May 23, 1997

MEMORANDUM TO: Marylee M. Slosson, Acting Director
Division of Reactor Program Management

FROM: Alfred E. Chaffee, Chief |original signed by†
Events Assessment and
Generic Communications Branch
Division of Reactor Program Management

SUBJECT: OPERATING REACTORS EVENTS BRIEFING
MAY 21, 1997 - BRIEFING 97-05

On May 21, 1997, we conducted an Operating Reactors Events Briefing (97-05) to inform senior managers from offices of the Commission, EDO, AEOD, NRR and regional offices of selected events that occurred since our last briefing on May 7, 1997. Attachment 1 lists the attendees. Attachment 2 presents the significant elements of the discussed events.

Attachment 3 contains reactor scram statistics for the weeks ending May 11, and May 18, 1997. No significant events were identified for input into the NRC Performance Indicator Program.

The statements contained in the attached briefing slides represent the best information currently available to the NRC. Future followup could produce new information that may alter the NRC's current view of the events discussed.

Attachments: As stated (3)

cc w/atts:
See next page

CONTACT: Kathy Gray, NRR
(301) 415-1166

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DATE	05/21/97		05/22/97		05/22/96		05/23/97	

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cc:

S. Collins, NRR (O-12G18)
F. Miraglia, NRR (O-12G18)
F. Gillespie, NRR (O-12G18)
R. Zimmerman, NRR (O-12G18)
T. Martin, NRR (O-12G18)
B. Sheron, NRR (O-12G18)
S. Varga, NRR (O-14E4)
J. Zwolinski, NRR (O-14H3)
J. Roe, NRR (O-13E4)
E. Adensam, NRR (O-13E4)
G. Lainas, NRR (O-7D26)
G. Holahan, NRR (O-8E2)
D. O'Neal, NRR (O-10E4)
B. Boger, NRR (O-9E4)
M. Markley, ACRS (T-2E26)
D. Ross, AEOC (T-4D18)
C. Rossi, AEOD (T-4A9)
F. Congel, AEOD (T-4D28)
R. Barrett, AEOD (T-4A43)
S. Rubin, AEOD (T-4D28)
M. Harper, AEOD (T-4A9)
W. Leschek, AEOD (T-4A9)
V. McCree, EDO (O-17G21)
J. Gilliland, PA (O-2G4)
D. Morrison, RES (T-10F12)
W. Hill, SECY (O-16G15)
H. Miller, Region I
C. Hehl, Region I
L. Reyes, Region II
J. Johnson, Region II
S. Vias, Region II
A. Beach, Region III
G. Grant, Region III
E. Mershoff, Region IV
P. Gwynn, Region IV
K. Perkins, Region IV/WCFO
G. Fader, INPO
J. Zimmer, DOE
D. LaBarge, NRR (O14H25)
H. Berkow, NRR (O14H25)

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

May 23, 1997

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FROM: Alfred E. Chaffee, Chief
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MAY 21, 1997 - BRIEFING 97-05

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See next page

CONTACT: Kathy Gray, NRR
(301) 415-1166

LIST OF ATTENDEES

OPERATING REACTORS EVENTS FULL BRIEFING (97-05)

MAY 21, 1997

NAME	OFFICE	NAME	OFFICE
E. Goodwin	NRR	G. Tracy	EDO
N. Fields	NRR	J. Beall	OCM/EM
K. Gray	NRR	T. Hsia	OCM/NJD
T. Martin	NRR	C. Hsu	AEOD
D. O'Neal	NRR	D. LaBarge	NRR
S. Collins	NRR	M. Hartzman	NRR
I. Ahmed	NRR	D. Coe	NRR
D. Taylor	NRR	S. Weiss	NRR
J. Thompson	NRR	J. Lyons	NRR
K. Manoly	NRR	R. Wessman	NRR
D. Desaulniers	NRR	H. Berkow	NRR

TELEPHONE ATTENDANCE
(AT ROLL CALL)

Regions
Region I
Region II
Region III
Region IV

Resident Inspectors
K. Kennedy, Arkansas
M. Scott, Oconee

Misc.
E. Girard, Region II
W. Holland, Region I

ATTACHMENT 1

OPERATING REACTORS EVENTS BRIEFING 97-05

LOCATION: O-10B11, WHITE FLINT
WEDNESDAY, MAY 21, 1997, 11:00 A.M.

