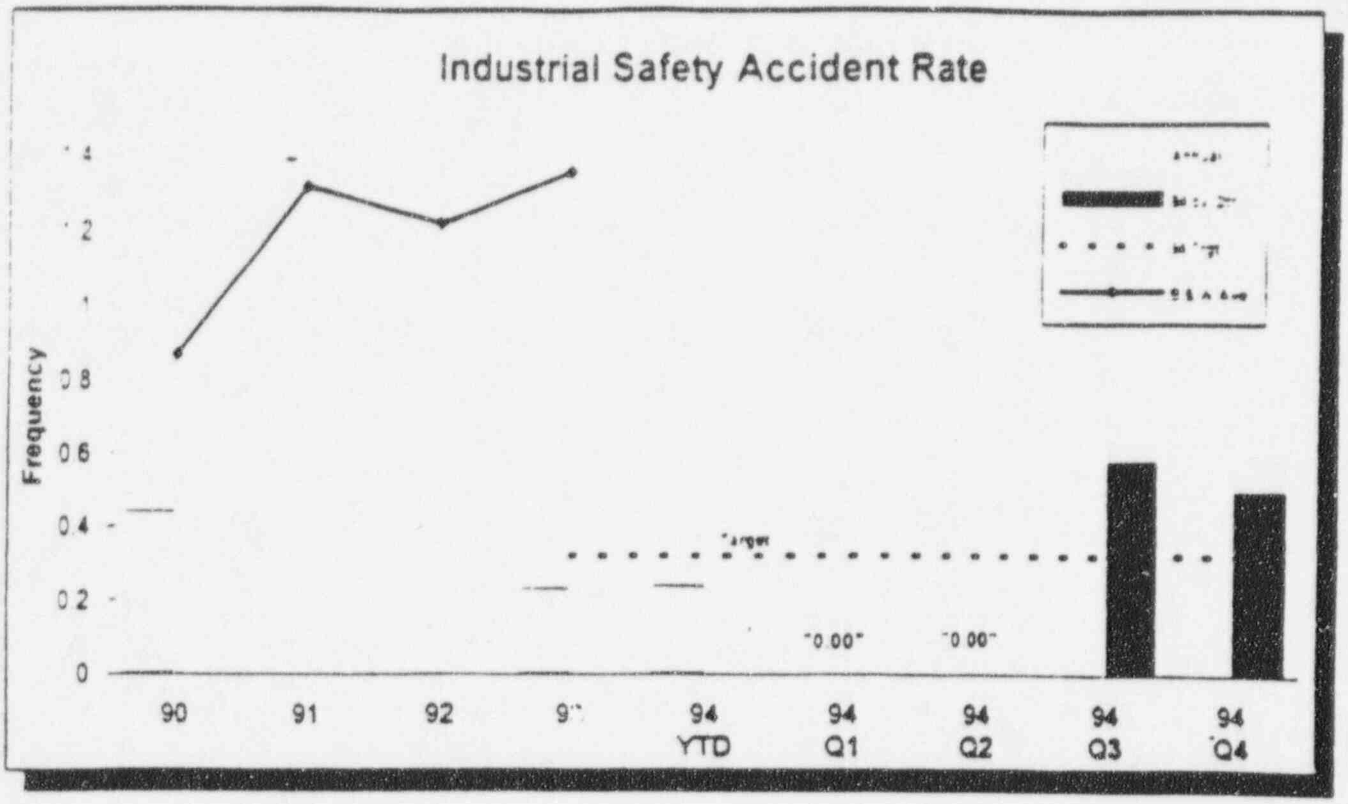
Analysis / Summary

Written Communication and Work Practices continue to be the most prevalent causes recorded in both systems.

The slight downward trend in events attributed to Work Practices reported on PRs continues for the fourth quarter, possibly reflecting increased efforts to promote self-checking.

The rise in events reported in four out of five areas on precursor cards can be attributed to increased awareness and use of these cards by all, especially by operations and maintenance personnel. Increased use of precursor cards will identify potential concerns with human performance which can be addressed before escalation into problems. This should be evidenced by a decreasing trend in events that become Problem Reports in 1995.

Responsible: ~~P. F. McKee~~, Director, Quality Programs
Data Collected By: R. L. Thompson, Senior Nuclear Quality Assurance Engineer



Definition of the Performance Indicator

The Industrial Safety Accident Rate results from the number of accidents at the station involving days of restricted work plus the number of lost time accidents at the station involving days away from work, plus the number of work-related fatalities at the station. This rate is normalized per 200,000 man-hours worked at the station. Contractor personnel are not included in the calculation.

Performance Measurement / Goal

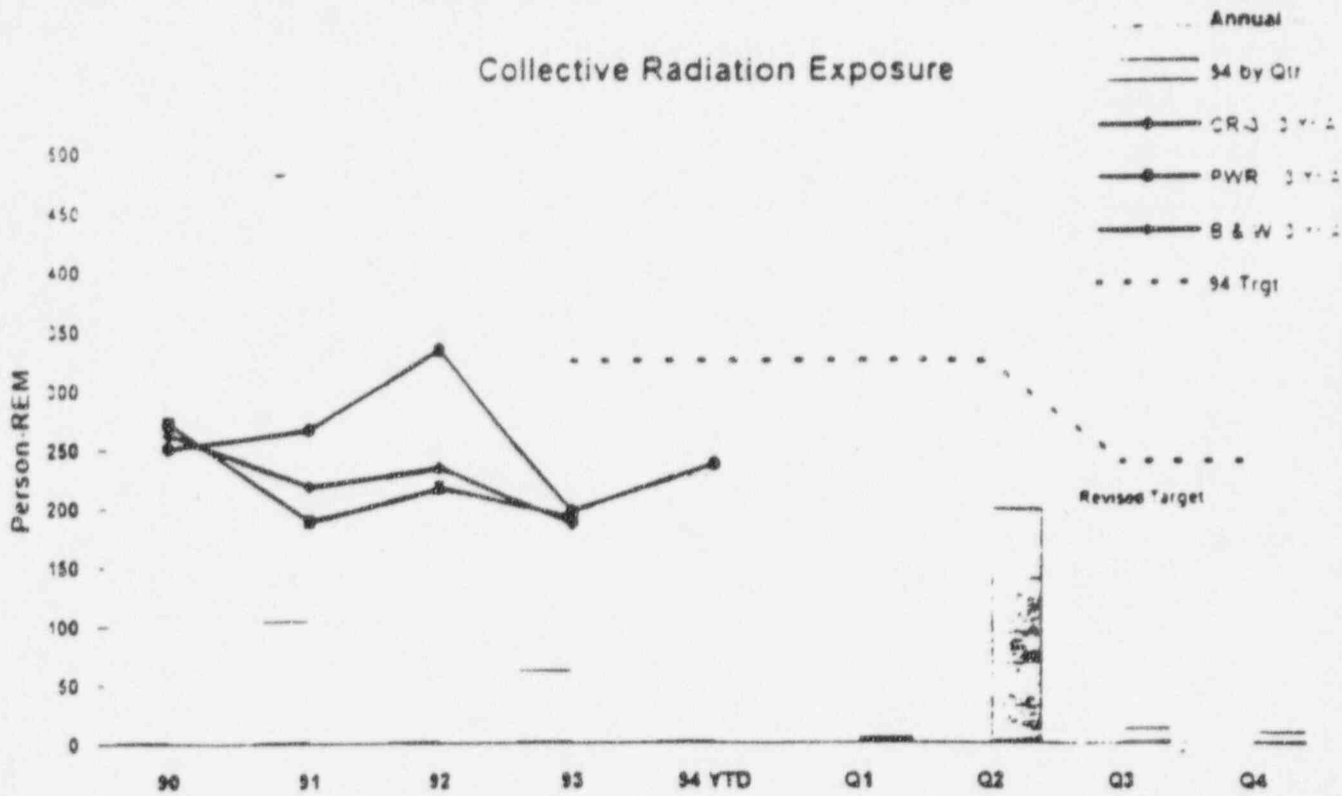
Achieve an Industrial Safety Accident Rate of less than .32 accidents per 200,000 man-hours worked

Analysis / Summary

During the fourth quarter, the Industrial Safety Accident Rate for Nuclear Operations and CR-3 was calculated at 0.50. Averaged over the past 12 months, the Industrial Safety Accident Rate = 0.24, which is below the established goal of 0.32.

The Safety Performance Index for Nuclear Operations and CR3 for the fourth quarter was calculated at 0.0. Averaged over the past 12 months, the Safety Performance Index = 0.013

The Safety Performance Index for SBI for the fourth quarter was calculated at 0.0. A 12 month average was not determined as the SBI group has only been under contract with Florida Power for a portion of 1994.



Definition of the Performance Indicator

Total external whole-body dose received by all on-site personnel (including contractors and visitors) as measured by thermoluminescent dosimeter (TLD).

Performance Measurement / Target

Achieve a Collective Radiation Exposure target of less than 325 REM. Due to the outage exposure coming well unde its 285 REM exposure target, the 1994 target has been decreased to 240 REM.

Analysis / Summary

The dose for the fourth quarter of 1994 is 10.2 REM, bringing the yearly total to 227.6 REM. This is 12.4 REM below our target for the year. The CR3 three year rolling average dose is 237.9 REM, down from 262.5 REM after the th quarter. This decrease is a result of dropping the first 8M Outage dose from the calculation. The current three year average still includes one mid-cycle outage and two refueling outages.

ATTACHMENT 3

FPC REVIEW

Items Considered:

FPC/NRC Management Meetings
Management Review Panel Report
LER History
NRC Inspection History
Self-assessment History
Problem Reports and Precursors

FACTORS SPECIFIC TO CR-3

- Degree and Rate of Change
- Initial Gap in Performance
- Communication Quality and Frequency
- Maintaining Critical Industry Interface

ROOT CAUSE ANALYSIS

PROBLEM STATEMENT:

Human performance has resulted in a number of "events" not commensurate with our standard for excellence in nuclear operations. While the majority of these events have not impacted plant operation, some have. Additional corrective action is needed to maintain a decreasing trend in human error and achieve event-free operation.

ROOT CAUSE:

Inattention to detail (at multiple oraganizational levels) with contributing causes.

Method: CP-144 "Root Cause Analysis"

CONTRIBUTING CAUSES

1. Significant and Rapid Concurrent Change

2. Some Information Shortfalls

3. Insufficient Independence and Integration in some Self-Assessment Activities

4. Insufficient focus in Managing Human Performance

SUMMARY OF SIGNIFICANT ACTIONS

- The Long Range Plan and 1995 Plan identify safety culture and human performance improvement as the top priority in nuclear operations

- The Event Free Operations program is a major new initiative for 1995

- Employee safety communication will be increased through quarterly "all-hands" meetings

- The lead role of line management in discussions regarding safety, operability, compliance, and human performance improvement has been reemphasized

Sources: Response to the Management Review Panel (MRP) Report, Nuclear Operations 1995 Plan

- Implemented several procedure initiatives:
    - Ownership transfer
    - NUPOST program
    - Simulator use
    - Validation
    - Hold points/witness points
- Transferred ownership for the problem report and precursor tracking programs to the plant manager
- Strengthened the project manager/team approach to plant modifications
- Implemented Ful/Text search capability for procedures and other plant records

- Strengthen self-assessment activities
  - Management review panel
  - NGRC/PRC focus on major issues
    - Independence
    - Integration

- Strengthen action plan and contingency plan development

- An FPC/NRC communications plan was developed with emphasis on increased frequency, quality, line management participation, and participation at multiple (counterpart) levels.

- All engineering resources and records are being consolidated at the Crystal River site

SAFETY/REGULATORY PERFORMANCE

- Objectives

  - Consistently meet FPC management expectations for safety perspective

  - For each SALP area achieve and demonstrate the criteria of a category 1 rating

  - Achieve and demonstrate the other criteria of an NRC "Good Performer" as discussed in SECY-94-017

  - Maintain the safety performance indicator "on standard" in each area

- How monitor

  - Periodic self-assessment against FPC management expectations for safety perspective

  - Periodic self-assessment against SALP and Good Performer criteria including comparison with current "Good Performers"

  - Quarterly Performance Indicator Reports

  - AEOD Performance Indicator Reports

SUMMARY

HOW MANAGEMENT ACTIONS ADDRESS THE ISSUE

- New sources of information
    - Precursor cards
    - New human performance indicators
    - Tracking of events that affect operations
    - Improved monitoring of safety/regulator performance

- Improved processing of information
    - NGRC efforts
    - QA audits
    - Senior management review meetings

- New programs
    - Event free operations
    - Monitoring safety/regulatory performance

- Enhanced information sharing
    - Internally
    - With NRC

EVENT FREE OPERATIONS PROGRAM

Overview:

- Provides comprehensive approach to improving human performance.

- Two-fold challenge:

  1. Instill safety culture where all individuals exhibit a questioning attitude, conservative decision making, and take personal responsibility for safety.

  2. Reduce impact of human errors on plant operations.

- Event-Free Operations Definition and Objective:

  "The expectation that human errors can be controlled such that they will not result in an undesirable event." This term recognizes that whenever humans are involved in a process it is unreasonable to expect "error-free" operations, however, aspects of errors such as frequency, significance and acceptance can be controlled.

  The objective of Event-Free Operations is to ensure all personnel are properly equipped with and utilize the "tools" necessary to perform their job function with the result being an ever-decreasing frequency and significance of errors to the point that operations is event free.

PROGRAM ELEMENTS

- Clear expectations
- Promotion of questioning attitude, conservative decision-making, self checking (by use of "tools")
- Corrective action system
- Program effectiveness assessment

KEY EXPECTATIONS

Safety and Quality: Work must be performed safely and correctly first and foremost. There are no good reasons for short-cutting safety or quality.

Procedure Use: Procedures will be followed exactly as written. When a procedure cannot be followed as written, work will be stopped and the procedure will be interpreted or changed.

All manipulations, equipment alterations and evolutions will be performed with an approved procedure, work instruction or tagging order.

Human Performance Improvement Commitment: All personnel are expected to make a personal commitment to improving human performance.

TOOLS

Job Site Tools:	Safety Knowledge/Skill Procedures/Instructions Communications Performance Verification Questioning Attitude Pre-Job Briefings Teamwork
Management Tools:	Observation and Assessment Coaching Accountability Rewards Expectations/Standards Corrective Action System Organizational Resources

CORRECTIVE ACTION SYSTEM

- Line management ownership
- Process simplified
- Nuclear Shift Manager (NSM) focal point
- Accountability moved lower in organization

EFFECTIVENESS ASSESSMENTS

- Direct observation of work in progress
- Independent Audits and Surveillances
- Independent Review Group oversight
- Tracking and Trending enhancements
- Management "Aggregate" assessment

EXAMPLES OF EVENTS WHICH IMPACT PLANT OPERATIONS

Unexpected System Actuations--Events considered under this category include system actuations caused by human error which present a challenge to nuclear safety or to plant operators to regain control. Usually these are full system actuations not half-trips of control systems. Initiation of HPI, fire system actuation, loss of power to electrical buses and connected equipment are examples. Also, any system actuation that requires entry into EOPs falls under this category as does an actuation which causes injury, equipment damage or significant cost to recover.

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Mismanagement of Reactivity Control--Events considered under this category include unanticipated reactivity additions, start-up rates in excess of limits, incore temperatures in excess of limits, violation of rod insertion limits, or any other condition including administrative, which leads to or could potentially lead to a loss of reactivity control.

CURRENT ASSESSMENT OF HUMAN PERFORMANCE

- The number of errors as recorded by problem reports has been decreasing throughout 1994.

- Equipment mispositioning events are under control.

- The number of events which impacted plant operations in 1994 were the same as in 1992 and 1993; however, the 1994 events were less consequential than the previous two years.

- The use of precursor cards has grown rapidly throughout the organization. They are proving to be an extremely good predictive tool.

- Organizational understanding and buy-in of Event-Free Operations program has been very encouraging.

- Off to a good start. Continued success will depend upon:

  Developing useful insights from human performance data and acting on these.

  Continuous reinforcement of program elements by management.

Post-it® Fax Note 7671	Date 4/26/95 # of pages 5
To Gerald Williams	From Bruce Hickle
Co./Dept. Legal	Co. FPC CR3
Phone #	Phone # 240 3401
Fax # 231-4931	Fax # 240 3751

TO: Pat Beard

DATE: April 24, 1995

SUBJECT: Management Follow-Up to Make-Up Tank Event

RECEIVED
APR 26 1995
LEGAL DEPT.

This memo is intended to provide documentation with respect to follow-up taken by Greg Halnon and myself on the subject of counseling provided to operating crews following the make-up tank event.

On September 15, 1994, immediately following a Management Review Committee (MRC) meeting to discuss the make-up tank event (minutes attached) I met with Messrs. Dave Fields, Nuclear Sift Supervisor, and Robert Weiss, Assistant Nuclear Shift Supervisor, to discuss the findings of the Management Review Committee and to personally counsel these individuals. Mr. Greg Halnon was also in attendance. Specifically the following items were addressed:

(1) Results of MRC evaluation and follow-up actions (see attached documentation).

(2) Discussed my overall assessment of this event, and specifically told them I felt their motives may have been correct in that they did demonstrate a good questioning attitude and did not attempt to hide the results of their evolution but instead attempted to use the data to effect a change. On the other hand, I communicated to them that their methods were wrong and truly reflected poor judgement and possibly group think on their part.

(3) I clearly articulated my expectations with respect to operation of our plant emphasizing:

- That procedures are followed as written or formally changed with proper safety evaluations.
- That all operators are expected to operate within established limits and have no right to knowingly violate these limits except as provided by 10CFR50.54 during emergency operations.
- All operators are expected to take prompt action to return the plant to within established limits in the event that plant parameters exceed these limits.
- That shift and off-shift resources be enlisted to provide support in evaluating unusual evolutions or situations that appear not to be covered by procedure. I indicated that the nuclear shift manager should have been contacted as well as the operations manager or plant manager prior to commencement of the evolution in question.
- I informed Messrs. Fields and Weiss that any future violation of these expectations would result in severe and certain consequences, including revocation of their operating licenses and possible release from employment.

- I asked them if they understood these expectations and how they viewed the make-up tank evolution at present. These questions were asked in order to assess their understanding and also their recognition of the mistakes that were made and commitment to make a change in their operating practice. I felt they understood the gravity of their errors and they were committing to change their operating practice.

- I asked Messrs. Weiss and Fields to prepare a test procedure and to submit it to the PRC for evaluation after the fact. I felt that a procedure should have been prepared to start with and I wanted them to do that to reinforce my expectation.

After Messrs. Fields and Weiss left the room, Greg and I discussed whether or not there was a need to immediately pull them off of shift. Considering the results of the MRC and the feedback that I received during the counseling session, I did not feel there was a need to immediately pull them from shift work; however, I did follow-up and visit their shift at the simulator to first-hand assess their operating practices. I saw a number of strengths in their communications and use of procedures and did not observe any weaknesses during my visit.

Greg subsequently counseled other members of Dave Fields' shift and met with all operating crews as outlined in the attached memo.

Memo to Bruce

This memo is to document the discussions and counselling I had with the operators involved in the MUT issue of November, 1994. I discussed philosophies of safe operation with each of the operators involved. Jim Atkinson and Jack Stewart were together when we talked and expressed some concern over the definition of tests. We discussed this and came to a full understanding of when a evolution is a test needing procedural guidance and when existing procedures can be used. I spoke with Christine Smith and she exhibited an excellent handle on the requirements of a safe Reactor Operator. She expressed that she never would permit a test if she knew a design basis limit would be challenged. She also acknowledged the importance of staying within operating curves. Christine questioned the use of out-dated OP-103A curves that were based on previous maximum licensed power levels. In response to this question, I issued a memo on the use of such curves and expedited the formation of an action plan to update all of the curves in the OP-103 series procedures. This plan is assigned to Ken Vogel of the Operations Engineering group.