OCONEE, UNIT 2	UNISOLABLE PRESSURE BOUNDARY LEAK
OCONEE, UNIT 3	FAILURE OF NON-SAFETY LEVEL INSTRUMENTATION RESULTS IN INOPERABLE HIGH PRESSURE INJECTION PUMPS (AIT)

PRESENTED BY:

Attachment 2

EVENTS ASSESSMENT AND GENERIC COMMUNICATIONS BRANCH
DIVISION OF REACTOR PROGRAM MANAGEMENT, NRR

OCONEE, UNIT 2
UNISOLABLE PRESSURE BOUNDARY LEAK
APRIL 22, 1997

PROBLEM

CRACK IN MAKEUP/HIGH PRESSURE INJECTION LINE (MU/HPI) RESULTED IN UNISOLABLE PRESSURE BOUNDARY LEAK.

CAUSE

PROBABLY HIGH CYCLE LOW STRESS THERMAL FATIGUE WITH FLOW INDUCED VIBRATION AS CONTRIBUTOR.

SAFETY SIGNIFICANCE

UNISOLABLE PRESSURE BOUNDARY LEAKAGE IS A PRECURSOR TO A LOSS-OF-COOLANT ACCIDENT.

DESCRIPTION OF EVENT

- OCONEE UNIT 2 WAS TAKEN OFF LINE DUE TO UNIDENTIFIED REACTOR COOLANT SYSTEM (RCS) LEAKAGE EXCEEDING 1 GPM.

- LEAKAGE WENT FROM APPROXIMATELY 2 GPM TO A PEAK OF 12 GPM.

CONTACT: EDWARD GIRARD, REGION II
NICK FIELDS, NRR/DRPM/PECB

AIT: NO

REFERENCE: 10 CFR 50.72 #32194
PNO-II-97-023

SIGEVENT: YES

- A CONTAINMENT ENTRY IDENTIFIED SOURCE OF LEAKAGE TO BE IN THE AREA OF THE HPI LINE ASSOCIATED WITH REACTOR COOLANT LOOP 2A1. (FIGURE 1)

- NOTIFICATION OF UNUSUAL EVENT (NOUE) DECLARED AT 4:00PM AND EXITED AT 8:32PM ON APRIL 22, 1997.

- SUBSEQUENT CONTAINMENT ENTRY REVEALED AN UNISOLABLE RCS LEAK FROM CIRCUMFERENTIAL CRACK IN THE PIPE-TO-SAFE END WELD UPSTREAM OF THE 2A1 REACTOR COOLANT LOOP HPI NOZZLE.

DISCUSSION

- PRELIMINARY EXAMINATION AFTER REMOVAL OF CRACKED WELD AND ASSOCIATED PIPING REVEALED THAT THE THERMAL SLEEVE LOCATED IN THE NOZZLE AND SAFE-END WAS LOOSE AND CRACKED WITH PORTIONS MISSING.

- PENETRANT EXAMS IDENTIFIED THERMALLY INDUCED CRACKS IN THE SAFE-END AND ATTACHED PIPE. LABORATORY ANALYSIS INDICATED THAT HIGH CYCLE LOW STRESS THERMAL FATIGUE CAUSED THE CRACKS.

- THE THERMAL SLEEVE HAD BEEN ORIGINALLY ROLL EXPANDED TO PROVIDE A TIGHT FIT INTO THE SAFE-END. A GAP (LOSS OF CONTACT) BETWEEN THE SAFE-END AND THE ROLL EXPANDED AREA OF THE NOZZLE THERMAL SLEEVE (ORIGINAL EQUIPMENT) EXISTED AND IS THOUGHT TO HAVE BEEN ASSOCIATED WITH THIS FAILURE. (FIGURE 2)

- LICENSEE RE-REVIEW OF RADIOGRAPHS (RT) MADE IN APRIL 1996 OF THE 2A1 SAFE-END REVEALED THE GROWING GAP BETWEEN THE THERMAL SLEEVE AND SAFE-END. THE LICENSEE'S ORIGINAL EVALUATION HAD FAILED TO RECOGNIZE THAT THIS CONDITION WAS UNSATISFACTORY.

- THE LICENSEE REVIEWED 1996 RADIOGRAPHS OF THE UNIT 3 3A1 SAFE-END AND FOUND A COMPLETE GAP IN THE ROLLED AREA OF THE THERMAL SLEEVE. UNIT 3 WAS SHUT DOWN ON MAY 2, 1997.

- ULTRASONIC (UT) EXAMS IDENTIFIED APPARENT CRACKING IN THE UNIT 3, 3A1 SAFE-END. VISUAL EXAM AFTER REMOVAL REVEALED CRACKS IN THERMAL SLEEVE. THE SAFE-END WAS REMOVED AND IS NOW BEING EXAMINED AT A MET LAB.

- UT EXAMS ON OTHER UNIT 2 AND 3 HPI NOZZLE ASSEMBLIES FOUND NO CRACKING. RADIOGRAPHS REVEALED NO COMPLETE OR DEVELOPING GAPS.

- BECAUSE OF DUAL THERMAL SLEEVE DESIGN, UNIT 1 IS THOUGHT NOT TO BE AS SUSCEPTIBLE TO SIMILAR CRACKING.

HISTORICAL:

- JANUARY 24, 1982 - CRYSTAL RIVER DEVELOPED A LEAK IN A HPI LINE CHECK VALVE-TO-SAFE END WELD.

- INFORMATION NOTICE 82-05 ISSUED DESCRIBING THE CRYSTAL RIVER LEAK AND THE FINDING THAT HPI NOZZLES AT OCONEE UNITS 2 AND 3 ALSO CONTAINED CRACKS.

- GENERIC ISSUE 69, "MAKE-UP NOZZLE CRACKING IN B&W PLANTS" LED TO ACTION ON THE PART OF THE BABCOCK & WILCOX (B&W) OWNERS GROUP.

- B&W OWNERS GROUP SAFE-END TASK FORCE REPORT ON THEIR GENERIC INVESTIGATION OF MU/HPI NOZZLE COMPONENT CRACKING AND RECOMMENDATIONS FOR MODIFICATION TO DESIGN, OPERATION, AND INSPECTION.

- BY LETTER DATED FEBRUARY 15, 1983, LICENSEE INFORMED NRC OF ITS AGREEMENT WITH THE RECOMMENDATIONS OF THE B&W OWNERS GROUP (FOR AUGMENTED INSPECTION OF HPI PIPING). THE LICENSEE STATED THAT, WHILE THE RECOMMENDATIONS DID NOT APPLY TO UNIT 1, A SIMILAR PROGRAM HAD BEEN DEVELOPED FOR UNIT 1.

- IN 1983/84, LICENSEE INITIATED AUGMENTED INSPECTIONS BUT THE PROGRAM WAS DEFICIENT: NO ACCEPTANCE CRITERIA FOR GAPS; NO UT OF SAFE-END/PIPING WELD OR ADJACENT PIPING; UT THAT WERE PERFORMED MAY NOT HAVE BEEN OF NECESSARY SENSITIVITY.

- GENERIC LETTER 85-20, "RESOLUTION OF GENERIC ISSUE 69: HIGH PRESSURE INJECTION/MAKEUP NOZZLE CRACKING IN BABCOCK AND WILCOX PLANTS" ISSUED NOVEMBER 11, 1985, AGREED THAT TASK FORCE RECOMMENDATIONS SUFFICIENT TO PRECLUDE FUTURE NOZZLE CRACKING.

FOLLOWUP

- THE LICENSEE FORMED A FAILURE INVESTIGATION TEAM.

- LICENSEE'S IDENTIFIED ROOT CAUSE TO BE INEFFECTIVE EXAMINATION PROGRAM FOR HPI LINES:
  - INADEQUATE EXAMINATION PROCEDURES
  - UNCLEAR ACCEPTANCE CRITERIA
  - INADEQUATE CONTROL OF AUGMENTED INSPECTION COMMITMENTS BY THE ISI PROGRAM

- LICENSEE REPLACED FAILED PIPE, SAFE END, AND THERMAL SLEEVE ON UNIT 2 AND REPLACED DAMAGED SAFE END AND THERMAL SLEEVE ON UNIT 3.