Mark VanSicklen and I have had numerous discussions on the event focussing on safety and procedural use. The outcome of these discussions gives me confidence he understands the importance of the plant's design basis in relation to safe operation of the plant. Mark has an outstanding questioning attitude which has lead to even more discussions on other issues. I continue to work with Mark on his concerns over the tight operating limits we sometimes impose and on technical specification issues he has raised.

I have had many follow up discussions with Dave Fields and Rob Weiss. They acknowledge the error in judgement in letting the plant drift to the unacceptable side of the curve without an approved test procedure. They regretted the action and feel like other alternatives could have been pursued such as bringing management forward to review the desired actions prior to the test. After the many discussions, I have confidence in both Dave and Rob in their ability to operate the plant in a safe and legal manner although, presently, I feel it prudent to keep them off shift for the foreseeable future.

The remainder of Operations was obviously shaken by the events prior to and after the test. Many operators were losing confidence in our ability to resolve this significant work around issue they had dealt with every day. The disciplining of the operators had both a wake-up affect and a chilling affect. On the positive note, operators are much more aware and are questioning more often evolutions and adequacy of procedures. It is, however, noticeable that they are empathetic with the operators involved. It has taken time to restore the open openness I had with them in the past. I feel, though, we have reached a higher plateau in openness since this event, mainly through my MNPO Seminars and Tool Bag Tag program during the first quarter of 1995. The MNPO Seminar was the mechanism I used to discuss, in general, operating procedure philosophy with all operators. We also formed a procedural use committee involving the operators themselves to clarify and cement the policy on procedural use in operations. This is a well documented committee and details are available upon request.

The following is a synopsis of the actions taken:

Dave Fields	o appearance before the Management Review Committee o counselled by the DNPO and MNPO after the Management Review Committee o reassignment off shift to the administrative shift o a low rating and commentary to support it in 1994 performance record o a 0% raise o responsible for writing a test procedure, after-the-fact detailing the steps taken o internally committed to have NRC involved in any future decisions regarding crew assignment
Rob Weiss	o appearance before the Management Review Committee o counselled by the DNPO and MNPO after the Management Review Committee o reassignment off-shift to the administrative shift o a low rating and commentary to support it in 1994 performance record o reduction in raise by 1.5% o responsible for writing a test procedure, after-the-fact detailing the steps taken o internally committed to have NRC involved in any future decisions regarding crew assignment
Reactor Operators	counselled by the MNPO and reassignment to different shifts
Other Operating Crews	Discussions with the MNPO during MNPO Seminar in Cycle 1 Requal and personally with each Nuclear Shift Supervisor

Florida Power CORPORATION

INTEROFFICE CORRESPONDENCE

Nuclear Plant Operations NA2C 240-3401

SUBJECT: Management Review Committee Meeting Notes

TO: G. L. Boldt

PM94-0037

DATE: October 4, 1994

D. A. Fields
G. H. Halnon
S. G. Johnson
J. R. Maseda
P. R. Tanguay

A management review committee was convened on September 15, 1994, to discuss PR-94-0267, Make-Up Tank Pressure Limit Curve Technical Basis Inadequate. Messrs. Hickle, Halnon, Davis, McKee, Widell, Tanguay and Maseda were present at the meeting. The purpose of the meeting was to conduct an overview of open issues relative to the subject problem report and to review a test that was performed by the operating shift to determine the validity of the make-up tank hydrogen overpressure curve in OP-103B.

As a result of the meeting, the committee recommends the following actions be taken.

1. Discuss the importance of adherence to operating curves and other limits and expected response to alarm conditions with all operating shifts. **Action Hickle and Halnon, due 12/31/94.**

2. Review all operating curves in OP-103 to identify other instances where operating crews may be required to operate to close to limit, i.e. too little margin exists between normal administrative limit and operating limit. **Action Halnon, due 12/31/94.**

3. Provide counseling for shift that performed test stressing importance of avenues for resolving issues, importance of maintaining operating limits, correct methods for performance of evolutions, abnormal evolutions, and consequences of repeat performance. **Action Hickle - Complete.**

4. Generate procedure or work instructions as appropriate after the fact for make-up tank overpressure test. **Action Fields - due 10/31/94.**

5. Counseling of reactor operators on the shift that performed the make-up tank test. **Action Halnon - Complete.**

6. Validate the make-up tank hydrogen overpressure curve and reissue. **Action Tanguay, due 10/31/94.**

7. Review plant modifications to ensure that operator burden is minimized. Action - **Management Review Committee, due 12/31/94.**

8. Revisit the technical justification for 25cc/kg. dissolved hydrogen in the reactor coolant system to determine whether or not there is technical justification for lowering the limit. Action - **Johnson and Maseda, due 12/31/94.**

Bruce J. Hickle

cc: P. F. McKee
R. C. Widell

FLORIDA
POWER
CORPORATION
Crystal River Unit 3
Docket No. 50-302

May 5, 1995
3F0595-13

Mr. Stewart Ebneter
Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W., Suite 2900
Atlanta, Georgia 30323

Reference: A. NRC to FPC letter, 3N1194-02, dated November 4, 1994
B. FPC to NRC letter, 3F1294-09, dated December 2, 1994

Subject: Unresolved Item 94-22-01, Makeup Tank Operation

Dear Mr. Ebneter:

This letter supplements our letter of December 2, 1994 (Reference B) by providing additional information from our continuing review of unresolved item 94-22-01, makeup tank (MUT) operation. This additional information includes FPC's corrective actions to resolve the issue and further disciplinary action taken against the responsible Shift Supervisor and Assistant Shift Supervisor.

As you know, this matter has been the subject of an investigation by the NRC's Office of Investigations (OI). The focus of that investigation, as we understand it, is whether the actions of an FPC operating shift at Crystal River Unit 3, in conducting an unauthorized evolution on the MUT on September 5, 1994, constituted a willful violation of procedural requirements. FPC takes any NRC concern in this regard very seriously. We have therefore reviewed the events of September 5, 1994, from the perspective of whether a willful violation occurred.

As explained in more detail below, FPC in no way condones the actions of the Shift Supervisor and Assistant Shift Supervisor. FPC has taken appropriate disciplinary action with regard to the responsible individuals, which we believe to be adequate in light of all the circumstances, including their overall performance records. Based upon our review, however, we do not believe that the individuals' actions rose to the level of deliberate misconduct. They were motivated by a desire to obtain data to support a legitimate technical concern with the validity of the MUT operating curve. Moreover, they did not understand at the time that the curve reflected design basis limits.

Under these circumstances, FPC does not believe that any purpose would be served by NRC enforcement action against the individuals. We are also concerned with the message that such an action might send. FPC management has worked hard to instill a questioning attitude among the workforce at Crystal River. Further action against the personnel involved could have the unintended effect of discouraging others from pursuing legitimate concerns.

Additional Corrective Actions

In addition to the steps described in our December 2, 1994 letter, FPC has taken the following corrective actions:

1. The Shift Supervisor and the Assistant Shift Supervisor were removed from licensed duties and reassigned within the Operations Department. Their current duties involve procedures development and other operational support areas where their SRO experience is helpful. FPC has no intent to place the individuals back on shift at this time. FPC will consult with the NRC before returning either individual to shift duties.

2. FPC has established a detailed follow-on action plan to resolve, in a comprehensive fashion, the complex technical issues associated with makeup tank operation and the borated water storage tank/reactor building sump level. The action plan includes further validation of OP-103B, Curve 8, to ensure the correct operating region and alarm values.

If any FPC licensed personnel had willfully violated operating procedures, FPC would not hesitate to take even stronger action, including discharge of the persons responsible. Our further review of this matter has confirmed our conviction that although the Shift's actions in conducting an unauthorized evolution were unacceptable and warranted strong discipline, the individuals did not engage in deliberate misconduct.

Conclusions Regarding Deliberate Misconduct

The facts surrounding the unauthorized evolution on the MUT are summarized in our December 2, 1994, letter and the NRC's Inspection Report (Reference A). We provide here a summary of the factors that reflect the state of mind of the individuals involved. If the NRC is aware of any evidence of wrongful intent, please notify FPC so that we can take appropriate action.

- In brief, on May 10, 1994, during the refueling outage at CR-3, the Shift Supervisor and Assistant Shift Supervisor were in charge of the operating crew that performed Surveillance Procedure (SP)-630, a full flow test for the High Pressure Injection pumps and check valves. While performing SP-630, the operators observed a noticeable decrease in the MUT level, indicating a possible stuck-open makeup valve, along with cavitation of MUP-1C. This condition was documented in Problem Report (PR) 94-0149, dated May 10, 1994. PR 94-0149 noted that, based on comparisons by Operations personnel of the actual drop in MUT level with the maximum MUT overpressure curve in OP-103B (Curve 8), a curve plotted with the actual data points trended toward the unacceptable region of Curve 8. PR 94-0149 further noted that this occurred even though the initial MUT over-pressure level during SP-630 was below the maximum allowable pressure per Curve 8.

- The corrective actions for PR 94-0149 included evaluating the MUT level drop that occurred to determine whether Curve 8 was acceptable. The evaluation performed by System Engineering [Nuclear Plant Technical Support] concluded as follows:

  The decreasing change between the plotted curve and OP-103B, Curve 8 appears to be mainly due to the fact that both curves are converging on zero psig. Based on this evaluation, it does not appear the plotted curve would have enterer [sic] the unacceptable region of Curve 8. In addition, *there is conservatism built into Curve 8* to ensure that instrument error, for example, could not create an excessive overpressure condition. [emphasis added]

- These conclusions were also documented in a memorandum from Nuclear Plant Technical Support, dated September 2, 1994. A copy of the memorandum was provided to the Shift Supervisor and Assistant Shift Supervisor, for the purpose of determining whether they had any additional concerns or questions before the issue was closed.

- The Shift Supervisor and Assistant Shift Supervisor have indicated that they did not have enough information to know whether they still should be concerned with the MUT overpressure/level curve. Accordingly, on September 5, 1994, they conducted the evolution (described in FPC's letter of December 2, 1994) to gather additional data by measuring the system response as MUT level was lowered. In carrying out this evolution, the Shift Supervisor and Assistant Shift Supervisor have indicated that they followed the operating procedure for the MU system (OP-402) and initially placed the system on the operating curve limit (i.e., not in violation of the curve). They expressly decided not to take the MUT level below the clearly stated low level limit of 55 inches. As the MUT level was reduced, they took data on the system response. Soon after the evolution began, the overpressure drifted into the unacceptable operating region with respect to MUT level. The crew failed to terminate the evolution at that point or otherwise take appropriate action. The evolution did, however, lead to engineering confirming that the operating curve was inaccurate and nonconservative. The shift reported this discrepancy to their management and initiated a Problem Report (PR 94-0267).

The NRC's Enforcement Policy, 10 C.F.R. Part 2, Appendix C, Section VIII, states that enforcement actions involving individuals are "significant personnel actions which will be closely controlled and judiciously applied." According to Section VIII of the Enforcement Policy. enforcement actions against an individual are reserved for "[m]ore serious violations, including those involving the integrity of an individual (e.g., lying to the NRC).

Application of this policy is reflected in the following cases involving unauthorized actions by operators, where the NRC has imposed individual enforcement sanctions: <u>See</u> <u>David Tang Wee</u>, IA 94-06 (1994) (NRC prohibited SRO from engaging in licensed activities for three years following deliberate cover up of mispositioned control rod incident); Robert L. Dickherber, EA 90-31 (1990) and Commonwealth Edison Co. (Quad Cities Nuclear Power Station, Unit 1), EA 90-32 (1990) (NRC issued orders suspending license of fuel handling SRO and modifying the license for Quad Cities where the individualengaged in manipulations to make up for an error in the placement of a fuel assembly); see also GPU Nuclear Corp. (Oyster Creek Nuclear Generating Station), EA 87-185 (1989) and Alfred E. Geaudreau, Jr., EA 88-224 (1989) (NRC issued violations to both licensee and control room operator for operator's deliberate destruction of alarm tape documenting safety limit violation); PECO Energy (Peach Bottom Atomic Power Station), EA 93-290 (1994) (NRC cautioned licensee that future deliberate violations of procedures governing entry into high radiation areas would result in enforcement action against both licensee and individuals involved).

However, in cases not involving deliberate intent to violate regulations or procedures, the NRC has found forceful disciplinary action by the licensee to be sufficient, and has not pursued enforcement action against the individuals involved. See Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), EA 83-34 (1983) (licensee removed from licensed duties the senior control room operator and shift supervisor on duty when a technician caused violation of LCO requiring secondary containment integrity during movement of irradiated fuel in spent fuel pool); Carolina Power & Light Co. (H.B. Robinson Plant); EA 84-13 (1984) (licensee suspended without pay a licensed operator and shift foreman who failed to follow procedures for work in high radiation area).

Extenuating Factors

Although the Shift's actions in conducting the evolution without proper authority were clearly inappropriate, two extenuating factors should be noted. First, the evolution was conducted for the purpose of gathering data to determine whether a technical concern with Curve 8 existed. This was not a case of a failure to follow procedures motivated by improper or wrongful intent. Second, the Shift Supervisor and Assistant Shift Supervisor did not realize that the operating curve was a design basis limit. They believed that the curve effectively established administrative limits, as had been indicated in the September 2, 1994, memorandum in which Engineering had concluded that Curve 8 was "accurate and reasonably conservative." In fact, only after further design basis evaluation did FPC conclude that operation in the unacceptable region of the curve constituted operation outside the design basis of the system (see Attachment 6 of our December 2, 1994 letter).

This was also not a case where an operator knowingly failed to follow an explicit procedural step or other requirement, or disregarded the advice of other control room personnel that his action was inconsistent with procedures. The Shift Supervisor and Assistant Shift Supervisor referred to OP-402 and maintained the MUT level within the normal operating limits of 55 to 86 inches. In addition, they have also indicated that they were not sure that Curve 8 (of OP-103B) applied during this evolution since it is only referenced in the portion of OP-402 governing venting and hydrogen addition (section 4.20). These factors do not excuse the operators' failure to act in a timely manner once the system response drifted into the unacceptable range of Curve 8. However, this case should be distinguished from one where operators took affirmative action that violated an explicit procedural requirement.

Summary

We reiterate that FPC in no way condones the actions of the shift in conducting an unauthorized evolution on the MUT. Such an action is incompatible with good operating principles and management's expectations. Nevertheless, FPC remains concerned with the negative impact of further NRC enforcement sanctions against the individual Shift Supervisor and Assistant Shift Supervisor in the absence of deliberate misconduct and in view of FPC prior disciplinary actions . Based upon the facts of this case, therefore, FPC does not believe enforcement action against the individual operators is warranted (e.g., for a violation of the NRC's deliberate misconduct rule in 10 C.F.R. § 50.5).

Sincerely,

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB:ff

xc: Document Control Desk
Office of Investigations
Chief, Branch 2, Region II
Senior Resident Inspector
NRR Project Manager

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

July 7, 1995

EA 95-126

Mr. P. M. Beard Jr.
Senior Vice President, Nuclear Operations
ATTN: Manager, Nuclear Operations Licensing, NA2I
Florida Power Corporation
15760 West Power Line Street
Crystal River, Fl 34428-6708

SUBJECT: NRC OFFICE OF INVESTIGATIONS REPORT 2-94-036
NRC INSPECTION REPORT NO. 50-302/95-13

Dear Mr. Beard:

This refers to an investigation by the Nuclear Regulatory Commission (NRC) Office of Investigations (OI) completed on May 24, 1995, and inspections conducted by Mr. Ross Butcher of this office between September 5, 1994 and July 5, 1995 and documented in NRC Inspection Report No 50-302/95-13. This special inspection report also summarizes related findings discussed in NRC Inspection Reports 50-302/94-22, 95-02, 95-07, 95-08 and 95-09. During these reviews, the NRC examined the facts and circumstances surrounding a September 5, 1994 event involving pressure control of the reactor coolant system makeup tank; and reviewed the adequacy of design control and corrective actions that affected operability of emergency core cooling system pumps. The subject inspection report and the synopsis of the OI investigation are enclosed. At the conclusion of the inspection, the findings were discussed with those members of your staff identified in the enclosed report.

Based on the results of our inspections and the OI investigation, four apparent violations have been identified and are being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), 10 CFR Part 2, Appendix C. In addition, enforcement action is being considered against the licensed operators involved in the September 5, 1994 event.

In regard to the first apparent violation, on September 5, 1994, licensed operators planned and conducted an evolution that allowed the makeup tank pressure to exceed the acceptable operating region of OP-103B, Curve 8 for approximately 35 minutes. In addition, the operators delayed their response to the annunciator for the makeup tank overpressure condition while they continued to drain the makeup tank, causing the tank overpressure to diverge further into the unacceptable region of Curve 8. These apparent intentional acts resulted in a violation of Technical Specification 5.6.1.1 which requires implementation of procedures AI-500, Conduct of Operations; OP-402, Makeup and Purification System; OP-103B, Plant Operating Curves; and AR-403, PSA H Annunciator Response. Had an Engineered Safeguards actuation occurred while in this condition, cavitation and subsequent inoperability of one of the high pressure injection pumps could have resulted.

which procedures?

The OI investigation concluded that the shift supervisor, assistant shift supervisor, and two chief operators deliberately violated Crystal River Nuclear Plant procedures. 10 CFR 50.5 (a), Deliberate Misconduct, in part, prohibits licensee employees from engaging in deliberate misconduct that causes a licensee to be in violation of a condition of any license issued by the Commission. Deliberate misconduct is defined by 10 CFR 50.5(c) as an intentional act or omission that the person knows constitutes a violation of a requirement, procedure, instruction or policy of a licensee.

The record in this case reflects that licensed operators planned and conducted an evolution that they fully expected would result in exceeding the makeup tank overpressure limits specified in procedures. The record also reflects that the licensed operators intentionally delayed implementation of the requirements of the annunciator response procedure in order to gather additional data on the overpressure condition. Apparently, the licensed operators involved were aware of the procedural requirements and intentionally violated the procedures. The NRC considers these apparent intentional acts to constitute an apparent violation of 10 CFR 50.5(a). We are also concerned that appropriate management oversight and control was not exercised to preclude intentional violation of plant procedures.

The remaining apparent violations involved failures to meet the requirements of 10 CFR 50, Appendix B, Criterion III, Design Control in that the design basis was not correctly translated into drawings, procedures, and instructions, for: (1) operation of the makeup tank; (2) operation of the manual swap over of the ECCS pumps' suction from the borated water storage tank to the reactor building sump; and (3) maintaining adequate inventory in the reactor building sump to provide adequate net positive suction head to one low pressure injection pump with the high pressure injection (HPI) pump suction crosstie valve open and supplying two operating HPI pumps. Two of these violations also involved apparent violations of 10 CFR 50, Appendix B, Criterion XVI, Corrective Action, in that once the design deficiencies were identified they were not adequately corrected in a timely manner.

These apparent violations indicate significant weaknesses in management control of the review and resolution of significant conditions adverse to quality. Operator concerns about gas entrainment in the high pressure injection pumps, identified in problem reports and correspondence between operations and engineering, were not adequately resolved over a significant period of time. Subsequent to identification of the design deficiencies in makeup tank overpressure limits, engineering reviews of the design assumptions for the pressure/level operating curve of the makeup tank were not thorough. The curve issued by engineering contained errors and was non-conservative. The revised curves issued by engineering also contained errors and were non-conservative. The curves permitted the plant to be operated outside the design basis. Indications of deficiencies in the design assumptions for various tank levels in other safety related tanks also were not aggressively pursued.