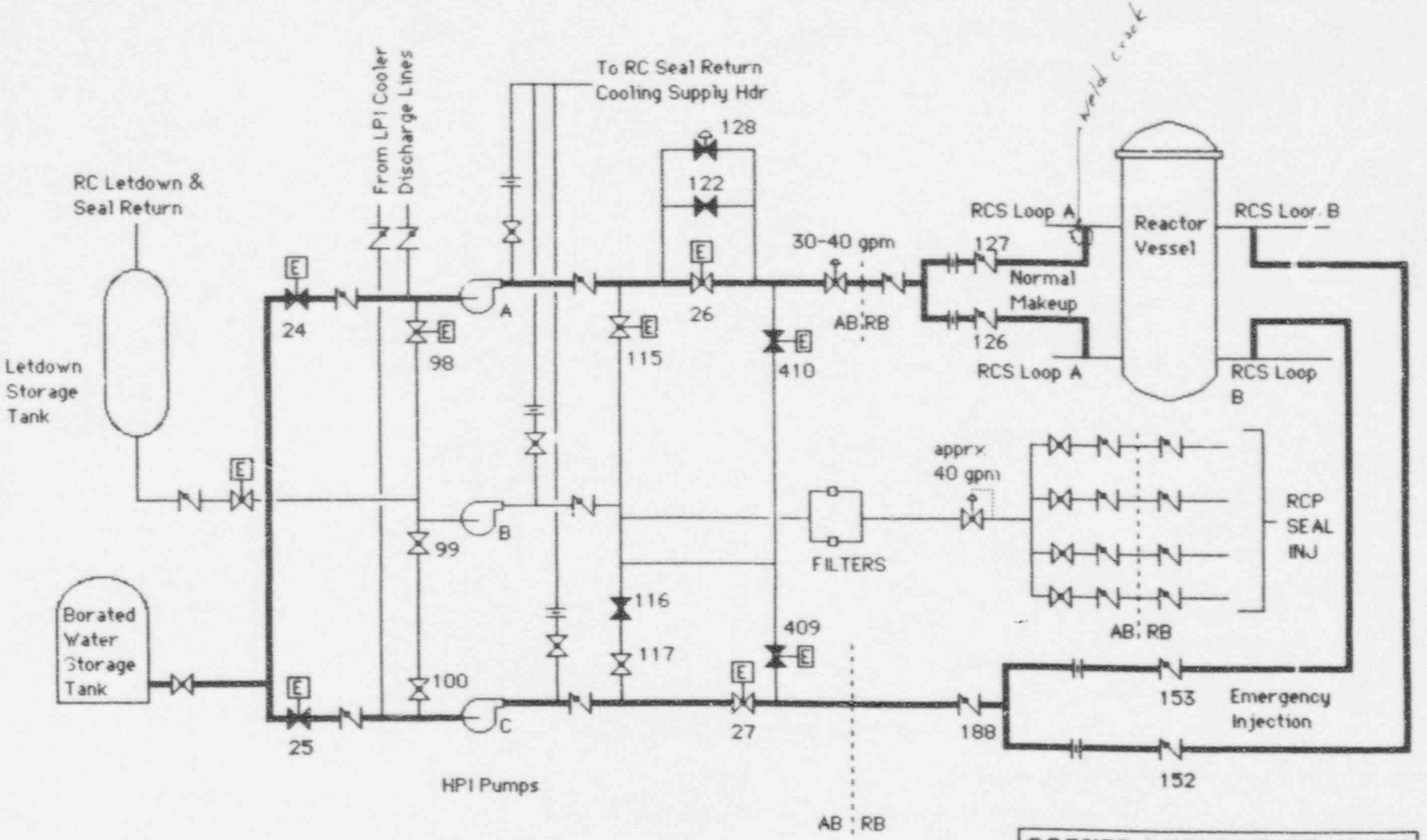
- NRC SPECIAL INSPECTION TEAM FINDINGS:
  - THE LICENSEE'S INVESTIGATION WAS THOROUGH AND THEIR INVESTIGATION WAS WELL-PERFORMED
  - THE INSPECTION TEAM GENERALLY AGREED WITH THE LICENSEE'S CAUSE DETERMINATIONS
  - THE LICENSEE'S REPAIRS OF UNIT 2 AND UNIT 3 WERE ADEQUATE, BUT UT AND RT PROCEDURES CONTINUE TO BE WEAK.