No Notice of Violation is presently being issued for these inspection findings. The number and characterization of the apparent violations described in the enclosed inspection report may change as a result of further NRC review.

A closed predecisional enforcement conference to discuss these apparent violations has been scheduled for July 25, 1995 at 10:00 a.m. in the NRC's Region II office in Atlanta, Georgia. In addition, as discussed with you on July 5, 1995, we are also scheduling predecisional enforcement conferences with each of the licensed operators involved in the September 5, 1994 event. The decision to hold conferences with you and the licensed operators does not mean that the NRC has determined that the violations have occurred or that enforcement action will be taken. The purposes of these conferences are to discuss the apparent violations, their causes and safety significance; to provide you the opportunity to point out any errors in our inspection report; and to provide an opportunity for you to present your corrective actions. In your discussion, you should specifically address the concerns described above with regard to management oversight and control of licensed activities and include any mitigating considerations not previously identified. In addition, this is an opportunity for you to provide any information concerning your perspectives on 1) the severity of the violations, 2) the application of the factors that the NRC considers when it determines the amount of a civil penalty that may be assessed in accordance with Section VI.B.2 of the Enforcement Policy, and 3) any other application of the Enforcement Policy to this case, including the exercise of discretion in accordance with Section VII.

Please note that the NRC Enforcement Policy was revised and became effective with its publication in the *Federal Register* (60 FR 34381, June 30, 1995) (Enclosure 3). Because the apparent violations in this case were under review before the effective date of the revised Policy, the NRC will utilize whichever version of the Policy accrues to the benefit of the licensee. During the conference, you will be provided an opportunity to address any application of the revised Enforcement Policy to this case. You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding the apparent violations is required at this time.

Pursuant to 10 CFR 2.790 of the NRC's "Rules of Practice", a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please contact us.

Sincerely,

Ellis W. Merschoff, Director
Division of Reactor Projects

Docket No. 50-302
License No. DPR-72
EA 95-126

Enclosures: 1. Synopsis of NRC Office Of Investigations Report 2-94-036
2. NRC Inspection Report 50-302/95-13
3. Revised Enforcement Policy

cc w/encls: (See next page)

cc w/encls:
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SYNOPSIS

On November 29, 1994, the U.S. Nuclear Regulatory Commission, Region II, Office of Investigations initiated this investigation to determine if certain reactor operators at Florida Power Corporation's Crystal River Nuclear Plant (CRNP) deliberately violated CRNP procedures by conducting an unauthorized evolution involving the relationship between the water level versus pressure in the makeup tank.

The investigation disclosed that on September 6, 1994, the Operations midnight shift deliberately allowed the makeup tank water level to decrease, within allowable limits, without adjusting the makeup tank overpressure to prevent entering a prohibited area of overpressure. This prohibited area was described by a CRNP procedural document which displayed a plot (curve) of permissible tank level versus pressure response. The purpose for the conduct of this evolution by the operators was to obtain actual tank level versus pressure response data for comparison to the procedural curve. This curve described the permissible operating region.

When the overpressure entered into the unacceptable operating region, annunciators activated, and the operators knowingly continued to obtain data without taking any action to alleviate the overpressure and allowed the unacceptable overpressure condition to exist for 35 minutes. The data gathered by the operators confirmed that the procedural curve differed from the actual curve.

Based upon the evidence developed in this investigation, it is concluded that the shift supervisor, assistant shift supervisor, and two chief operators deliberately violated CRNP procedures by exceeding the allowable makeup tank overpressure, and delaying taking appropriate action to reduce makeup tank overpressure.

This is the issue

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report No.: 50-302/95-13

Licensee: Florida Power Corporation
3201 34th Street, South
St. Petersburg, FL 33733

Docket No.: 50-302 License No.: DPR-72

Facility Name: Crystal River 3

Inspection Conducted: September 5, 1994 through July 5, 1995

Inspector: R. Schin for 7/7/95
R. Butcher, Senior Resident Inspector Date Signed

Accompanying Inspectors:

T. Cooper, Resident Inspector
L. Mellen, Reactor Inspector, RII
R. Schin, Project Engineer, RII

Approved by: K. Landis 7/7/95
K. Landis, Section Chief Date Signed
Division of Reactor Projects

SUMMARY

Scope:

This special inspection report documents inspections conducted by the NRC between September 5, 1994 and July 5, 1995 and summarizes the related findings of NRC Inspection Reports 50-302/94-22, 95-02, 95-07, 95-08 and 95-09. These inspections included reviews of:

- The unauthorized evolution by licensed operators regarding the operation of the makeup tank outside of procedural operating limits,
- Operation of the makeup tank per approved operating instructions that resulted in operation outside the design basis of the makeup and purification system,

- Emergency operating procedures that directed the manual swapover of the Emergency Core Cooling System (ECCS) pumps suction from the Borated Water Storage Tank (BWST) to the reactor building sump at a BWST water level that could have resulted in the loss of the ECCS pumps, and

- Emergency operating procedures that directed the alignment of one Low Pressure Injection (LPI) pump to supply two operating High Pressure Injection pumps that could have resulted in the loss of the only operable LPI pump.

Results:

Four apparent violations were identified.

Apparent violation 50-302/95-13-01: Deliberate operation of makeup tank outside the acceptable operating region. (paragraph 2)

Apparent violation 50-302/95-13-02, Examples 1, 2 and 3: Operating curves for makeup tank outside design basis and failures to take adequate corrective actions for significant conditions adverse to quality. (paragraphs 3 and 4)

Apparent violation 50-302/95-13-03, Examples 1, 2 and 3: Inadequate design assumptions for borated water storage tank swapover level; failure to take adequate corrective actions for significant conditions adverse to quality; and failure to adequately translate design basis requirements for available stored fire protection water into procedures. (paragraphs 5 and 6)

Apparent violation 50-302/95-13-04: Inadequate net positive suction head to an Engineered Safeguards pump during accident conditions. (paragraph 7)

These issues were previously being followed up as URI 50-302/94-22-01, Makeup tank operation outside the acceptable operating region, and URI 50-302/95-08-04, Discrepancies in the implementation of the fire service water tank level versus volume calculations. These unresolved items are closed.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

*P. Beard, Senior Vice President Nuclear Operations
*G. Becker, Manager-In-Training, Site Nuclear Engineering Services
*R. Davis, Manager, Nuclear Plant Maintenance
*P. Fleming, Senior Nuclear Licensing Engineer
*B. Gutherman, Nuclear Engineering Supervisor
*G. Halnon, Manager, Nuclear Plant Operations
*B. Hickle, Director, Nuclear Plant Operations
*M. Jacobs, Corporate Communications
*L. Kelly, Director, Nuclear Operations Site Support
*J. Maseda, Manager, Design Engineering
*P. McKee, Director, Quality Programs
*P. Tanguay, Director, Nuclear Engineering and Projects
*G. Williams, Legal Council
*K. Wilson, Manager, Nuclear Licensing

Other licensee employees contacted included office, operations, engineering, maintenance, chemistry/radiation, and corporate personnel.

Nuclear Regulatory Commission

*R. Butcher, Senior Resident Inspector
*T. Cooper, Resident Inspector
#*C. Evans, Regional Council, RII
#*K. Landis, Chief, Reactor Projects Branch 2, Region II (RII)
#*E. Merschoff, Director, DRP, RII
#*T. Peebles, Chief, Operator Licensing Branch, RII
#*L. Raghaven, Licensing Project Manager, Office of Nuclear Reactor Regulation (NRR)
#*R. Schin, Project Engineer, RII
#*L. Watson, Senior Enforcement Specialist, RII
#*G. West, Engineering Psychologist, Human Factors Branch, NRR

*Attended exit interview
#Participated in exit interview via telephone

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Followup of Apparent Operator Misconduct During September 5, 1994 Event (92901)

On September 7, 1994, a PR was issued regarding the adequacy of the MUT hydrogen overpressure curve in OP-103B, Plant Operating Curves. PR 94-0267, MUT Pressure Limit Curve Technical Basis Inadequate, listed operator concerns regarding the engineering calculation (190-0024, Revision 5) that the operating limits curve was derived from. The need to maintain H_2 overpressure as high as possible was to address RCS chemistry control. The industry guideline for RCS H_2 concentration is ≥25 cc/Kg. At CR-3, the operators manually manipulate the MUT level to attain the maximum H_2 overpressure by lowering MUT level, increasing H_2 pressure to the maximum allowed value per the curve, and then raising the MUT level to increase H_2 pressure, RCS H_2 concentration will stabilize at ≥ 25 cc/Kg. Operators were instructed by management to maintain hydrogen overpressure as high as possible due to RCS hydrogen concentration concerns. The NSS/ANSS shift relief checklist dated July 21, 1994, under Comments/Special Instructions, directed the operators to keep MUT pressure as high as possible. OP-103B, Plant Operating Curves, Curve 8, Maximum Makeup Tank Overpressure, plots MUT allowable overpressure (psig) versus MUT indicated water level (in.). The purpose of OP-103B is to provide operational information for plant startup, shutdown, and other plant operations and evolutions. The operators are to use this curve to determine that the MUT is in an acceptable operating region.

Recently, the operators expressed concern that the engineering calculations regarding the acceptable H_2 overpressure on the MUT were non-conservative. Operators had observed the MUT pressure versus level variance from the curve during operation and were convinced that curve 8 was neither accurate nor conservative. This observation had been documented in PR 94-0148, MUV-60 Stuck Open, which resulted in an unexpected drop in the MUT level. On September 5, 1994 in order to verify actual MUT pressure versus level differed from that shown on curve 8, the operators adjusted MUT pressure to fall on the curve at a MUT level of 86 inches (MUT high level setpoint). The system was allowed to stabilize and then the MUT level was bled down to the low level setpoint of 55 inches. Operating procedure OP-402, Makeup and Purification System, paragraph 4.2.15 directs operators to maintain the MUT level between 55 and 86 inches. As noted earlier, curve 8 in OP-103B is then used to maintain the MUT allowable overpressure (in psig) versus indicated water level (in inches). When the operators allowed the MUT to bleed down, the MUT pressure entered the unacceptable region and the difference between the curve and actual pressure increased throughout the entire level decrease. At a MUT lower level of 55 inches, MUT pressure was approximately 1.7 psig above the curve. PR 94-0267 stated that the 1.7 psig equates to approximately 3.9 feet of water. Calculation 190-0024, Revision 5, only ensures a column of water in the MUT line 2.27 feet high and therefore the error in curve 8 is larger than the margin provided by the calculation. || ?

TS 5.6.1.1 requires procedures be established, implemented, and maintained covering activities as recommended in Regulatory Guide 1.33, Rev. 2, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A recommends procedures for startup, operation, and shutdown of the reactor coolant system. Procedure AI-500, Conduct of Operations, paragraph 4.3.1, Procedural Compliance, states it is the duty of every member of the Crystal River Plant work force to comply with procedures. Procedure OP-402, Makeup and Purification System, steps 4.19.8 and 4.19.9 required operators to refer to curve 8 of OP-103B for maximum MUT overpressure. Procedure OP-103B, Plant Operating Curves, Curve 8, Maximum Makeup Tank Overpressure, defines the allowable makeup tank pressure versus level operating region during operation. AR-403, PSA H Annunciator Response, annunciator MUT PRESS HIGH/LOW, requires operators to take action to reduce MUT pressure to within the limits of OP-103B, curve 8, when a valid alarm is received.

However, on September 5, 1994, operators allowed the makeup tank pressure versus level to exceed the acceptable operating region of OP-103B, curve 8. The operators then delayed actions to comply with AR-403 when the makeup tank high pressure alarm annunciated. Exceeding the acceptable region of curve 8 of OP-103B and delaying the annunciator response is an apparent violation of the requirements of Technical Specification 5.6.1.1 which requires implementation of plant procedures AI-500, Conduct of Operations; OP-402, Makeup and Purification System; OP-103B, Plant Operating Curves; and, AR-403, PSA H Annunciator Response.

An investigation of the apparent deliberate failure to follow plant procedures was conducted by OI. The investigation was completed on May 24, 1995. The OI investigation concluded that the shift supervisor, assistant shift supervisor, and two chief operators deliberately violated Crystal River Nuclear Plant procedures by exceeding the allowable makeup tank overpressure, and delaying taking appropriate action to reduce makeup tank overpressure. 10 CFR 50.5, (Deliberate misconduct), paragraph (a), in part, prohibits licensee employees from engaging in deliberate misconduct that causes a licensee to be in violation of a condition of any license issued by the Commission. Deliberate misconduct is defined by 10 CFR 50.5(c) as an intentional act or omission that the person knows constitutes a violation of a requirement, procedure, instruction or policy of a licensee. The licensed operators involved apparently were aware of the procedural requirements and intentionally violated the procedures. The NRC considers these intentional acts to constitute an apparent violation of 10 CFR 50.5(a). Management oversight and control of control room operations is discussed in paragraph 8. The apparent violation of plant procedures and 10 CFR 50.5 is identified as apparent violation 50-302/95-13-01.

3. Review of Design Basis of MUT Operating Limits (92903)

FSAR Section 6.1, ECCS, states in part that upon a valid actuation signal, the Makeup and Purification System is automatically switched from its normal operating mode to the emergency operating mode (High Pressure Injection) to deliver water from the BWST into the reactor vessel. Unstated in the FSAR is the design feature which requires the hydrogen overpressure in the MUT be limited to prevent the MUT from being emptied which could allow hydrogen gas to enter the suction of the HPI pumps (which also function as the makeup pumps in the Makeup and Purification System) and result in damage to the pumps.

? "could"

Based on the continuing operator concerns, licensee management initiated a comprehensive review of the MUT H_2 overpressure issue. An engineering evaluation was completed on November 16, 1994 that concluded that operation on or to the left of the OP-103B curve at the onset of a LBLOCA or core flood line LOCA would have resulted in HPI pump damage. This means that operation on curve 8 of OP-103B resulted in operation outside the design basis of the plant.

Subsequently, the licensee recognized that they normally operate with the two trains of HPI isolated from each other on the suction side of the MUPs. One train is aligned with its suction from the MUT (and also the BWST after an ES signal), while the other train suction is normally isolated from the first train and is aligned to the BWST after an ES signal through a separate pipe from the BWST. In this case, excess hydrogen pressure in the MUT during the onset of a LOCA could cause gas binding in one of the two ES selected HPI pumps. The other ES selected HPI pump would not be affected since its suction is aligned directly to the BWST.

what does this mean

However, one LOCA scenario, a postulated break in a core flood line in conjunction with the potential gas binding of high pressure injection pump due to a high overpressure in the makeup tank, could lead to the loss of the safety function as explained below. In this scenario, LPI cooling water enters into the reactor vessel through the core flood lines. Any cooling water from LPI in the train containing the break would not reach the vessel. A single failure in the other train, i.e., loss of the B emergency diesel generator, would result in loss of the other train of LPI and loss of one train of HPI. The remaining train of HPI cooling water would then be required to mitigate this event. The core flood line nozzles have inserts which limit the break size to 0.44 square feet which is considered an intermediate break size. The blowdown rate for this LOCA is rapid enough to prompt systems to respond as they would in a large break LOCA. Therefore, the MUT pressure limit curve constitutes a design basis limit for this event because a high overpressure in the makeup tank could result in emptying the makeup tank prior to switchover to the BWST resulting in gas binding of the remaining HPI pump and loss of the safety function. Consequently, a pipe break in the A core flood line concurrent with a LOOP, and a start failure of the B emergency diesel generator could result in a reactor coolant system blowdown and unavailability of both trains of LPI and one train of HPI, as well as loss of the second train of HPI due to hydrogen gas binding. It should be noted that with operator action the A LPI pump could be manually aligned to the BWST and used for injection of cooling water.

is this feasible? i.e. design basis?

10 CFR 50, Appendix B, Criterion III, Design Control, requires that measures be established to assure that applicable regulatory requirements and the Design Basis, as defined in 10 CFR 50.2, Definitions, and as specified in the license application, are correctly translated into specifications, drawings, procedures, and instructions. The failure to translate the design basis to ensure proper operation of

the Makeup and Purification System such that the system is automatically switched from its normal operating mode to the emergency operating mode (High Pressure Injection) and is capable of delivering water from the BWST into the reactor vessel is an apparent violation of 10 CFR 50, Appendix B, Criterion III. This is identified as example 1 of apparent violation 50-302/95-13-02.

4. Review of Revised Operating Curves for MUT (92903)

On September 9, 1994, short term instruction (STI) 94-019 was issued requiring operators to maintain MUT pressure approximately 2 psig below the limit shown on OP-103B, curve 8. On September 14, 1994, STI 94-021 was issued stating that engineering had identified that the calculated error was greater than 2 psig and therefore, operators were directed to maintain MUT pressure approximately 2.8 psig below the limit shown on OP-103B, curve 8. The permanent revision, Revision 13 to OP-103B, was issued on January 30, 1995, and contained two new curves to replace the existing curve 8 titled, Maximum Makeup Tank Overpressure.

what is violation?

On January 31, 1995, the licensee reported the operation outside their design basis to the NRC. The licensee determined that the short term instructions issued on September 9 and September 14, 1994, and the new pressure versus level operating curves for the MUT (curves 8A and 8B in OP-103B, Plant Operating Curves), issued on January 30, 1995, were non-conservative. The STIs and the new curves were based on design assumptions that did not correspond to current EOP requirements. Specifically, EOP-08, LOCA Cooldown, step 3.35 and 3.63, and EOP-07, Inadequate Core Cooling, step 3.9, require realigning ECCS pump suction to the RB sump and aligning for piggy back operation of the MUPs when the BWST reaches an indicated level of ≤ 5 feet. The calculation used to support the STIs and generate the new OP-103B curves assumed the swap over to the RB sump and piggy back alignment was completed prior to reaching 5 feet in the BWST. The STIs issued on September 9 and September 14, 1994 and the curves issued on January 30, 1995 did not provide adequate margin to ensure that hydrogen entrainment in the high pressure makeup pumps was prevented during design basis events when the makeup tank was operated within the specified pressure and level limits; and, therefore, the interim curves allowed operation of the makeup tank outside of the design basis of the plant.

The licensee's immediate action was to issue a short term instruction with the following guidance to operations:

(1) Due to inconsistencies between the design assumptions used to generate OP-103B, Rev. 13, Curves 8A and 8B, and EOP-8 LOCA Cooldown, maintain MUT pressure a minimum of 7 and a maximum of 11 psig less than the limit given in OP-103B, Rev. 13, Curves 8A and 8B.

(2) When transferring LPI suction from the BWST to the RB sump and establishing HPI suction from LPI (EOP-8, steps 3.35 and 3.63 and EOP-7, Inadequate Core Cooling, steps 3.9 and 3.10) valve

alignments need to be performed in a timely manner. While performing the numbered detail steps in order, both A and B train valves listed within the step should be stroked simultaneously.

(3) Due to the location of the transmitter, indicated BWST level will not decrease below 2.33 feet.

(4) The STI was not to be altered or rescinded without DNPO approval.

10 CFR 50, Appendix B, Criterion III, Design Control, requires that measures be established to assure that applicable regulatory requirements and the Design Basis, as defined in 10 CFR 50.2, Definitions, and as specified in the license application, are correctly translated into specifications, drawings, procedures, and instructions.

FSAR Section 6.1, ECCS, states in part that the upon a valid actuation signal, the Makeup and Purification System is automatically switched from its normal operating mode to the emergency operating mode (High Pressure Injection) to deliver water from the borated water storage tank into the reactor vessel.