- ENFORCEMENT ACTION BEING CONSIDERED
- NO RECENT UT OF UNIT 1 NOZZLE ASSEMBLIES. RE-REVIEW OF PAST RT REVEALED NO ANOMALIES. NO RT OF UNIT 1 SINCE 1989, BUT UNIT NOZZLE DESIGN APPEARS LESS SUSCEPTIBLE TO CRACKING

- INFORMATION NOTICE BEING PREPARED.

- GENERIC ASPECTS OF EVENT EXPLORED BY NRR STAFF AND B&W OWNERS GROUP.

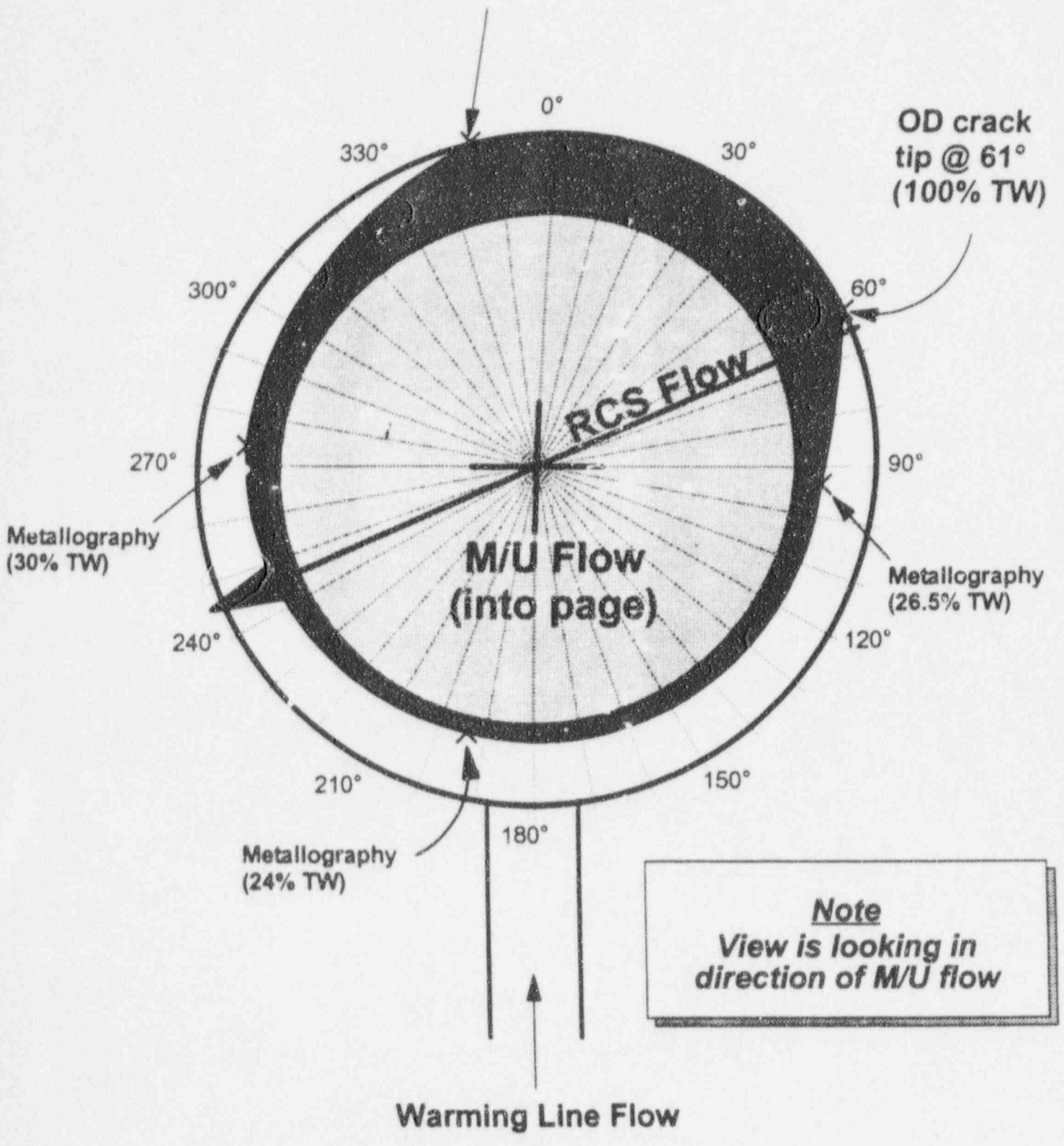
Oconee, Unit 2
Brief 97-05
Figure 1

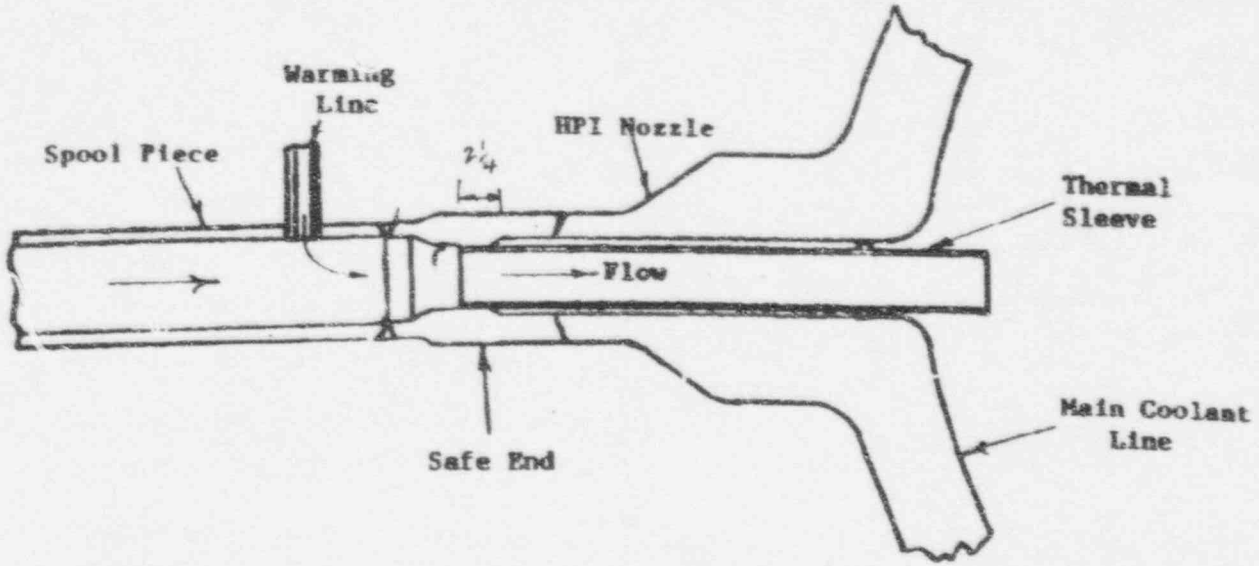


OCONEE NUCLEAR STATION
HIGH PRESSURE INJECTION SYSTEM

FSAR 6-1

Oconee, Unit 2
Brief 97-05
Figure 2





Arrangement of HPI Safe End Thermal Sleeve, Spool Piece and Warming Line

OCONEE, UNIT 3
FAILURE OF NON-SAFETY LEVEL INSTRUMENTATION RESULTS IN INOPERABLE HIGH PRESSURE INJECTION PUMPS
MAY 3, 1997

PROBLEM