OP-103B, Plant Operating Curves, Curve 8, Maximum Makeup Tank Overpressure, defined operating limits for control of the reactor coolant system makeup tank pressure versus level. Operators were instructed by management to maintain the makeup tank pressure versus level close to the limit defined by Curve 8 to maximize hydrogen overpressure.

10 CFR 50, Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality , such as nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition.

As discussed above, the design basis for the ECCS was not correctly translated into drawings, procedures, and instructions for the emergency operating mode (High Pressure Injection) of the Makeup and Purification System. The STIs issued on September 9 and September 14, 1994 and Revision 13 to OP-103B, Plant Operating Curves, which replaced Curve 8, Maximum Makeup Tank Overpressure, with new Curves 8A and 8B, Maximum Makeup Tank Operating Pressure Versus Level on January 30, 1995 all allowed operation outside the plant design basis. An Engineered Safeguards actuation while operating on the new curves, could have resulted in cavitation and subsequent inoperability of at least one of the high pressure injection pumps and, for a given scenario as described in paragraph 3, without operator intervention, could have resulted in the loss of all HPI pumps. Therefore, the corrective actions for the previously identified problem with the curves were inadequate to prevent operation outside of the design basis. Failure to meet the requirements of 10 CFR 50, Appendix B, Criterion III and XVI for the interim curves and the curves issued in Revision 13 to OP-103B are identified as examples 2 and 3 of apparent violation 50-302/95-13-02.

5. Review of Design Assumptions for Borated Water Storage Tank Swapover Level (92903)

On February 2, 1995, the residents questioned the licensee regarding their design assumptions for the BWST level for swap over from the BWST to the RB sump. The inspectors identified the following additional concerns:

- The indicated BWST in the control room reads from 0 to 50 feet. The accuracy of the BWST level instrumentation contains more than 0.5 feet of uncertainty.

- The top of the 14 inch line from the BWST to the ES pumps is located at approximately the two feet level in the BWST.

- Vortexing of the borated water in the BWST was not accounted for. The BWST contains a vortex breaker, however, the licensee has been unable to locate any of the calculations for this device. The licensee's preliminary calculations indicate that even with the vortex breaker, vortexing would be likely to occur between 3.5 and 4 feet of BWST level.

- Operators could perform the BWST to RB sump transfer function in accordance with procedures at anytime the BWST level became less than 5 feet.

- At the maximum flow rates, the draw down of the BWST approaches one foot per minute.

On February 2, 1995 the licensee made a report to the NRC regarding their finding that manual swap over of the ES pumps from the BWST to the RB sump may not occur in time to prevent vortexing in the BWST. Preliminary calculations indicated that a minimum of 4 feet is required in the BWST to prevent vortexing and therefore ensure adequate NPSH.

Engineering calculation M95-0005 dated February 6, 1995 concluded that vortexing in the BWST has the potential to begin at 5' 6" in the tank. Taking level instrument error and calibration tolerances into consideration increases the level required by 1' 2" and the swapover to the RB sump suction should be complete before an indicated level of 7 feet is reached in the BWST.

The licensee's analysis indicated that after dispositioning these considerations, it was acceptable to raise the BWST swap over to the 15 foot level. The EOPs have been revised to reflect that the swapover should occur starting at 15 feet and be completed by 7 feet.

The swapover from the BWST to the RB sump is a manual operation and has been designated over the years as follows:

(1) 6/75 to 5/79 2.5 feet in the BWST

(2) 5/79 to 6/83 3 foot 9 inches in the BWST

(3) 6/83 to 6/90 2.5 feet in the BWST

(4) 6/90 to 4/93 2.2 feet in the RB

(5) 4/93 to 2/95 ≤5 feet in the BWST

The licensee is conducting a more rigorous analysis of the swapover level. There are vortex and NPSH considerations for the pumps taking suction from the reactor building sump. Additionally, there are Trisodium Phosphate baskets for pH control in the RB lower basement areas. The calculations for their placement assume a certain volume of water in the sump and a certain flow rate. Both the volume and flow rate of BWST water into the sump area will change if the swap over level in the BWST changes. These changes will result in a different rate of Trisodium Phosphate dissolution.

10 CFR 50, Appendix B, Criterion III, Design Control, requires that measures be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2, Definitions, and as specified in the license application, are correctly translated into specifications, drawings, procedures, and instructions.

FSAR Section 6.1.2.1.2, LPI, states that when the BWST level reaches an elevation of 5 feet, the operator will take action to open the LPI System suction valves from the RB emergency sump, permitting recirculation of the spilled reactor coolant and injected water from the RB sump.

EOP EOP-08, LOCA Cooldown, revision 2, steps 3.35 and 3.63, and EOP-07, Inadequate Core Cooling, step 3.9, revision 1, require realigning the LPI pump suction from the BWST to the RB sump and aligning for piggyback operation of the Make Up Pumps (MUPs) when the BWST reaches an indicated level of less than or equal to five feet.

As discussed above, the design basis for the ECCS was not correctly translated into drawings, procedures, and instructions for operation of the manual swap over of the ECCS pumps suction from the BWST to the RB sump in that on February 2, 1995 an engineering evaluation identified that initiation of swap over of ECCS pump suction from the BWST to the RB sump should be completed prior to an indicated level of seven feet to prevent vortexing and resultant disabling of the ECCS pump. Since 1975 (except for the time period of June 1990 through April 1993) plant procedures have required the manual swapover from the BWST to the RB sump at a level of five feet or less in the BWST, which is insufficient to assure that all of the ECCS pumps would not be damaged by vortexing.

This is an apparent violation of 10 CFR 50, Appendix B, Criterion III, Design Control and is identified as example 1 of apparent violation 50-302/95-13-03.

6. Follow-up of Licensee Event Report 92-003, Personnel Error and Lack of Technical Review in Past Procedure Revision Process Leads to Incorrect Procedures Resulting in Violation of Technical Specification and Design Basis (92903)

On August 1, 1991, the licensee identified a potential problem concerning a calculation to support the basis for assuring EDG fuel oil storage volumes were maintained as required by TS and design basis. On April 16, 1992, the licensee determined that two procedures for documenting the volume of fuel stored in the EDG fuel oil storage tank had been erroneously revised, resulting in one occurrence of failure to meet the minimum volume of fuel assumed in the design basis and 14 occurrences of failure to meet TS requirements for minimum fuel volume. The cause of the problem was attributed to a failure to recognize that due to suction locations, some of the volume in the storage tanks would be unusable and could not be taken credit for.

As part of the corrective actions, the licensee stated that the relationship of suction point to tank level for other tanks having a TS required minimum volume would be verified. A corrective action plan, which prioritized the various tanks, was developed. Originally, the various tanks were scheduled to be completed by December 1994, with the highest priority tanks being scheduled for completion by December 1993. The priority 1 tanks included the CST, the BWST, the EGDG fuel oil day tanks, the BASTs, and the CFTs.

On September 19, 1994, the corrective action plan was revised, as none of the steps for recalculating the volumes had been completed. The new completion dates called for the project to be completed by April 1997, and the priority 1 tanks were scheduled to be completed by March 1995. This delay has an impact on the concerns on the BWST discussed in previous paragraphs. The calculation of the BWST volume concerns has a direct impact on the BWST issues. This issue was a previous opportunity for the licensee to identify and correct the problems with BWST suction.

Is this true?

A recent NRC review of the fire water storage tanks FST-1A and FST-1B tank calculations, M93-0028, revealed a discrepant condition between the FPP and the EDBD requirements. The FPP required that 345,000 gallons of water be contained in each fire water storage tank. The EDBD required a minimum capacity of 300,000 gallons of water be available from each tank to the fire pumps. However, the capacity of the FSTs is less than 345,000 gallons of usable water in either tank. When full the tanks each contain approximately 318,000 gallons of usable water. The requirement in the FPP for each tank to contain 345,000 gallons does not appear to correspond to the design basis requirement of 300,000 gallons. The licensee's volume calculations of the tanks concluded that when

345,000 gallons of water are contained in the tanks, only approximately 297,000 gallons of usable water are in the tanks.

The surveillance procedure, SP-300, Operating Daily Surveillance Log, requires that each tank be verified to contain greater than 35 feet of water by level indicators FS-1-LI and FS-2-LI. These indicators are read on a 0 to 37 foot scale in the control room. The 37 foot level corresponds to approximately 315,500 gallons of usable water. The 35 foot requirement specified in SP-300 corresponds to approximately 295,000 gallons of usable water. The procedural requirement does not appear to account for instrument tolerances, which between the transmitter and the indicator, are nearly 14 inches. This worse case condition, considering the instrument tolerance and a level of 35 foot in the tank, would only ensure a value of approximately 283,000 gallons of usable water in the tank. This value is outside of the design basis. The licensee has stated that they normally operate above the 35 foot level, since there is an alarm eight inches above this level. The alarm is calibrated to assure that approximately 302,000 gallons of usable water are available in the tank. However, the level switch has an allowable tolerance of four inches, meaning that the alarm, set within the tolerance, could correspond to only approximately 299,000 gallons of water, which is outside of the design basis.

When made aware of the inspectors concerns, the operators increased FST levels to the maximum the tank can hold, to assure that there was enough water available to guarantee that the design basis calculated minimum requirements were met. This placed the FST usable water above the levels where concerns exist. Operators were informed of this issue by a note in the shift supervisors' log.

The Crystal River Facility Operating License No. DPR-72, paragraph 2.C.(9), Fire Protection, requires that fire protection measures be implemented. FSAR Section 9.8 states that the fire protection program has been formulated in accordance with specific fire protection governing documents listed in FSAR Table 9-18. Table 9-18 includes the FPP. The FPP required that 345,000 gallons of water be contained in each fire water storage tank. To implement this requirement, the EDBD required a minimum capacity of 300,000 gallons of water be available from each tank to the fire pumps.

The what's relation?

10 CFR 50, Appendix B, Criterion XVI, Corrective Action, states, in part, that measures shall be established to assure that conditions adverse to quality, such as nonconformances, are promptly identified and corrected. In the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. Failure to implement timely corrective action to review potential significant conditions adverse to quality involving safety related tanks, including the BWST and FST, is a violation of the requirements of 10 CFR 50, Appendix B, Criterion XVI and is identified as example 2 of apparent violation 50-302/95-13-03.

10 CFR 50, Appendix B, Criterion III, Design Control, requires that measures be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2, Definitions, and as specified in the license application, are correctly translated into specifications, drawings, procedures, and instructions. Failure to translate the design basis requirements of the FST into operating procedures is a violation of 10 CFR 50, Appendix B, Criterion III and is identified as example 3 of apparent violation of 50-302/95-13-03. This issue was previously followed up under URI 50-302/95-08-04. This unresolved item is now closed.

7. Operation With One LPI Pump and Two HPI Pumps While in the Piggy Back Mode (92901)

On March 22, 1995, at 5:07 p.m. the licensee made a 10 CFR 50.72(b)(1)(ii)(B) report regarding the finding of inadequate post LOCA RB water inventory to support the current EOP requirement to align one operating LPI pump with two operating HPI pumps. During a followup engineering investigation of previously identified problems involving operation of the MUT outside of the design basis (See LER 94-009, Personnel Errors in Determining MUT Level/Hydrogen Pressure, BWST Vortexing and RB Sump Level Parameters Result in Potential for Operation Outside Design Basis, and URI 50-302/94-22-01 addressed in IRs 50-302/94-22, 95-02, and 95-07) the licensee identified a condition specified in EOP-08, LOCA Cooldown, revision 2, steps 3.39 and 3.67, and EOP-07, Inadequate Core Cooling, revision 1, step 3.10 that directs the operator to accomplish the following:

If only 1 LPI pump is operating, then ensure MUP suction cross tie valves are open;

* MUV-62
* MUV-69

This created a system alignment where one LPI pump could be subjected to supplying 2200 gpm nominal to the RV, 540 gpm to the suction of each of two HPI pumps, and 100 gpm recirculation flow. A recently revised flow calculation (M90-0021) shows that insufficient water inventory would exist in the RB to provide adequate NPSH to the single LPI pump at the noted flow rates. This lineup could result in the loss of the only operable LPI pump.

As immediate corrective action, the HPI pumps' suction cross tie valves were caution tagged to the SSOD. STI 95-0022 was issued on March 22, 1995, to provide operators with additional guidance. The STI is required reading for all operators and it advised operators of the reason for the revised calculation and to alert them to the tagging order on the HPI suction cross tie valves. The STI also alerted the operators that EOP-07 and EOP-08 were affected. The STI had a 10 CFR 50.59 safety evaluation, an independent review, a PRC review, and DNPO approval. The control copy of the affected EOPs in the control room were marked with a red pen at the appropriate steps to remind the

 - good corrective action

operators that a STI affecting that step had been issued. The formal change to the EOPs is scheduled to be accomplished within ten days. The inspectors verified that the EOPs had been marked as specified and that the STI was in the control room.

10 CFR 50, Appendix B, Criterion III, Design Control, requires that measures be established to assure that applicable regulatory requirements and the design basis, as defined in 10 CFR 50.2, Definitions, and as specified in the license application, are correctly translated in to specifications, drawings, procedures, and instructions.

FSAR Section 6.1.1, which describes the design basis of the ECCS states, in part, that the ECCS has been designed to perform its functions if a single active failure occurs and that one of the design functions of the ECCS is to provide long term cooling by recirculation of injection water from the reactor building sump to the core through LPI.

EOP-08, steps 3.39 and 3.67, and EOP-07, step 3.10, direct the operators to open the HPI pumps' cross tie valves in the event only one LPI pump is available to supply suction when in the piggy-back mode of operation. These procedural directions have existed since April 8, 1993.

However, engineering calculation M90-0021, revision 5, dated March 22, 1995, determined that during post LOCA operation there was inadequate inventory in the RB sump to provide adequate NPSH to a LPI pump, with the HPI pump suction crosstie valve open, supplying two operating HPI pumps. This lineup could result in the loss of the only operable LPI pump. This is an apparent violation of 10 CFR 50, Appendix B, Criterion III, Design Control, and is identified as apparent violation 50-302/95-13-04.

8. Review of Management Oversight and Control of Licensed Activities

In regard to the actions of the licensed operators on September 5, 1994, the NRC is concerned that appropriate management oversight and control was not exercised to preclude the apparent intentional violation of plant procedures. In the licensee's letter to the NRC dated May 5, 1995, the licensee characterizes the operator's concerns about the makeup tank operating curve as a legitimate technical concern, yet the record reflects that engineering found the curve to be adequate and proposed that the issue be closed. It is not clear that management was properly involved in resolution of these differing technical opinions. In addition, operators did not seek approval of management in conducting the evolution to evaluate response of the system. This raises questions as to the adequacy of communications between management and the licensed operating staff including whether management has clearly conveyed its expectations in regard to procedural adherence and the need to use established review mechanisms for planned activities that are outside routine operation.

need to address this! ?

As stated in the cover letter, these apparent violations also indicate significant weaknesses in the management control of the review and resolution of significant conditions adverse to quality. These weaknesses include (1) the failure to adequately review operator concerns on gas entrainment in the high pressure injection pumps which had been identified in several problem reports and correspondence between operations and engineering; (2) inadequate engineering reviews of the design assumptions for the pressure/level operating curve of the makeup tank; and (3) failure to implement timely corrective actions for indications of deficiencies in the design assumptions for various safety-related tank levels. The root cause of these issues appears to be a lack of management oversight of the review process. The NRC has previously expressed concerns with management oversight and commitment to program implementation in meetings with licensee management on November 22, 1994 and March 1, 1995.

9. Exit Interview

The inspection scope and findings were summarized on July 5, 1995, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report.

Type	Item Number	Status	Description and Reference
EEI	95-13-01	Open	Deliberate operation of makeup tank operation outside of acceptable operating region. (paragraph 2)
EEI	95-13-02	Open	Operating curves for makeup tank outside design basis and failure to take adequate corrective actions. Three examples. (paragraphs 3 and 4)
EEI	95-13-03	Open	Inadequate design assumptions for borated water storage tank swapover level, inadequate corrective actions, and inadequate stored fire protection water. (paragraphs 5 and 6)
EEI	95-13-04	Open	Inadequate Net Positive Suction Head to an Engineered Safeguards pump during accident conditions. (paragraph 7)
URI	94-22-01	Closed	Makeup tank operation outside the acceptable operating region. (paragraphs 2, 3, and 4)
URI	95-08-04	Closed	Discrepancies in the implementation of the fire service water tank level versus volume calculations. (paragraph 6)

Type	Item Number	Status	Description and Reference
LER	92-003	Open	Personnel Error and Lack of Technical Review in Past Procedure Revision Process Leads to Incorrect Procedures Resulting in Violation of Technical Specification and Design Basis. (paragraph 6)

10. Acronyms and Abbreviations

AI - Administrative Instruction
ANO - Auxiliary Nuclear Operator
ANSS - Assistant Nuclear Shift Supervisor
BSP - Building Spray Pump
B&W - Babcock & Wilcox
BWST - Borated Water Storage Tank
CCHE - Control Complex Habitability Envelope
CFM - Cubic Feet per Minute
COC - Certificate of Compliance
CP - Compliance Procedure
CRDM - Control Rod Drive Mechanism
CREVS - Control Room Emergency Ventilation System
CVT - Constant Voltage Transformer
DCP - Decay Heat Closed Cycle Cooling Pump
DCV - Decay Heat Closed Cycle Cooling Valve
DHP - Decay Heat Pump
DHV - Decay Heat Valve
DNPO - Director Nuclear Plant Operations
ECCS - Emergency Core Cooling System(s)
EDSFI - Electrical Distribution System Functional Inspection
EGDG - Emergency Diesel Generator
EOP - Emergency Operating Procedure
ESF - Engineered Safeguards Feature
ESAS - Engineered Safeguards Actuation System
F - Fahrenheit
FCN - Field Change Notice
FLUR - First Level Undervoltage Relay
FPC - Florida Power Corporation
FSAR - Final Safety Analysis Report
HEPA - High-efficiency Particulate Air
HPI - High Pressure Injection
IR - Inspection Report
LCO - Limiting Condition for Operation
LER - Licensee Event Report
LOCA - Loss of Coolant Accident
LPI - Low Pressure Injection
MAR - Modification Approval Record
MP - Maintenance Procedure
MUP - Makeup Pump
MUT - Makeup Tank
MUV - Makeup Valve
NCV - Non-cited Violation

NOTIS - Nuclear Operations Tracking & Information System
NOV - Notice of Violation
NPSH - Net Positive Suction Head
NPTS - Nuclear Plant Technical Support
NSS - Nuclear Shift Supervisor
NUREG - NRC technical report designation
OI - NRC Office of Investigations
OP - Operating Procedure
PM - Preventive Maintenance
ppm - parts per million
PR - Problem Report
PRC - Plant Review Committee
psi - pounds per square inch
psig - pounds per square inch gauge
QC - Quality Control
QA - Quality Assurance
RB - Reactor Building
RBS - Reactor Building Spray
RCA - Radiation Control Area
RCP - Reactor Coolant Pump
RCS - Reactor Coolant System
RPS - Reactor Protection System
RV - Reactor Vessel
RW - Raw Water
RWP - Raw Water Pump
RWV - Raw Water Valve
SCBA - Self Contained Breathing Apparatus
SLUR - Second Level Undervoltage Relay
SP - Surveillance Procedure
SR - Surveillance Requirement
SRP - Standard Review Plan
SSOD - Shift Supervisor on Duty
STI - Short Term Instruction
SWP - Service Water Pump
TDP - Training Department Procedure
TIS - Training Information System
TS - Technical Specification
TSI - Technical Specification Interpretation
URI - Unresolved Item
VIO - Violation
WR - Work Request

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Florida Power
CORPORATION

INTEROFFICE CORRESPONDENCE

FPC NUCLEAR OPERATIONS
OFFICE

MAC A-7 231-5682
MAC TELEPHONE

SUBJECT: INVESTIGATION OF POSSIBLE MISCONDUCT

DATE: July 22, 1995

TO: DANIEL POOLE
VICTOR HERNANDEZ
DAVID DEMONTFORT ✓
JERRY CARTER

Attachment "A" is a charter for the conduct of an investigation into instances of possible misconduct at Crystal River Unit 3. You have been appointed as members of the investigative team. Your investigation will be governed by the provisions of Attachment "A".