TWO HIGH PRESSURE INJECTION (HPI) PUMPS DAMAGED BY LOSS OF SUCTION.

CAUSE

- SINGLE REFERENCE LEG LED TO COMMON MODE FAILURE OF LETDOWN STORAGE TANK (LDST) LEVEL INDICATION

- OPERATORS FAILED TO RECOGNIZE THAT LDST LEVEL INSTRUMENTS WERE READING INCORRECTLY

SAFETY SIGNIFICANCE

- OCONEE, UNIT 3 WAS OPERATED OUTSIDE ITS DESIGN BASIS.

- POTENTIAL FOR TOTAL FAILURE OF THE HIGH PRESSURE INJECTION SYSTEM DURING DESIGN BASIS ACCIDENTS.

DESCRIPTION OF EVENT

- OCONEE UNIT 3 SHUT DOWN TO INSPECT HPI NOZZLE ASSEMBLIES

CONTACT: WILLIAM HOLLAND, REGION II
NICK FIELDS, NRR/DRPM/PECB

AIT: YES

REFERENCE: 10 CFR 50.72 #32271
PNO-II-97-026

SIGEVENT: YES

- SEQUENCE OF EVENTS

MAY 3, 1997

0700 - COOL DOWN IN PROGRESS, 3B HPI PUMP IN MAKEUP (MU) MODE, 3A HPI PUMP IN STANDBY, REACTOR COOLING SYSTEM < 250 °F, 300 PSIG.