If you have any questions about your appointment or the scope of your duties in this regard contact me immediately.

P. M. Beard, Jr.

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INVESTIGATION OF POSSIBLE MISCONDUCT ASSOCIATED WITH UNAUTHORIZED EVOLUTION ON MAKEUP TANK AT CRYSTAL RIVER 3

CHARTER

I. STATEMENT OF PURPOSE

FPC is initiating an independent investigation into possible deliberate misconduct associated with performance of unauthorized evolution on MUT @ CR-3 in 9/94. This charter defines scope of issues to be investigated, designates team and establishes schedule for completion of investigation in timely manner.

The basic mission ensures independent, objective and thorough review of matter. To this end, FPC has assembled a team independent of any affected and knowledgeable of technical and legal issues involved. Investigation will prepare a report to management setting forth actual findings of any programmatic or generic issues they identify.

B. Background

On September 5, 1994, data was collected by control room operators conducting an evolution in which MUT pressure was set at high level limits and MUT level was decreased from high to low level limits. The data caused FPC to question the validity of the operating curve (operators believed this evolution was bounded by existing procedures, but later management review recognized it constituted a "test" requiring a dedicated procedure and review as required by 10CFR50.59). Reanalysis of the calculation which generated the curve led to a determination that the operating curve contained incorrect assumptions and was slightly nonconservative relative to intended design margins. The curve was not recognized at the time as a design limit curve (it was considered to be an administrative limit). A series of corrective actions, including re-evaluation of both calculations and hydrogen concentration requirements is being conducted. (Operator actions are addressed in FPC letter to the NRC 3F1294-09 dated December 2, 1994.)

Although the operations shift personnel in question provided timely information regarding the evolution of September 5, 1994, a similar unauthorized test on September 4, 1994, was not disclosed until on or about July 18, 1995. this test appears to have involved the same operating personnel.

II. ISSUES

The scope of the investigation is defined by the events and circumstances surrounding any possible misconduct in the performance of the evolution in question. Specifically, the investigation team will:

- Review the regulatory requirements and procedures governing the MUT evolution.

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- Document the facts concerning the evolution, and determine whether the actions by personnel were appropriate.
- Identify any programmatic or generic implications developed from facts learned in the course of the investigation.

Based upon a preliminary review, FPC has identified the following issues to be examined:

- Did the operating crew conduct an unauthorized evolution on the MUT on September 4, 1994?
- If so, what are the implications of that action for whether the crew deliberately violated procedures in conducting the MUT evolution on September 5, 1994?
- Did members of the operating crew agree among themselves not to disclose the September 4, 1994 evolution?
- Did members of the operating crew fail to provide complete and accurate information to FPC (or the NRC) regarding the September 4, 1994 evolution?
- What are the generic implications or extent of condition - - e.g., did the crew perform other unauthorized evolutions? Were unauthorized evolutions performed by other crews?
- What other FPC personnel other than the operating crew had knowledge of the evolutions conducted by the operating crew? Did anyone talk about desire or need to withhold any information from either FPC or the NRC? Did anyone attend to suppress or withhold? This should include prior or post-knowledge of the evolution(s) and timeliness of disclosure of this knowledge to either FPC or NRC.

As the investigation progresses, it expected that the issues will be refined, modified, reduced or supplemented as necessary.

III. KEY ELEMENTS OF THE INVESTIGATION

The investigators shall expeditiously prepare a confidential report for FPC management (1) making factual findings; and (2) assessing each of the defined issues in the context of possible violations of FPC policy or procedures or NRC requirements.

The investigative effort will be sensitive to the need for required reports to the NRC.

To the maximum extent possible, the investigators shall take measures to assure the confidentiality of interviewee names and statements as well as employee records and to protect them from public disclosure. Information will be shared with FPC employees only on a need-to-know basis.

Consistent with full development of the facts, the investigation shall be conducted in a manner so as to minimize disruption of CR-3 operations and any adverse impact on morale of the employees.

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Due to the existence of joint defense agreements between the company and operators Van Sicklin, Smith and Stewart, there are specific limitations on information sharing between them and the company. No interviews of these personnel should be conducted or information sought from them without first conferring with company counsel.

IV. IMPLEMENTATION

A. Organization

The investigation team will consist of the following members:

- Daniel Poole, Management Consultant and NGRC member, who will serve as team leader for the investigation.
- Victor Hernandez, Employee Concerns Coordinator, who will coordinate the team's access to information.
- Jerry Carter, FPC Corporate Security.
- David deMontfort, Nuclear Operations Instructor.

B. Conduct of the Investigation

The team will conduct the investigation as follows:

- Interviews: It is anticipated that the investigators will conduct interviews of FPC or contractor employees having information relevant and probative to the investigation. For key witnesses, a stenographic reporter may be used to transcribe the interviews. Written statements from the interviews of other witnesses will be prepared. Interviewees will be afforded the opportunity to review, correct and concur with any transcripts or statements.
- Review of records: relevant documentary evidence will be reviewed and utilized as appropriate.

C. Results/Report

At the conclusion of the investigation, the investigators will issue a comprehensive report to FPC senior management. The report shall address the issues identified for examination in this Charter.

The investigators shall periodically brief senior management on the status of the investigation, the schedule for remaining work, and the resolution of issues. Management feedback will be incorporated into the investigatory process.

V. SCHEDULE

A. Investigation

The investigative phase is expected to be conducted over a two week period, subject to availability of interviewees. It is expected that this phase will be completed by July 27, 1995.

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B. <u>Report</u>

The investigators will conduct the investigation and brief senior management on their preliminary findings and conclusions at appropriate points during the investigation. A final report will be submitted to management by August 5, 1995. This schedule may vary depending on the final scope of issues.

Approved: Percy M. Beard Jr. 7/22/95
Percy M. Beard, Jr. Date

cc: K. E. Armstrong
P. K. Blizzard

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To: Mr. Kenneth E. Armstrong

Date: September 6, 1995

c/o: Mr. Gerald A. Williams

From: Daniel C. Poole
Jerry W. Carter
Richard David deMontfort
Victor A. Hernandez

Subject: Final Report on the Investigation of Possible Misconduct - Phase 1

Attached is the completed report of Phase I of the investigation of possible misconduct. The final report was prepared pursuant to the charter from Dr. P. M. Beard on July 22, 1995 as amended by Dr. Beard on August 4, 1995 and by Mr. Poole on August 14, 1995.

cc: P. M. Beard

INVESTIGATION PROVIDED TO O/I

NOT WITH UNDER-

STANDING WOULD

INCLUDED <u>NOT</u> BE MADE PUBLIC

DUE TO

CONFIDENTIALITY

Florida Power
CORPORATION

INTEROFFICE CORRESPONDENCE

Nuclear Operations Administration — OFFICE | A7E — MAC | 231-5682 — TELEPHONE

SUBJECT: **Additional MUT Event Corrective Actions**

TO: **G. L. Boldt**

DATE: **September 18, 1995**

I agree with the actions in your attached memo of September 12, 1995. Please assign responsibility and due dates for each (all done before October 31, 1995) and will track on my Action Tickler. Also add additional corrective action:

> Develop specific examples of evolutions that are within Shift Supervisor authority to authorize and evolutions that require higher authority to authorize. Then, conduct training with Shift Supervisors and Assistant Shift Supervisors on these example evolutions and the guidance in applicable AIs.

Greg Halnon
Training Rel
10/31/95

Pat

P. M. Beard, Jr.

PMB:mf

xc: B. J. Hickle
G. H. Halnon
~~R. M. Bright-Action Tickler~~

INTEROFFICE CORRESPONDENCE

Florida Power Corporation

NUCLEAR PRODUCTION	SA2C	240-4594
Office	MAC	Telephone

SUBJECT: Additional MUT Event Corrective Actions

TO: P. M. Beard, Jr.

DATE: September 12, 1995
VPNP95-0052

At your request, I reviewed the report of Dan Poole's team investigation of the September 4, 1994, MUT test ("Investigation of Possible Misconduct - Phase I - Final Draft", dated August 18, 1995) to determine if additional corrective actions were warranted to address the opinions and/or conclusions of that report.

I believe additional actions are appropriate and have summarized them in the attachment to this memorandum. I have discussed these actions with Bruce Hickle and he concurs.

G. L. Boldt

GLB:lss

xc: D. C. Poole
B. J. Hickle
L. C. Kelley
G. M. Williams

ATTACHMENT

ADDITIONAL MUT EVENT CORRECTIVE ACTIONS

1. Revise page 16 of AI-400B (Enclosure 3) so that step 1 is more broadly focused as shown on the attached revised pages.

2. Revise page 17 of AI-400B (Enclosure 3) so that the checklist for infrequently performed tests or evolutions is approved by the DNPO or his designee (usually the shift manager). See attached page.

3. Revise AI-500, page 46, step 4.3.2.3.2 to assure the intent of the procedure or evolution is also considered by the shift supervisor and that he follows the following four steps when in doubt:

   - Communicate
   - Approve
   - Plan
   - Schedule

   See attached pages.

4. The management review panel process (MRP) is a good concept but fell short in application when used to initially review the MUT event. Expand the MRP process to apply to all potential NRC violations whether self-identified or NRC-identified. Draft a charter or guideline for conducting MRP's to assure consistency and thoroughness of reviews. Some items that should be included are:

   - an attempt to interview all personnel involved, including support groups where appropriate;
   - assurance that CP-111 and CP-144 have been fully applied as appropriate;
   - review of all appropriate logs, chart recordings, completed procedures, REDAS data, annunciator printouts, and other relevant documentation;
   - review for generic aspects of the event, i.e., similar violations, events, errors, systems, etc.;
   - assure both technical and human performance aspects of the issue get equal attention.

5. There is some evidence that operations log entries remain imprecise or incomplete. Schedule further audits and/or training on the topic of adequate log keeping. Consider reinforcing log keeping practices by running table top or simulator exercises specifically for this purpose.

GLB:lss

INFREQUENTLY PERFORMED TEST OR EVOLUTION CHECKLIST

Answer the following questions to determine if this procedure describes an infrequently performed test or evolution.

IF unable to make a determination following completion of this checklist, THEN consult the DNPO for final decision.

1. Does this procedure create a situation that can affect the core, reactivity control, or the reactor protection system?

   ☐ NO — IF the answer is no, THEN this checklist is complete and it is NOT to be included in the procedure package.

   ☐ YES — IF the answer is yes, THEN SOER 91-01, Conduct of Infrequently Performed Tests or Evolutions (available from the Operations Technical Advisors), should be reviewed to help assure adequate controls are in place for the optimization of reactor safety, AND continue on with this checklist.

See next page for revision

2. Does this procedure create an evolution not covered by an existing normal or abnormal operating procedure?

   ☐ YES ☐ NO

3. Does this procedure create an evolution that will seldom be performed, even though it is covered by an existing normal or abnormal operating procedure?

   ☐ YES ☐ NO

4. Does this procedure create an infrequently performed surveillance test that involves complicated sequencing, or placing the plant in an unusual configuration?

   ☐ YES ☐ NO

5. Does this procedure required the use of a special test procedure in conjunction with existing operating or testing procedures?

   ☐ YES ☐ NO

1. Does this procedure create a situation that can affect plant safety, the core, reactivity control, ~~or~~ the reactor protection systems, the engineered safeguards systems, or the plant design basis?

☐ NO — IF the answer is no,
THEN this checklist is complete and it is NOT to be included in the procedure package.

☐ YES — IF the answer is yes,
THEN SOER 91-01, Conduct of Infrequently Performed Tests or Evolutions (available from the Operations Technical Advisors), should be reviewed to help assure adequate controls are in place for the optimization of reactor safety,
AND continue on with this checklist.

IF the answer to question 1 AND at least one other question is "YES," THEN this procedure is an infrequently performed test or evolution and requires a briefing in accordance with AI-500 prior to being performed. The procedure shall contain a sign off step, either as a prerequisite to performing the procedure or as its first step, that documents this briefing having been performed. This can be included in the procedure as shown in the example below.

Example:

4.1 Initial Conditions

4.1.1 Perform a DNPO pre-job briefing in accordance with AI-500, Conduct of Operations.

DNPO pre-job briefing has been completed for each new shift

0000-0800 ____/____
DNPO or Designee/Date

0800-1600 ____/____
DNPO or Designee/Date

1600-2400 ____/____
DNPO or Designee/Date

Other Shifts List Below:

____/____
DNPO or Designee/Date

____________________ Performed By ____________ Date

____________________ Approved By DNPO or Designee ____________ Date

revision

4.3.2.3 General Practices for Procedure Implementation

4.3.2.3.1 AI-400A, Description and General Administration of Plant Procedures, Section 4.1, Requirements for Approved Written Procedures, must be utilized to determine if a procedure is required for an evolution.

4.3.2.3.2 Written procedures are also needed for those evolutions that would affect a change in the system flowpath or operating parameters.

- The boundary between an "evolution" and a "task" may not always be clear and, as such, it is expected that plant operators will encounter situations where the adequacy of existing procedures may be questioned.

  a. In these instances, shift supervision will make the determination as to what procedural requirements are applicable.

See next page for revision

4.3.2.3.3 For procedures performed by Plant Operations, the Shift Supervisor or his designee shall ensure the principles of Enclosure 19, Pre-Job Briefing Checklist, are met.

- Using his judgement in regard to plant safety, the SSOD may elect to formally complete Enclosure 19, Pre-Job Briefing Checklist, for the applicable procedure.

4.3.2.3.4 Written procedures are not necessary for situations where:

- Prompt actions are being taken (including troubleshooting, locating, and isolating problems) where detrimental system interaction would result if the prompt actions were not taken.

- Prompt actions are being taken to prevent an undesired loss of process system medium

- Prompt actions are being taken to prevent an inadvertent system actuation (when the system is no longer required to be OPERABLE)

- The activities are performed under the requirements of a CP-115 Tagging Order.

4.3.2.3.5 Except in emergency or abnormal operating situations where immediate actions are required to protect the health and safety of the public, to protect equipment or personnel, or to prevent the deterioration of plant conditions to a possibly unsafe or unstable level, the operation of equipment shall be preplanned and performed in accordance with approved written procedures.

- When approved written procedures would be required and are not used, the activities that were accomplished shall be documented after-the-fact and receive the same degree of review as if they had been preplanned.

4.3.2.3.2 Written procedures are also needed for those evolutions that would affect a change in the system flowpath or operating parameters.

- The boundary between an "evolution" and a "task" may not always be clear and, as such, it is expected that plant operators will encounter situations where the adequacy of existing procedures may be questioned.

- When questioning the adequacy of existing procedures, plant operators should also consider the intent of the evolution or task to be performed in comparison to the original intent of the existing procedure. OP-406, "Spent Fuel Cooling System" was intented to provide instructions for normal startup, operation, and shutdown of the system. It was not intended to be used to permit shutdown of both cooling trains with fuel in the pool for the purpose of plotting heatup rates of the pool water temperature (i.e. intentionally approaching alarm or operating curve limits).

a. In ~~those~~ the above instances, shift supervision will make the determination as to what procedural requirements are applicable or whether a new procedure must be prepared and approved.

b. However, whenever in doubt, it is expected that shift supervision will:

- Communicate the problem to higher management (especially the shift manager)
- Assure approval of ~~higher~~ appropriate management and review groups
- Plan the job (including preparation of appropriate procedures)

Florida
Power
CORPORATION
Crystal River Unit 3
Docket No. 50-302

December 27, 1995
3F1295-22

Public Document Room
U.S. Nuclear Regulatory Commission
101 Marietta Street, Suite 2900
Atlanta, GA 30303

Reference: NRC Inspection No. 50-302/95-22

Dear Sir:

The subject inspection at Crystal River Unit 3 (CR-3) included the review of the unauthorized Make-Up Tank evolutions of September 4 and 5, 1994, and verified other Make-Up Tank information that had recently been given to Florida Power Corporation (FPC).

In order to understand this recent information and put it in perspective, FPC has conducted an extensive evaluation of the information. The results of this evaluation are summarized in the attachment to this letter.

Please do not hesitate to contact me or my staff should you desire any further discussion on this recent information or any other Make-Up Tank related subject.

Sincerely,

P. M. Beard, Jr.
Senior Vice President
Nuclear Operations

PMB/RMB/lf
Attachment
xc: Region II Administrator
Region II Project Manager
Resident Inspector

CRYSTAL RIVER ENERGY COMPLEX: 15760 W Power Line St • Crystal River, Florida 34428-6708 • (352) 795-6486
A Florida Progress Company

ATTACHMENT

Evaluation of Information in Document "Analysis of the Control of MUT Pressure at Crystal River Unit #3, 6/1/94 to 9/7/94"

On December 7, 1995, FPC received a document entitled "Analysis of the Control of MUT Pressure at Crystal River Unit #3, 6/1/94 to 9/7/94." The document contained computer data for the pressure and level parameters of the Make-Up Tank (MUT) and determined when the parameters would have exceeded a computer-generated annunciator alarm. The document then attempted to give explanations for each alarm condition and draw parallels to the unauthorized evolutions of September 4 and 5, 1994.

This evaluation provides FPC's review of this data, the reasons for and responses to the alarm conditions, and the differences with the unauthorized evolutions of September 4 and 5, 1994.

The computer data for the MUT pressure and level between June 1 and September 30, 1994 was reviewed by FPC in detail. Data beyond the dates in the subject document was included in the evaluation to determine if any alarm conditions occurred after the unauthorized evolutions of September 4 and 5, 1994. Some occurrences of computer parameters indicating the computer-generated annunciator to be in alarm were confirmed as noted in the subject document.

FPC identified a total of 669 MUT manipulations in the June 1 to September 30, 1994 time frame. These manipulations were 610 level reductions (bleeds) and/or level increases (feeds); 49 pressure increases by hydrogen addition (H2 adds); and 10 pressure reductions (vents).

In all these manipulations, only twenty-one (or 3.1%) resulted in the computer-generated annunciator being in the alarm condition at some point during the manipulation. These twenty-one manipulations are described below:

1. Ten of the 669 manipulations (or 1.5%) resulted in MUT operation less than one-half pound per square inch gauge (psig) above the computer-generated alarm limit and MUT operation with the computer-generated annunciator in alarm for less than one-half hour. These were manipulations that were slightly over the alarm curve and operator action was effective in quickly clearing the alarm condition.

2. Eleven of the 669 manipulations (or 1.6%) resulted in MUT operation greater than one-half psig over the alarm limit at some point in the manipulation and MUT

operation with the computer-generated annunciator in alarm for more than one-half hour.

a. Two of these eleven manipulations were the unauthorized evolutions of September 4 and 5, 1994 which were performed in order to challenge the accuracy of the operating curve (Curve 8 of operating procedure [OP] -103B, "Plant Operating Curves").

b. The other nine manipulations were for operational reasons. This is a small fraction of the total MUT manipulations and shows that this annunciator alarm was not regularly challenged by the control room operators and shift management. During the subject inspection, FPC provided to the NRC inspection team with a compilation of relevant data for these nine occurrences. This compilation included the computer parameters for each occurrence; plots of the parameters with time histories to show graphically how each manipulation was performed; and relevant plant information on reactor coolant system (RCS) hydrogen concentration and purity.