0745 - LDST LEVEL CONSTANT. (55.9 INCHES)

0913 - HPI PUMP DISCHARGE HEADER PRESSURE LOW ALARM.

0915 - 3A HPI PUMP AUTO STARTS. (LOW SEAL INJECTION FLOW)

0916 - OPERATOR RETURNS 3A PUMP TO AUTO AND PUMP RESTARTS

0917 - 3B HPI PUMP SECURED.

0921 - OPENED BORATED WATER STORAGE TANK (BWST) SUCTION ISOLATION VALVE HP-24.

0928 - CLOSED HP-24.

0930 - 1603 GALLONS OF WATER ADDED TO LDST.

0931 - 3A HPI PUMP SECURED.

0932 - RCS LETDOWN ISOLATED. ENTERED ABNORMAL PROCEDURE (AP) FOR LOSS OF HPI MU.

1030 - COMPLETED AP.

1104 - OSC MANNED

1110 - TSC MANNED

1124 - EOF OPERATIONAL

1504 - LICENSEE DECLARED UNUSUAL EVENT.

1515 - LDST LEVEL INSTRUMENT REFERENCE LEG FOUND EMPTY.

1547 - NRC NOTIFIED.

MAY 4, 1997

1134 - COOLDOWN RECOMMENCED USING 3C HPI PUMP FOR MU.

1943 - COOLDOWN COMPLETE.

1946 - SECURED FROM UNUSUAL EVENT.

DISCUSSION

- SYSTEM DESCRIPTION (FIGURE 1)
  - 3 HPI PUMPS, 300 GPM AT 3,100 PSIG
  - PROVIDES NORMAL MU AND SEAL INJECTION FROM LDST
  - PROVIDES EMERGENCY MU FROM BWST
  - NORMAL OPERATION IS ONE PUMP ON, ONE IN STANDBY
  - STANDBY PUMP AUTO STARTS ON LOW SEAL INJECTION FLOW OR AFTER SOME LOSS OF POWER SCENARIOS

- ALL THREE PUMPS START ON ENGINEERED SAFETY FEATURES SIGNAL
- LDST LEVEL AND PRESSURE MANUALLY CONTROLLED IN BAND (SEE FIGURE 2)
- LDST LEVEL INSTRUMENTATION IS CLASS II AND NOT RELIED ON FOR ACCIDENT MITIGATION (FIGURE 3)

- APPARENT CAUSES OF EVENT
  - DESIGN WEAKNESS IN SHARED REFERENCE LEG FOR LDST LEVEL INSTRUMENTATION COMBINED WITH LEAKING INSTRUMENT FITTING THAT RESULTED IN HPI PUMPS TAKING SUCTION ON A EMPTY TANK
  - OPERATORS FAILED TO DETECT LEVEL ANOMALIES THROUGH OTHER AVAILABLE MEANS

- LEVEL INSTRUMENTATION LAST CALIBRATED FEBRUARY 22, 1997. POTENTIAL LEAK ATTRIBUTED TO THE FOLLOWING POSSIBLE CONDITIONS: OVER-TORQUING, SCORING OF SEAT SURFACE, AND INCOMPATIBLE COMPONENTS.

- OTHER ISSUES
  - DURING SAFETY INJECTION ACTUATION, SUCTION VALVE TO BWST OPENS WHILE SUCTION VALVE ON LDST REMAINS OPEN CROSS-TIEING BOTH TANKS. ALSO THE SUCTION PIPING OF ALL THREE PUMPS ARE CROSSTIED. A 25 PSI HYDROGEN OVER PRESSURE IN LDST TO SCAVENGE OXYGEN. THE POTENTIAL EXISTS TO GAS BIND ALL PUMPS ON LOSS OF LDST LEVEL IF PRESSURE/LEVEL CURVE NOT ADHERED TO.

FOLLOWUP:

- AGENCY ENTERED MONITORING MODE.

- DAMAGED PUMPS REPLACED AND PUMP MOTORS INSPECTED.