A review of these nine authorized manipulations shows that when the computer generated annunciator was in alarm, the operators in each case had initiated a course of action to lower the MUT pressure and clear the annunciator alarm. This action was to either vent the MUT, feed the MUT, or allow H2 to go into solution. These methods are described below:

1. The fastest technique to clear the alarm is to vent the MUT gas space. This is accomplished by selecting a Waste Gas Decay Tank (WGDT), performing a valve alignment (2 valves), starting the Waste Gas Compressors, opening another valve, monitoring the pressure decrease, stopping the Waste Gas Compressors, restoring the valve alignment (3 valves), purging the Waste Gas lines of H2 with the Waste Gas Compressors, removing the selected WGDT from service, and placing another WGDT in service. (All H2 was directed to a specified WGDT for industrial safety reasons.) Besides generating radioactive waste gas, this method generally lowered the H2 concentration in the RCS.

2. Another method was to raise level, recognizing the tank level / pressure moved from left to right in a slightly less sloped manner than the computer-generated alarm. This would be less precise, less timely, and with more judgement involved due to the variables discussed below with the deviation between the computer point and the indicator-recorder. This method was often chosen due to creating less radioactive waste gas and not monopolizing the primary plant operator for a significant period of time.

3. The H2 was being put in the MUT to raise or maintain the concentration of H2 in the RCS. As the H2 went into solution, the pressure dropped. This, coupled with 2. above, was the most common method to clear the alarm.

Further review of the main control board MUT indicator-recorder chart for the relevant time period shows that the MUT parameters were in the acceptable operating region of the MUT operating pressure-level curve for all but one of the nine authorized manipulations. (Instrument error for the indicator-recorder was included in the calculation of the MUT operating curve so using the indicator-recorder for MUT parameters was acceptable.) It was normal for the operators to verify the computer-generated alarm with the indicator-recorder. While engineering considered the computer-generated parameters to be more accurate, operations generally used the MUT indicator-recorder on the main control board to follow MUT manipulations.

However, it is not acceptable to operate with one indication in alarm and one indication showing the MUT parameters in the acceptable region of Curve 8. Operators are trained to react to the more conservative indication. Thus, for each manipulation, the operators reacted to the more conservative indication and moved the MUT toward and into the acceptable region of MUT operation as defined by the computer-generated annunciator alarm. However as noted below, operator actions in these nine evolutions did not result in a prompt return to the acceptable region.

The nine authorized manipulations are summarized as follows:

	Date	Maximum psig Above Alarm	Reason for Manipulation and Resulting Actions
(1)	07/23/94	1.08	Operators raised pressure of hydrogen (H2) to bring H2 in RCS to higher equilibrium. The alarm occurred due to overshoot in H2 addition. (Overshoot is a phenomenon where the H2 added increases in pressure as it reaches equilibrium with the MUT temperature.) At worst point, the MUT operating curve was exceeded by the indicator-recorder readout but this was not noted by the operators. Level increase (feed) method was used to clear the alarm but was not effective. Alarm condition existed for 122 minutes. Operators should have recognized sooner that the feed method was not being effective and shifted to the vent method to clear the alarm more quickly.

(2)	07/25/94	0.68	Operators lowered MUT level and H2 added to bring H2 in RCS to higher equilibrium. H2 add caused MUT pressure to overshoot to alarm condition. Feed method used to clear alarm but alarm condition existed for 48 minutes. Indicator-recorder read below the MUT operating curve. Even though the pressure-level relationship was going in the right direction, more timely action should have been taken to clear the alarm.
(3)	07/27/94	0.68	Operators raised pressure of hydrogen (H2) to bring H2 in RCS to higher equilibrium. H2 add caused MUT pressure to overshoot to the alarm condition. The operators attempted to clear it with the feed method but alarm condition existed for 78 minutes. Indicator-recorder read below the MUT operating curve. Again, operators should have taken more timely action to clear the alarm.
(4)	07/28/94	2.1	Operators raised pressure of hydrogen (H2) to bring H2 in RCS to higher equilibrium. H2 add caused MUT pressure to overshoot to the alarm condition. The operators attempted to clear it with the feed method but alarm condition existed for 184 minutes. Indicator-recorder read on the MUT operating curve. (MU demineralizer changes may have caused a temperature change, thus affecting the pressure.) Again, operators should have taken more timely action to clear the alarm.
(5)	07/30/94	0.73	Operators raised pressure of hydrogen (H2) to bring H2 in RCS to higher equilibrium. H2 add caused MUT pressure to overshoot to the alarm condition. The operators attempted to clear it with the feed method but alarm condition existed for 190 minutes. Plotting the indicator-recorder shows it on or below the MUT operating curve. Again, operators should have taken more timely action to clear the alarm.
(6)	08/06/94	0.82	Operators raised pressure of hydrogen (H2) to bring H2 in RCS to higher equilibrium. H2 add caused MUT pressure to overshoot to the alarm condition. H2 purity was low so fresh H2 was required. Operators tried to let H2 dissolve in water to clear alarm but alarm condition existed for 141

			minutes. Operators then shifted to the feed method to clear alarm. Again, operators should have taken more timely action to clear the alarm. Indicator-recorder read below the MUT operating curve.
(7)	08/08/94	1.54	Operators raised pressure of hydrogen (H2) to bring H2 in RCS to higher equilibrium. H2 add caused MUT pressure to overshoot to the alarm condition. H2 purity was low but increasing, so fresh H2 was still required. Operators tried to let H2 dissolve in water to clear alarm but alarm condition existed for 67 minutes. Again, operators should have taken more timely action to clear the alarm. The maximum pressure plotted right on the MUT operating curve.
(8)	08/24/94	0.51	Operators raised pressure of hydrogen (H2) to bring H2 in RCS to higher equilibrium. H2 add caused MUT pressure to overshoot to the alarm condition. Operators tried to let H2 dissolve in water but alarm condition existed for 87 minutes. Again, operators should have taken more timely action to clear the alarm. (RCS average temperature [Tave] was swinging at this time, thus affecting the level in the MUT.] Indicator-recorder read below the MUT operating curve.
(9)	09/04/94	2.07	Operators raised pressure of hydrogen (H2) to bring H2 in RCS to higher equilibrium. H2 add caused MUT pressure to overshoot to the alarm condition. Operators tried to let H2 dissolve in water but alarm condition existed for 86 minutes. Operators then shifted to vented method to clear alarm. Again, operators should have taken more timely action to clear the alarm. Indicator-recorder read below the MUT operating curve.

In all but one of the above examples, the indicator-recorder did not indicate a condition in the unacceptable region of the MUT operating curve. Even so, operator actions were not prompt.

A second area of review was the difference between the evolutions on September 4 and 5, 1994 and the other nine authorized manipulations above. There are two main differences:

1. There were valid operational reasons for the nine authorized MUT manipulations (and all the other MUT manipulations) while there were no operational reasons for the September 4 and 5, 1994 unauthorized evolutions (they were designed solely to "challenge" Curve 8). There was clearly a difference of intent.

2. The nine authorized manipulations reflect documented operator actions in order to bring the MUT to an acceptable operational configuration after receiving the annunciator alarm (although not prompt in clearing alarms). In contrast, during the unauthorized evolutions of September 4 and 5, 1994 the "A" Shift entered the unacceptable operating region of the MUT by lowering level in order to "challenge" the MUT operating curve. The unauthorized evolution of September 4, 1994 actually began in the unacceptable operating region of the MUT. The unauthorized evolution of September 5, 1994 began on the MUT annunciator alarm curve after initially exceeding the curve.

The referenced document implies there was a strong safety concern among the shift that performed the unauthorized evolutions. It is true the events brought more attention to resolving the issue of the difference between the MUT operating curve (which is based on MUT response to a loss of coolant accident [LOCA]) and the normal day-to-day operation of the MUT. However, the "A" Shift's actions (on a midnight shift during a holiday weekend) reflect a poor communication, non-conservative operation, and mis-use of procedures. It now appears that the primary motivation was to prove engineering wrong. Significantly, there was no urgent condition which required immediate action on September 4 and 5, 1994.

The "A" Shift had a number of avenues to further raise their concerns without conducting unauthorized evolutions. They could have:

1. consulted with the on-duty Shift Manager;

2. raised the issue with the Manager, Nuclear Plant Operations or his supervisor, the Director, Nuclear Plant Operations;

3. used the Employee Concern Program (which the shift supervisor had previously used to raise other issues);

4. contacted the Vice President, Nuclear Production or the Senior Vice President, Nuclear Operations.

Rather than use these other avenues, the "A" Shift chose to conduct an unauthorized evolution on two consecutive midnight shifts during the Labor Day Weekend.

FPC earlier investigations into reports of the other MUT manipulations focused on the indicator-recorder parameters and its relation to the MUT operating curve rather than on computer parameter points which fed the annunciator alarm. There were very few instances of alarm conditions evident and little reason to suspect that some instances may have exceeded thirty minutes.

With regard to management expectations and operator response to the MUT alarm conditions in the June to September 1994 time frame, our review has concluded the following:

1. Operators were expected to acknowledge alarms, verify them, and the take appropriate action to clear alarm conditions. There was no specific guidance regarding timeliness of clearing alarm (time frames) other than operators are trained to take prompt and prudent actions.

2. Management relied heavily on the judgement of licensed operators to diagnose, evaluate, and respond to alarm conditions. In these nine authorized manipulations, the judgement of the licensed operators was affected by the management expectation to keep the MUT as close to the alarm curve as possible in order to maintain a high H2 concentration in the RCS. Recognizing the MUT parameters from the indicator-recorder were on or below the MUT operating curve, the operators did not respond promptly in clearing the alarm conditions on a timely basis. However, it is doubtful that they recognized that they were in the unacceptable region of the MUT operating curve.

3. In discussing these nine manipulations with the operators involved, they acknowledge that they were more focused on maintaining H2 pressure as high as possible rather that promptly clearing the alarm condition. This is a result of their interpreting management expectations for maintaining H2 pressure as more important than promptly clearing the alarm.

4. Management should have been more specific on expectations to operators regarding timeliness of response to alarms and in providing operators with sufficient guidance on how to balance H2 pressure versus being in an alarm condition.

LETTER FROM MR WEINberg TO Mr VORSE (NRC) detailing opportunities for the Shift Supervisor and ASST. SHIFT Supervisor TO COME Forward sooner (before JUL 95) about The Sept 4 TEST

NOT
INCLUDED
DUE TO
CONFIDENTIALITY

Provided to OI with understanding would not be made public

BOLDT RESPONSE TO THE MRP REPORT

AS OF MARCH 21, 1996

CURRENT STATUS:				
	Complete with Documentation (or N/A).....46	last report 41	MUT Additional Corrective Actions:	Complete...... 5
	Complete, need Documentation............ 0	3		
	Not Complete............................ 3	5		Not Complete...1
	49			6

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
I.	Initiate an aggressive effort to improve, from the top down, internal communication of the safety culture, including legal compliance aspects, of nuclear power operations.			
1	The Mission Statement was revised to place primary emphasis on nuclear safety.	Pat Beard/ Gary Boldt		COMPLETE Documents on File
2	The Long Range Plan identifies safety culture as the top priority and has established actions to go with it. This was also stressed in the 1995 plan.	Pat Beard/ Gary Boldt		COMPLETE Documents on File
3	Safety and conservative decision-making was emphasized by senior management at the "all hands" meetings in January. This will be continued in subsequent quarterly meetings. NRC COMMENTS (From Inspection Report 95-08) Residents attended the subject meetings. The importance of safe operation was emphasized to licensee personnel.	Pat Beard/ Gary Boldt		COMPLETE. PROCESS IN PLACE. ALL-HANDS MEETINGS ARE CONDUCTED QUARTERLY. THESE TOPICS WERE DISCUSSED IN THE 1/95 AND 4/95 MEETINGS.
4	A change was made to the plan of the day to remove the number of continuous days on line.	Brent Moore		COMPLETE Documents on File

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
5	The Plant Manager wrote a bulletin describing the nuclear safety and event free operations program which was distributed to all Nuclear Operations personnel. NRC COMMENTS (From Inspection Report 95-08) The residents attended the DNPO's briefing of personnel. This program will be implemented by each manager reporting to the DNPO. This program is a living program and will be enhanced as operating experience is gained. The residents have reviewed the dr t Plant Operations specific program. The residents monitored operator simulator exercises and noted the event free operations program elements were incorporated during the monitoring and critiquing of operator performance.	Bruce Hickle		COMPLETE Documents on File
6	Specific presentations were made to "all hands" on the event free operations program. This program will be implemented by the departments reporting to the Plant Manager by April 1, 1995. Each supporting department will fully implement this program by July 1, 1995. NRC COMMENTS (From Inspection Report 95-08) Residents attended the subject meetings. The importance of safe operation was emphasized to licensee personnel and the new initiative the event free operations program was presented.	ALL DIRECTORS + Jerry Campbell, Brent Moore		COMPLETE Documents on File

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
7	Line management directed that future audits include an assessment of safety culture in the departments audited. Performance criteria for this portion of the assessment will be based on FPC management expectations developed, in part, from consideration of IAEA bulletin 75-INSAG-4. <u>NRC COMMENTS (From Inspection Report 95-08)</u> The residents have discussed the safety culture audit program with responsible supervisors. The review criteria, for the audits, was reviewed by the inspectors. <u>NRC COMMENTS (From Inspection Report 95-16)</u> Assessment: The licensee's self assessment programs are a strong initiative to identify areas that need improvement. The one remaining challenge is the implementation of corrective actions for the issues identified by the assessments.	Paul McKee		COMPLETE. PROCESS IN PLACE. Audit 95-02-MAKP made some observations. Audits 95-03-SSUP and 95-04-CREW provided more intense analyses of hp/sc parameters.
8	A letter documenting FPC senior management commitment to (and role in achieving) conservative decision-making was sent from FPC (Allen Keesler) to INPO (Zack Pate).	Gary Boldt		COMPLETE Document on File

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
9	An event response checklist for the Nuclear Shift Manager to use in responding to and investigating significant plant events has been implemented. This approach is one of several initiatives intended to emphasize the lead role of line (especially plant) management in nuclear safety and legal compliance. <u>NRC COMMENTS (From Inspection Report 95-08)</u> The residents have reviewed the event response checklist and found it to have the potential to be a useful tool. The residents verified the NSMs were aware of the checklist and were prepared to use it when needed.	Bruce Hickle		COMPLETE Document on File Other initiatives include line management becoming more involved in personal safety by attending plant safety meetings and PRC establishing guidelines and goals to strengthen its role as a safety review committee.
	II. Expand existing management procedural initiatives, including additional emphasis on procedure adherence. This should include efforts to improve ownership and the quality of procedure maintenance by users, making them more simple and usable. This should be done consistent with the communication of safety culture.			

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
10	Implementation of the event free operations program in all departments by July 1, 1995. <u>NRC COMMENTS (From Inspection Report 95-16)</u> The inspectors reviewed the overall Event-Free Operations Program, which had been approved by the Senior Vice President, Nuclear Operations. The stated program objective was to ensure that all personnel are properly equipped with and utilize the "tools" necessary to perform their job function with the result being an ever-decreasing frequency and significance of errors to the point that operations is event free. The program applied to all personnel; including operations, engineering, maintenance, contractors, etc.; who work within Nuclear Operations. Assessment: Overall , the inspectors concluded that Event-Free Operations Program implementation was excellent in the operations department and acceptable in all departments. Remaining licensee challenges were to more consistently apply Event Free Operations in all departments and to monitor and trend in more detail.	DUPLICATE ITEM TO # 6 WHICH APPLIES TO THIS AREA ALSO		COMPLETE. SEE ITEM # 6.
11	A formal business process improvement (BPI) evaluation will be performed on the procedure change process in 1995.	Bruce Hickle	6/96 (START)	IN PROGRESS Kimberly Bowman and Dale Stevens are the Core Team leaders. Some enhancements have been implemented. The formal BPI is now scheduled to start after the outage. Ref. cc:Mail from K.R. Bowman (in folder).
12	"All hands" meetings presented and discussed event free operations and procedure compliance policies.	Pat Beard/ Gary Boldt		COMPLETE. PROCESS IN PLACE. SEE ITEM # 3

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
13	Procedure ownership is being transferred to end users on a trial basis (beginning in the I&C shop). The purpose of this effort is to enhance ownership and accountability among procedure users and to assure the level of procedure detail (or simplification) is commensurate with user needs. Such efforts, however, must maintain a proper balance of quality of technical input. Therefore, system engineering will remain a close partner in review and approval.	Bruce Hickle/ Ron Davis/ Jerry Campbell		COMPLETE The Managers of the Maintenance shops have been made the Interpretation Contact for procedures their shops perform.
14	A computer program (NUPOST) for recording and tracking procedure change recommendations was implemented. Operations led the development and implementation of this product.	Greg Halnon		COMPLETE System is operational. Contact is Earnie Gallion.
15	A training initiative to intentionally fault (or fail) a procedure during simulator exercises to verify that operators will use the procedure change process is being implemented.	Rolf Widell		COMPLETE Scenarios in each of the first two cycles of simulator requalification contained situations where procedures did not contain adequate guidance for correction of specific equipment problems. For each, MNPO policy regarding the use of 50.59 and 50.54 to determine appropriate corrective actions was developed and discussed. These types of activities will periodically occur during future requal. sessions.

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
16	When appropriate, new procedures and key changes to existing procedures are tested on the simulator.	Rolf Widell/ Jerry Campbell		COMPLETE. PROCESS IN PLACE. Examples include ITS required changes to SP-417 and loss of vital busses from 100% power. Also, simulator validation has been performed on EOP-7 and 8, SP-110, 113 and 130, and the new AP on Rapid Plant Shutdown.
17	All I&C surveillance procedures are being re-validated by the I&C shop. NRC COMMENTS (From Inspection Report 95-08) The residents have discussed the review and re-validation of I&C surveillance procedures with I&C personnel. This effort could result in improved procedures with fewer events.	Bruce Hickle/ Ron Davis	7/31/96 (All)	IN PROGRESS An SP team has been established that will validate and re-write both SPs and PTs. Some SPs have been validated on the simulator. As of 2/29/96, all of the outage I&C SPs have been validated. All remaining I&C SPs will be completed by 7/31/96.
18	To simplify procedures and place more accountability on the performer and performing departments, some "hold points" have been replaced with "witness points" (second party verification), and some new witness points have been added.	Bruce Hickle	ONGOING	IN PROGRESS The task force has identified those discretionary hold points that will become second-party verifications, witness points, or just go away. Procedure revisions were dependent on approval of NOD-48, which was signed the week of 6/19/95. The final step in the process will be to revise existing procedures and make the changes to the affected hold points. Approximately 160 procedures are affected. The procedures are being revised during their regular revision cycle. About 50% are complete.

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
19	To further clarify procedure intent and improve procedure usability, "independent verification" and "concurrent verification" have been re-defined (in CP115). <u>NRC COMMENTS (From Inspection Report 95-08)</u> The residents reviewed the change in definition in CP 115. The operations personnel were concerned at first that the revised definition would inhibit their ability to perform tagging under unique circumstances (such as in high radiation areas) where exposures to other hazards would dictate concurrent tagging. The provisions in CP 115 alleviated this concern.	Bruce Hickle		COMPLETE CP-115 on File

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
20	To improve line ownership of the problem report and precursor processes, program and procedure responsibility was moved from the QA director to the plant manager. NRC COMMENTS (From Inspection Report 95-08) As noted above, the plant manager has assumed the responsibility for the precursor and problem report processes and has placed emphasis on the program. The number of reports submitted is part of a licensee trending program. The number of precursor cards submitted has increased dramatically since the first of the year and the results are very positive. NRC COMMENTS (From Inspection Report 95-16) Assessment: The management attention and oversight to the issue of operability determinations has been inadequate and is considered a weakness. It has been six months since the subject of inadequate operability determinations was discussed with licensee management and an improved procedure was still not available. It should be pointed out that the licensee's briefings of the NRC on operability issues have been good and conservative. However, written operability determinations are very brief with few details and generally considered inadequate. The clear expectations reflecting management's highest safety standard was absent as shown by the lack of a detailed and thorough process with rigorous guidance for making operability determinations.	Bruce Hickle		COMPLETE CP-111 on File Additionally, CP-144 (Root Cause Analysis) has been revised.

ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
20 (continued) <u>NRC COMMENTS (From Inspection Report 95-18)</u> The inspectors reviewed Quality Programs Surveillance Report #QPS-95-0092, on the Event Free Operations Program for the site. The surveillance noted one good work practice, the use by operations of the tool bag tags to effectively focus on the use of human performance tools. The surveillance report identified several areas where improvement could be realized.			
III. Increase the management attention devoted to managing change. This includes configuration management, procedures and processes, and organizational change. Ineffective, or incomplete, management of changes was a significant contributor to many of the events or conditions reviewed by the MRP.			
21 The project manager/team approach to plant modifications was significantly strengthened, including operations representation. <u>NRC COMMENTS (From Inspection Report 95-16)</u> Multidiscipline project teams have been established with representatives from the various plant departments for all major projects and modifications. A project manager from NEP is assigned as the single point of accountability. Representatives present their department's position instead of personal opinion and provide input on the project in an effort to ensure that the needs of the plant are addressed.	Paul Tanguay		COMPLETE Revisions to NEP-102 and NEP-212 on File

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
22	Formal action plans (using a specific format) were implemented for significant issues.	ALL DIRECTORS		COMPLETE Examples on File
23	A computerized Ful/Text search capability was implemented to help manage change in procedures.	Bill Conklin		COMPLETE System Description on File
24	The System Engineering Manual was updated to include instructions for use of CMIS and Ful/Text and other available tools to verify documents requiring change.	Jerry Campbell		COMPLETE Document on File
25	A check-list was added to the MAR closure process to assure all documents requiring change are completed. <u>NRC COMMENTS (From Inspection Report 95-16)</u> (FPC has) Revised design control procedures to strengthen the process for ensuring that required documents are revised prior to modification package closure and system turnover. The project manager monitors and tracks the revision of other plant documents which require a change.	Paul Tanguay		COMPLETE See # 21 above
26	Maintenance of system histories in the Tech Support area will assist with continuity through organizational change. Some examples are the quarterly report, action plans, system libraries, and system outage critiques.	Jerry Campbell		COMPLETE Examples on File

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
27	A check-list for discussion items to be included in screening and selection of new supervisor candidates was implemented. This provides for senior managers to emphasize change management, safety culture, and conservative decision-making with new supervisory candidates prior to organizational change.	Bill Conklin/ Rolf Widell		COMPLETE TDP-205 checklist modified. Supervisor Assessmment Center evaluates change management capabilities. NucOps "red book" contains instructions regarding use of the Assessment Center and Director involvement in discussing expectations during selection process.
28	The 1995 goals include reviewing the AI's and NOD's and other administrative procedures to make sure they are current. A portion of that review was completed in 1994.	Bruce Hickle		COMPLETE AIs and NODs were reviewed by 12/31/95. Most have been revised and will be completed by 2/29/96.
29	Computer software controls are being audited with the purpose of improving change management.	Bill Conklin		COMPLETE Audit # 95-01-SQA completed this action. NOD-?7 was revised to comply with the recommendations.
30	Nuclear Operations is taking over the in-processing and fitness for duty programs from Human Resources and has established a project team with a designated transition manager.	Larry Kelley		COMPLETE As of April 3, 1995, Nuclear Operations Access Control has been performing all tasks needed for unescorted access to CR3.
31	The Master Schedule, the fuel cycle action plan, the 90-day, weekly and daily schedules, have been implemented as instruments to regulate and control the rate of change.	Phil Skramstad/ Brent Moore		COMPLETE Examples on File
32	A new section has been added to the quarterly performance indicators to look at changes occurring in fifteen different areas to arrive at an overall assessment of safety impact.	Paul McKee		COMPLETE Documents on File

ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
33 Changes recently made to the FPC QA Plan will allow the Nuclear General Review Committee (NGRC) and the Plant Review Committee (PRC) to focus on more safety significant (as opposed to routine) issues.	Paul McKee		COMPLETE Documents on File
34 NGRC-led targeted assessments (similar to the Management Review Panel Report) will be regularly performed. <u>NRC COMMENTS (From Inspection Report 95-16)</u> The inspectors attended significant portions of the NGRC operations and maintenance subcommittee meeting and observed a thorough, detailed technical review of several issues; including the service water inspections, the makeup tank issues, and evaluations of cause and corrective actions for problem reports and precursor cards. The subcommittee concluded that in some cases, the licensee needed to be more candid with respect to personnel errors, and stop building programmatic fixes for every error. The inspectors noted that the licensee has established a Senior Management Self-Assessment meeting on a biannual basis. This is considered an excellent initiative with the potential to greatly enhance the licensee's self assessment process. The inspectors have witnessed several strong initiatives to perform self assessments of management and plant performance. These new programs and enhancements to existing programs are still relatively new, and while they have identified some substantive issues, corrective actions have not boeen completely implemented. The inspectors will continue to monitor the programs to determine their effectiveness.	Paul McKee		COMPLETE Document on File (E. Mroczka report)

ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
35 Management directed that a quality audit be performed on the engineering process for making and changing engineering calculations and that the audit team include NGRC and/or other independent engineering calculation expertise.	Paul McKee		COMPLETE The Engineering Audit in November, 1995 included these elements.
36 Future significant change projects will require prior completion of an action plan, schedule, <u>and</u> contingency plan for potentially negative outcomes.	ALL DIRECTORS		COMPLETE. PROCESS IN PLACE. Recent examples: CCHE Action Plan; CR-3 Sepoint Action Plan.
IV. Enhance the current initiatives to improve the working relationship with the NRC, by development of a more comprehensive plan. This plan would address philosophy and expectations as well as mechanics. It should stress recognition of the value added by the regulator in each interaction. Once developed, thorough internal and external communication will be required for it to be effective.			
37 A revised plan regarding communication with the NRC was issued on January 6, 1995. It recognized the NRC's mission and value added by the regulatory process; however, further strengthening of this aspect is planned when the plan is converted to a nuclear operations directive (NOD).	Larry Kelley		COMPLETE NOD-53 has been implemented.
38 Senior management participation has increased in face-to-face phone conversations with Region II and NRR counterparts to share information and clarify expectations.	Pat Beard/ Gary Boldt		COMPLETE. PROCESS IN PLACE. Recent examples: TSI, SWOPSI, RPS setpoints. See also example in # 44 below.

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
39	Each executive direct report is increasing the frequency of contact with their NRC counterpart.	ALL DIRECTORS & Jerry Campbell		COMPLETE. PROCESS IN PLACE. Meetings have been held both at the NRC and on site. See also example in # 44 below.
40	The Senior Vice President has emphasized improvement in the timeliness, directness, and completeness of NRC communications with licensing management.	Pat Beard		COMPLETE Discussions with the Sr. VP were held at the Licensing staff meeting of May 4, 1995.
41	The Senior Vice President has emphasized the need for line management involvement in the NRC communication plan.	Pat Beard		COMPLETE
42	FPC will establish routine meetings between licensing and Region II staff similar to those we continue to hold with headquarters staff.	Larry Kelley		COMPLETE
43	FPC will strengthen the participation of line management in safety, operability, and regulatory compliance discussions/meetings with the NRC. We must continue to emphasize, however, that licensing remains the single point of contact to arrange and facilitate FPC/NRC communications.	ALL DIRECTORS		COMPLETE. PROCESS IN PLACE. recent example: Bruce Hickle/Bill Stephenson contacted the NRC on May 16 re: NOD-14.
44	FPC will increase contact between mid- and upper-level management and their NRC counterparts.	ALL MANAGERS		COMPLETE. PROCESS IN PLACE. recent example: R. Widell, J. Lind and G. Halnon met with R II staff to discuss Licensed Operator Training on May 24, 1995. Minutes on file. OTHER EXAMPLES?

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
45	Clear objectives for safety/regulatory performance are being developed, as well as methods to monitor performance against these objectives.	Larry Kelley		COMPLETE (see PMB's 3/1/95 presentation to the NRC)
	V. The MRP also recommends improving the timeliness of design engineering response to plant needs.			
46	Internal communications were enhanced to press issues to the forefront earlier. An example is the establishment of an operator workaround list in response to the Salem event. <u>NRC COMMENTS (From Inspection Report 95-08)</u> The residents have reviewed the licensee's operator work-around list. The list is a comprehensive list of outstanding work-around items and includes a status column so management can keep abreast of outstanding issues. For historical purposes, the operator workarounds that have been closed are attached to the back of the list under closed items. The licensee is placing increased emphasis on the PR/PC program. A significant rise in the number of PCs written has been noted by the inspectors. Several significant trends and issues have been identified by the licensee using this process. <u>NRC COMMENTS (From Inspection Report 95-16)</u> NED implemented monthly design engineering priority meeting with representatives from various departments. The meetings were held to discuss emergent plant issues, prioritize REAs, and discuss NED workload versus plant needs.	ALL DIRECTORS		COMPLETE (the Nuc Ops newsletter, the Operations Journal, the Focus Item list and naming issue managers for specific projects, e.g. Sid Powell for CCHE are examples)

ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
47 Engineering established an initiative to assure their customers have direct input to project priority setting. <u>NRC COMMENTS (From Inspection Report 95-16)</u> Multidiscipline project teams have been established with representatives from the various plant departments for all major projects and modifications. A project manager from NEP is assigned as the single point of accountability. Representatives present their department's position instead of personal opinion and provide input on the project in an effort to ensure that the needs of the plant are addressed.	Paul Tanguay		COMPLETE NED Prioritization Program was established to better support day-to-day plant problems.
48 Design engineering is in the process of relocating to, and consolidating all engineering employees and appropriate technical records at, the Crystal River Site. <u>NRC COMMENTS (From Inspection Report 95-08)</u> The residents have discussed the relocation efforts and its impact on engineering at this time. The relocation is scheduled to be completed by August 1995 and should result in improved internal communications within FPC. <u>NRC COMMENTS (From Inspection Report 95-16)</u> - NEP was relocated from the corporate office to the site. - Combined all engineering resources (NEP and NPTS) into one organization.	Paul Tanguay		COMPLETE

ACTION ITEM		ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
49	Managers in both design and system engineering functions have begun to increase the frequency of communication with the NRC. It has been particularly emphasized that they do so at the start of new projects and initiatives in order to communicate action plans, schedules, and contingency plans (for potentially negative results) prior to implementation.	Paul Tanguay/ Jerry Campbell		COMPLETE. PROCESS IN PLACE. Recent example: J. Masada and K. Lancaster met with the NRC engineering counterpart Chuck Casto.

ADDITIONAL MUT CORRECTIVE ACTIONS

ACTION ITEM		ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
1	Revise page 16 of AI-400B (Enclosure 3) so that step 1 is more broadly focused.	Bruce Hickle		COMPLETE Completed by revision 17 to AI-400C (see page 12).
2	Revise page 17 of AI-400B (Enclosure 3) so that the checklist for infrequently performed tests or evolutions is approved by the DNPO or his designee (usually the shift manager).	Bruce Hickle		COMPLETE Completed by revision 17 to AI-400C (see Enclosure 7).
3	Revise AI-500, page 46, step 4.3.2.3.? to assure the intent of the procedure or evolution is also considered by the shift supervisor and that he follows the following four steps when in doubt: - Communicate - Approve - Plan - Schedule	Bruce Hickle		COMPLETE Completed by issuance of OI-09.

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
4	The management review panel process (MRP) is a good concept but fell short in application when used to initially review the MUT event. Expand the MRP process to apply to all potential NRC violations whether self-identified or NRC-identified. Draft a charter or guideline for conducting MRP's to assure consistency and thoroughness of reviews. Some of the items that should be included are: - an attempt to interview all personnel involved, including support groups where appropriate; - assurance that CP-111 and CP-144 have been fully applied as appropriate; - review of all appropriate logs, chart recordings, completed procedures, REDAS data, annunciator printouts, and other relevant documentation; - review for generic aspects of the event, i.e., similar violations, events, errors, systems, etc.; - assure both technical and human performance aspects of the issue get equal attention.	Bruce Hickle		COMPLETE Completed by issuance of MRP guideline dated August 29, 1995.
5	There is some evidence that operations log entries remain imprecise or incomplete. Schedule further audits and/or training on the topic of adequate log keeping. Consider reinforcing log keeping practices by running table top or simulator exercises specifically for this purpose.	Bruce Hickle	9/5/96	QPD conducted Surveillance Procedure QPS-96-0017 "Nuclear Plant Operations Logkeeping" on 2/8/96. As a result, information from OI-05 and ROT lesson plans will be used to convey log keeping expectations and evaluate the standard by adding a signature for log keeping techniques in the SPO and PPC TPMs by 9/5/96.

	ACTION ITEM	ACTION ITEM RESPONSIBILITY	DUE DATE	STATUS
6	Develop specific examples of evolutions that require higher authority to authorize. Then, conduct training with Shift Supervisors and Assistant Shift Supervisors on these examples and the guidance in applicable AIs.	Bruce Hickle		COMPLETE Completed by Operations Workshop on Procedural Use Expectations training conducted during Cycle I Requal; 1996.

MAKEUP TANK AND BWST/RB SUMP LEVEL ISSUES ACTION PLAN AS OF: March 26, 1996

ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROBLEM REPORT CAP ITEM
1	Perform an independent review of FPC Calc.#M94-0053, Rev. 0 by B&W. ("Allowable MUT-1 Indicated Overpressure vs. Indicated Level").	ENGR: Balliet	COMPLETE	B&W Letter # FPC-95-020 (2/1/95)	N/A
2	Determine the highest BWST "swap-over" level allowed based on accident conditions. To accomplish this activity the following items must be completed:	~~ENGR: Campbell~~ See items 2a-2j below	~~4/15/95~~ See items 2a-2j below for status	REA 94-1380	~~PR95-0026 Item 4~~ see items below
2a	Determine the minimum RB sump level needed to meet the DHP/BSP NPSH and vortexing requirements. (This assumes single HPI pump piggyback operation after swap over; See 2g below))	ENGR: Gutherman Campbell	COMPLETE	Calculation M90-0021 Rev.4	PR95-0026 Item 4
2b	Evaluate pH changes in the Reactor Building Sump resulting from lower RB sump water inventory.	ENGR: Gutherman Campbell BWNT	COMPLETE	M95-0009, Rev 0 (2/24/95)	PR95-0026 Item 4
2c	Evaluate shutdown margin, which may be affected by the earlier swap-over point	ENGR: Gutherman Campbell BWNT	COMPLETE	M94-0060,Rev. 2 (2/24/95)	PR95-0026 Item 4
2d	Evaluate effect of lower volume of water in RB Sump as it effects Post Accident Radiation Dose calculations.(This will assume BWST starting at minimum ITS level and draining to 15'. If EOP-08 is changed again, this will have to be revisited).	ENGR: Gutherman Campbell G/CI	COMPLETE	FPC Calc. M95-0007, Rev. 1 (2/22/95)	PR95-0031 Item 1
2e	Revise Calculation I86-0003 to calculate Control Room Doses using information from d) above and considering : 1) 2568Mwth 2) Coordination with CC Habitability issues and door leakage 3) Fuel enrichment changes over plant life.	ENGR: Gutherman Campbell G/CI	~~3/31/95~~ COMPLETE	Calculation I86-0003, Rev.6 issued 3/30/95 per IOC NED 95-0186. Revised max. thyroid dose 29.48 REM.	PR95-0031 Item 2

Shaded Areas represent changes from the previous issue of the Action Plan. For comments or questions regarding this plan, contact Gary Becker @ x3300.

MAKEUP TANK AND BWST/RB SUMP LEVEL ISSUES ACTION PLAN AS OF: March 26, 1996

ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROBLEM REPORT CAP ITEM
2f	Determine expected RB sump level after transfer and assess the accuracy of flood level instrumentation to provide adequate MCB indication to allow Operators the ability to verify level prior to completing the swap-over.	ENGR: Balliet Gutherman/ Campbell	~~4/1/95~~ ~~4/30/95~~ ~~5/15/95~~ ~~6/15/95~~ ~~8/28/95~~ COMPLETE	~~Delayed due to BWST level instrument calcs. Actual expected Flood level is 98.2' per Gutherman.~~ ~~Extension request NED95-0369~~ Reference : Engr. Calc I88-0011, Rev.7 "Containment Sump and Building Flood Level Indication" and Calc M95-0016, Rev.0 "BWST Swapover and Minimum Allowable Level Evaluation" Also see item 20b below.	PR95-0026 Item 6 and item 8
2g	Determine RB Sump level requirements (NPSH) to support piggy-back operation of 2 make-up pumps off the discharge of a single DHP in accordance with EOP-08 Step 3.39.6.	ENGR: Gutherman Campbell	COMPLETE	M90-0021 Rev. 5 and STI 95-0022 was issued 3/22/95 to preclude two HPI pumps in Piggyback operation off a single LPI pump when on RB sump. Ref. New items 2J and 3d below.	PR95-0026 Item 6
2h	Evaluate a revision to EOP-08 Step 3.14 to trip a MUP rather then establishing piggy-back operation prior to going below 28' in the BWST (Reference STI 93-002)	Operations Bremer	~~June 30,1995~~ ~~4/15/95~~ ~~4/28/95~~ ~~5/31/95~~ COMPLETE	This item will be address with item 2J below. Cross-tieing MUP suctions is outside the design basis of CR-3. This step was removed from EOP-08. Procedure revision (Rev.04) was issued 6/9/95	
2i	Determine if BWST level continues to decrease after DHV-42/43 are opened under highest RB pressure conditions. If no, adjust dose calculation I86-0003 accordingly.	ENGR: Gutherman	~~6/30/95~~ ~~4/15/95~~ COMPLETE	A minimal amount of water was taken credit for below 15' per K. Campbell. Dose calculations are acceptable as-is. E-Mail from Gutherman to Becker dtd 4/13/95 closes this item.	
2J	Revise EOP-7 and 8 to NOT run two HPI pumps in piggyback off a single LPI pump when taking suction from the RB Sump. (Ref. STI 95-0022).	Operations Bremer	~~4/15/95~~ ~~4/28/95~~ ~~5/31/95~~ COMPLETE	~~NEW ITEM from item 2g above.~~ EOP -07 Rev.3 and EOP-08 Rev.4 issued 6/9/95 to trip a MUP when only 1 DHP is operating from Sump.	PR95-0059 Item 1
3	Establish lowest allowable water level in BWST under accident conditions. The following actions are required:	ENGR: Gutherman Austin OPS: Becker	~~4/5/95~~ See items 3a-3f below for status.	See Items Below	PR94-267 ITEM 1B PR95-0026 Item 5

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MAKEUP TANK AND BWST/RB SUMP LEVEL ISSUES ACTION PLAN AS OF: March 26, 1996

ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROBLEM REPORT CAP ITEM
3a	Determine minimum BWST level to preclude vortexing in the suction piping under worst case flow and temperature conditions.	ENGR: Gutherman Austin	COMPLETE	FPC Calc M95-0005,Rev.1 dtd 6/6/95	PR95-0026 Item 1
3b	Determine if NPSH requirements for MUP's/DHP's/BSP's (defined in 2a above) are satisfied at the minimum BWST vortexing level (based on highest pump flows and fluid temperatures).	ENGR: Gutherman Ledzian	COMPLETE	FPC Calc M95-0004 Rev 0 dtd 2/10/95	PR94-0149 ITEM 8
3c	Confirm that the BWST level instrumentation used for accident mitigation is consistent with analysis/design assumptions considering string accuracy and as-left data. (DH-7 &37-LI instrument accuracy) This item should also considers parallax and scaling while reading these instruments. Resolve concerns associated with temperature limits in BST-1/2 enclosure.	ENGR: Balliet Gutherman	~~4/5/95~~ ~~6/01/95~~ ~~6/15/95~~ ~~6/30/95~~ ~~8/28/95~~ COMPLETE	~~I91-0012 Rev.01 in progress. Delayed due to new environmental concerns addressed by Problem Report 95-0073~~ ~~Extension request NED95-0369~~ Reference: Instrument Accuracy Calc. I91-0012, Rev.1 and Calc M95-0016, Rev. 0 .	PR95-0026 item 8 and PR95-0073
3d	Determine lowest allowable BWST level that will permit running only HPI pumps assuming separate suction flow paths (ie MUV-58/73 are open). This will allow for additional transfer of water to the RB sump and allow additional time to terminate HPI flow rather than going to piggyback operation. Evaluate adding guidance to EOP's to allow continued suction for the HPI pumps from the BWST even after the LPI pumps are transferred to the sump. Consider min. flow requirements for DHP's.	ENGR: Gutherman Operations Becker	~~6/30/95~~ COMPLETE	~~This is a new item from Item 2g.~~ Min. Level in BWST with only HPI pumps taking suction is 2.5 feet <u>plus</u> instrument error. Ref. calc. M95-0005,rev1 Guidance will be added to EOP's during comprehensive revision process.	
3e	Evaluate requirement in EOP-06 step 3.32 to isolate faulted OTSG at 27.5' in BWST (TRACC Limit) in light of BWST vortexing concerns and minimum RB Sump Level requirements. Results of this evaluation will determine need to revise EOP-06.	ENGR: Gutherman Licensing: Fleming	~~7/31/95~~ ~~8/15/95~~ COMPLETE	~~NEW ITEM~~ Existing TRACC limit will not provide adequate RB flood level to permit isolation of two faulted OTSG's and HPI/PORV cooling in piggyback mode. This was a result of increasing BWST transfer to 15'. ~~Engr. Calc needs final verification.~~ SEE NEW ITEM 3F below. Reference Calc : M89-1023, Rev.02 dtd 9/8/95	

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MAKEUP TANK AND BWST/RB SUMP LEVEL ISSUES ACTION PLAN AS OF: March 26, 1996

ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROBLEM REPORT CAP ITEM
3f	NEW ITEM added 8/18/95: Revise EOP-06 to raise TRACC limit based on BWST level. ~~Preliminary~~ Engr. Calc M89-1023, Rev.02 indicate 35' level is adequate. Perform simulator validation using new criteria.	Operations: EOP Group/ Becker	~~T.B.S.~~ ~~11/1/95~~ COMPLETE	Precursor Card # 95-1943 written on this item. EOP-06 will be revised to raise TRACC limit. ~~after final Engr. Calc. is issued and new level is simulator validated.~~ New TRACC limit is 35'. Interim Procedure revision IC-01 issued 10/23/95.	P/C 95-1943
4	Revise Emergency Operating Procedures (EOP-7 and 8) to reflect latest swap over point analysis.	Operation: Bremer	COMPLETE	EOP-07 Rev. 2 EOP-08 Rev. 3 issued 02/03/95 Engr.Letter NED95-0066 and 0071	PR95-0025 Item 3
5	Revise Calculation M94-0053 ("Allowable MUT-1 Indicated Overpressure vs. Indicated Level") to reflect 15' start and 7' completion swap over points for BWST transfer to RB Sump.	ENGR: Balliet Clauson	~~5/31/95~~ ~~6/16/95~~ COMPLETE	~~STI 95-0028 remains in place to operate 7 psig to 11 psig below design curve until revised calcs are issued and alarms are established.~~ ~~Previous 5'S/O curve still valid based on revised EOP-08 using 15' Initial starting point.~~ ~~Rev.02 calculation is in progress. This rev should incorporate comments from IOC OP95-0039. Preliminary Calc issued for comments 4/5/95.~~ ~~Meeting was held on 6/5/95 with Ops/ Engr/ Licensing to review Rev.2 prior to issue. Comments being incorporated.~~ Rev. 2 of Calc issued 6/15/95.	PR94-0267 Item 1
6	Validate all assumptions used to calculate Makeup Tank curve.	Operations Becker	~~3/15/95~~ COMPLETE	IOC OP95-0039 Becker to Halnon dtd 3/24/95 issued with comments to Engr. Additional comments provided at 6/5/95 mtg with Engr.	PR95-0025 Item 5
7	Issue MAR 95-01-07-02 (including Field Work Packages) to raise the MUT-1 high level alarm to 100 inches, revise the pressure/level alarm curve and install a new low-end pressure/level curve to address tank vacuum.	ENGR: Balliet Murtagh	~~5/26/95~~ ~~6/30/95~~ ~~8/31/95~~ COMPLETE	Ops ~~to provide~~ has provided operating band. Refer to IOC OP95-0074 dtd 6/27/95. NED 95-0036 Item I ~~Delayed due to changes in MUT Calcs (item 5 above).~~ MAR issued 8/7/95	PR94-267 Item 4a

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MAKEUP TANK AND BWST/RB SUMP LEVEL ISSUES ACTION PLAN AS OF: March 26, 1996

ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROB'EM REPORT CAP ITEM
8	Install the MAR 95-01-07-02 from item 7 above.	Projects: Lancaster/ Don Porter	~~8/01/95~~ ~~9/30/95~~ COMPLETE	NED 95-0036 Item 2 ~~Delayed due to item 7.~~ ~~MAR pending PRC approval on 8/22/95.~~ ~~MAR was approved by PRC, awaiting installation.~~ MAR installed and turned over to OPS 10/5/95.	PR94-267 Item 4b
9	Process revision to OP-103b, curve 8a and 8b to include operating region and alarm values, based on MAR from item 7.	Operations Becker/ Metcalf	~~8/01/95~~ ~~9/30/95~~ COMPLETE	~~Delayed due to item 7 and 8. OP-103b revision in progress. Also revisions to OP-402, AR-403.~~ Procedures revised 10/5/95	
10	Evaluate the effects of higher MUT pressures on the ability to operate PASS as an on-line system for Boron and Hydrogen analysis	ENGR: Balliet Uhrinek Ezell	~~9/30/95~~ COMPLETE	(Ref. REA-95-0013) Higher MUT pressures not expected to interfere with on-line analysis capabilities. Refer to CC mail Ezell/Becker dtd.8/10/95.	
11	<u>Issue MARs</u> (including Field Work Packages) to implement balance of task force recommendations as part of the long term fix:	ENGR:			
	a) Install chain wheel operator on MUV-64.(MAR 95-01-07-01)	Gutherman	~~8/1/95~~ ~~8/15/95~~ COMPLETE	NED 95-0036 Item 5 MAR /FWP issued 8/4/95.	PR94-0267 ITEM 4e
	b) Install a new, manual isolation valve in the hydrogen line in the turbine building. (MAR 95-01-07-03)	Gutherman	~~6/1/95~~ COMPLETE	NED 95-0036 Item 6 . MAR and Work packages issued.	PR94-0267 Item 4f
	c) Restore MUV-64 position indication on the main control board. (MAR 95-01-07-04)	Balliet	~~8/15/95~~ ~~9/30/95~~ COMPLETE	NED 95-0036 Item 7 MAR Field Package issued 9/25/95.	PR94-0267 Item 4g
12	<u>Install the MARs</u> issued in item 11 above during Refuel 10.	Projects: Lancaster/ Porter	~~6/1/96~~ ~~4/18/96~~ (REFUEL 10)	NED 95-0036 item 8	PR94-0267 Item 4h
13	Revise appropriate EOP's and AP's to take advantage of modifications from item 12 above and to reflect finalized analysis.	Operations Becker	~~6/1/96~~ ~~4/18/96~~ (REFUEL 10)	EOP's will not be revised as a result of these modifications. AP-880 will be revised to close new hydrogen isolation valve in the event of a fire. OP-414 may also require a revision.	Refer to CC ~~mail to~~ G.Hebb dtd 2/22/96

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MAKEUP TANK AND BWST/RB SUMP LEVEL ISSUES ACTION PLAN AS OF: March 26, 1996

ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROBLEM REPORT CAP ITEM
14	Notify B&W of new BWST swap over level so that it can be implemented into the future Reload reports.	Fuels Mgmt: O'Shea	~~8/31/95~~ COMPLETE	Reference CC mail O'Shea to Becker dtd 9/12/95. Reload report not affected by swapover change.	
15	Submit changes to Licensing and Configuration Management to update the FSAR / DBD / ABD to capture appropriate items from all the above.	ENGR: ~~Gutherman~~ ~~Livingston~~ Austin Campbell	~~7/15/95~~ ~~8/28/95~~ ~~1/30/96~~ 9/8/96	Extension request NED95-0369 and NED95-0549.	PR95-0031 Item 3
16	Establish the minimum cc/kg hydrogen limit for the RCS	ChemRad: Johnson	~~TBD~~ COMPLETE	Lower limit is 20cc/kg per IOC CH94-090 dtd 11/14/94 Revisit per PMB at 3/3/95 staff mtg. Closed per E-Mail from S. Johnson dtd 4/1/95. ~~Interim limit is currently 20cc/kg.~~	PR94-0267 Item 3
17	Evaluate REA 94-0747 regarding SP-630 to install vents and drains upstream of MUV-58 and 73.	ENGR: Gutherman	~~4/1/95~~ COMPLETE	PMRG has approved REA. MAR 95-02-17-01 to be issued. See below	PR94-0149 Item 9
18	Develop MAR 95-02-17-01 (including Field Work Packages) to install vents and drains per Item 17 above.	ENRG: Gutherman	~~9/30/95~~ COMPLETE	~~In progress~~ MAR issued 6/8/95. FWP's ~~under development~~ issued.	PR94-0149 Item 10
19	Install MAR 95-02-17-01 from Item 18 above.	Projects: Lancaster	~~6/1/96~~ ~~4/18/96~~ (REFUEL 10)	OP-402 will require a revision to include these new valves. Refer to CC mail sent to G.Hebb 2/22/96	PR94-0149 Item 11
20a	Evaluate adequacy of BWST high and low level alarms based on EOP swap over points of 15' start and 7 'completion, and ITS volume requirements. ~~Include results in MAR for item 7 above.~~	ENGR: Balliet	~~5/18/95~~ ~~7/1/95~~ COMPLETE	Refer to Item 3c also. Delayed due to PR95-0073 regarding BST-1/2 enclosure temps. Mtg between OPs and Engr. on 5/9/95 decided on low alarm at 15' and low low alarm at 7'.	
20b	~~Issue MAR (including Field Work Packages) to change alarm setpoint per item 20a above. Also change RB Water Level Alarm Setpoint in accordance with Calc M95-0016, Rev. 0.~~ Issue calculations, revise calibration data sheets and generate Work Requests to change the BWST level alarms to 15' and 7' and to change the RB water level alarm setpoint per calc M95-0016,rev.0.	ENGR. Balliet	~~9/1/95~~ ~~11/1/95~~ COMPLETE	~~Separate MAR will be issued (not to be included with MUT alarm MAR).~~ Reference: IOC Becker to Balliet, dtd 9/12/95, OP95-0092. Calc. I91-0012, Rev.2 issued 10/30/95, and I88-0011,Rev.08 issued 10/30/95	

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MAKEUP TANK AND BWST/RB SUMP LEVEL ISSUES ACTION PLAN AS OF: March 26, 1996

ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROBLEM REPORT CAP ITEM
20c	~~Install MAR from item 20 b above~~ Recalibrate BWST alarms from 20b via work request 331861.	Projects: Lancaster	~~T.B.S~~ ~~12/1/95~~ ~~01/01/96~~ COMPLETE	MAR process will not be used to change these setpoints. Work request 331861 generated by engineering will implement changes to level alarms. ~~Annunciator Response Procedure AR 303 also needs to be revised.(M.Winship)~~ Alarms changed , AR303 revised,and OSB 9512.04 issued on 12/7/95	
20d	Recalibrate RB water level alarms via SP-175.(note: this item was previously part of item 20c but separated due to different completion dates.)	Projects: Lancaster	Refuel 10	SP-175 revision in progress. RB entry required for calibration. Annunciator Response procedure revisions also required. (AR-303 Event pt 1510, C-02-11 , ref. IOC to G.Hebb 2/22/96 ,OP96-0010)	
21	Generate REA to request an evaluation to upgrade the MUT/BWST/RB Flood Level MCB instrumentation to provide improved readability.	Operations Becker	~~5/15/95~~ COMPLETE	REA 95-0455 generated 4/28/95 requesting digital indication.	
22	Clarify ITS B3.5.4 based on BWST volume requirements (both minimum and maximum) considering "useable" volume resulting from the vortexing issue.	Licensing: Gutherman	~~12/31/95~~ COMPLETE	Reference E-Mail Gutherman to Becker dtd 2/14/95 . No change to the TS bases required per CC Mail Tunstill to Becker dtd 12/19/95.	
23	Evaluate the requirement to terminate HPI after 20 minutes of LPI flow of 1000 gallons/min to each line to allow termination sooner.	Licensing: Fleming Operations Becker	~~9/30/96~~ DELETED from plan	This item was deleted from this plan. It is not directly related to the BWST/MUT issue. It is being addressed by the Operations Support Committee of the B&WOG.	
24	Rerun SP-630 under worst case accident simulated conditions during Refuel 10.	Systems Engr. Saltsman	~~6/1/96~~ 4/18/96	Refer to CC mail sent to P.Saltsman 3/4/96	PR94-0149 ITEM 12
25	Evaluate and develop a test to lower MUT level from 86 in. to 55 in. to trend pressure reduction and validate assumptions used to generate overpressure curve. Test should minimize instrument error and isolate MUP recirc. flow to simulate accident configuration.	Operations Becker Licensing Fleming	~~4/30/95~~ ~~COMPLETE~~ ~~ON HOLD~~ COMPLETE	Item 24 should be adequate. No justification to run a test on-line exists. Adequate margin away from "design limit" will ensure safe operation. PRC Member requested this issue be revisited. Meeting between Plant Management /OPS Management and PRC Member required for resolution. Meeting on 6/29/95 w/ R.Davis & G.Halnon concluded NO on line test will be performed.	

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ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROBLEM REPORT CAP ITEM
26	Resolve Emergency Boration steps in EOP-02 due to high MUT overpressure that would preclude BWST water from entering RCS when MUV-73 was initially opened. ~~Also generate Emergency Boration AP.~~ Emergency Boration AP-490 (new) not part of this issue.	Operations ~~Weiss~~ Bremer A-Shift	~~10/31/95~~ ~~8/1/95~~ ~~8/30/95~~ COMPLETE	~~Emergency Boration AP-490 (new) has been drafted and out for review.~~ EOP-02, Rev.03 issued 9/15/95.	PR94-0267 item 4c.
27	Determine if it is acceptable to vent the MUT periodically, to remove non-condensables in light of the requirement to maintain a minimum MUT overpressure.	Operations Becker	~~8/1/95~~ COMPLETE	~~NEW ITEM~~ Minimum MUT overpressure requirement ~~will be~~ has been lifted (STI95-0042). Venting MUT will not be an issue. ~~Awaiting Calc info from Engr.~~ Reference Calc M95-0001 issued 1/20/95.	
28	Resolve H2 regulator setpoint issue. Current setpoint will require operator action in much less than 8 hours based on assumptions used in Calc. M94-0053, Rev.2 This calc. considers vortexing in the MUT. Hydrogen regulator is manually isolated and requires dedicated operator to "charge" MUT.	Engineering: Maseda	~~Pending based on CAP from Problem Report 95-0122~~ ~~01/01/96~~ COMPLETE	Precursor Card written 6/29/95. Problem Report 95-0122 issued 7/7/95 documents concern. ~~Corrective action plan not yet developed.~~ ~~Interim actions require manual isolztion valves MUV-492 & 493 to be closed and Blue Tagged to the SSOD.~~ Refer to OSB# 9507.02 and STI 95-0040. Hydrogen regulator isolation valve is maintained closed per revision to OP-402 issued 10/95. ~~CAP item 2 to develop long term resolution due 1/1/96.~~ Refer to IOC OP95-0133 dtd 12/19/95 for resolution. See new items 28a and b below.	PR95-0122 CAP Item 2
28a	Issue MAR to lower hydrogen regulator setpoint (MAR 96-02-15-01).	Engineering: Maseda / Shook	3 weeks after issue of revised calc. M94-0053, rev.03 refer to item 29	Refer to IOC OP95-0133 for basis of this item. Refer to Engineering ioc NED95-0763. OPs reviewed and signed MAR on 3/14/96.	PR95-0122 CAP Item 3
28b	Lower hydrogen regulator setpoint per MAR from item 28a above.	Projects: Lancaster	~~TBE (tied to item 28a issue date)~~ Refuel 10	Refer to IOC OP95-0133.	PR95-0122 CAP Item 4

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MAKEUP TANK AND BWST/RB SUMP LEVEL ISSUES ACTION PLAN AS OF: March 26, 1996

ITEM	ACTION	ASSIGNED TO:	DUE DATE/ STATUS	REFERENCE	PROBLEM REPORT CAP ITEM
29	Revise and issue calc. M94-0053 (rev.03) to incorporate new K factors and input from MPR. Perform a computerized analysis (possibly RELAP) of the MUT piping and tank to ensure the existing "hand "calculation (M94-0053, Rev.2) is conservative and adequate . Model should use field verified inputs for piping and tank dimensions,etc.	Engineering: Maseda/ Shook	~~02/01/96~~ ~~03/11/96 for calc revision~~ COMPLETE (Rev 3 issued) 04/1/96 for computer model	This is a new item added as a result of questions generated by the NRC review of the subject calculation and Problem Report 95-0232 . Rev 3 issued on 3/12/96. Ops provided comments on IOC OP96-0024.	PR95-0232 CAP # 2-8 Note: computer model is not part of CAP for problem report.
30	Re-evaluate installation of a motor operator on MUV-64 to ensure a positive means of preventing hydrogen entrainment in MUP's. This was added at the request of the MUT Issue Sponsor (P.R. Tanguay).	Operations: Becker	~~12/29/95~~ COMPLETE	~~A meeting will be arranged between Operations/ Engineering/Licencing to revisit the original KT analysis which resulted in the decision to install a chain wheel operator on MUV-64.~~ Meeting held 12/8/95. Refer to IOC OP95-0133 for resolution. Chain wheel will continue to be recommended over a remote operator.	
31	Prepare for NRC Inspection on MUT related issues. NRC visit currently set for week of January 8, 1996	Operations: Becker Engineering: Tanguay Licensing: Gutherman Training: Lind	~~01/08/96~~ COMPLETE	Identify scope of inspection and develop required FPC interfaces and supporting documentation. NRC visited December 11 through December 15,1995. Follow up items will not be included in this action plan unless requested.	

CHANGES FROM PREVIOUS STATUS:

NEW ITEMS ADDED = 0
ITEMS CLOSED = 0
ITEMS EXTENDED = 0

REMAINING OPEN ITEMS = 9
COMPLETED ITEMS = 42
TOTAL ALL ITEMS = 51

% COMPLETE = 82% (No change)

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