- SEPARATE LEVEL INSTRUMENTATION REFERENCE LEG ADDED AND SECOND PRESSURE TRANSMITTER ADDED - UNIT 2 AND 3. UNIT 1 WILL BE MODIFIED AT NEXT SHUTDOWN.

- OPERATOR SIMULATOR TRAINING ON LOSS OF LDST LEVEL.

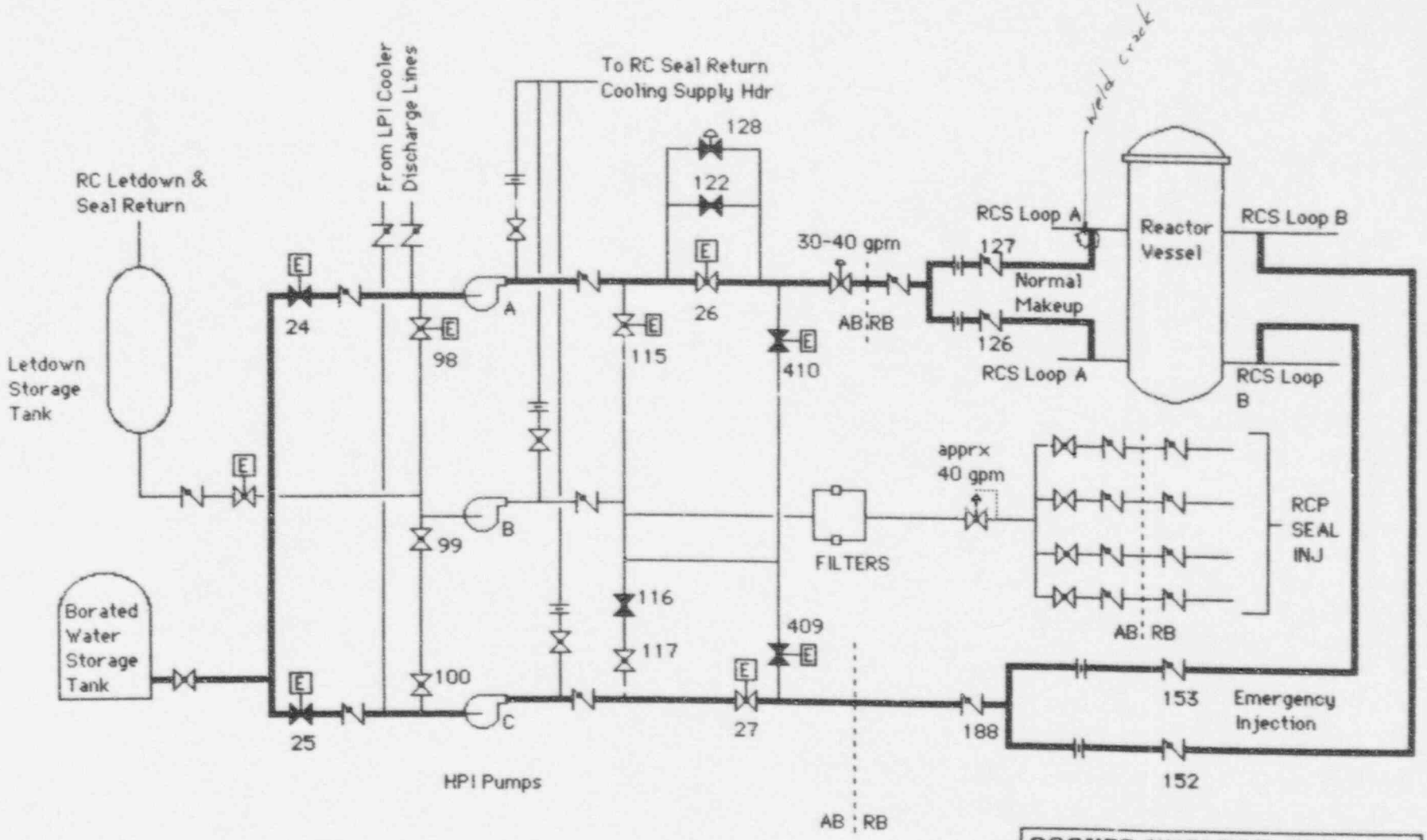
- AIT DISPATCHED TO THE SITE. EXIT MAY 9, 1997.

- B&W OWNER'S GROUP CONTACTED:
  - OTHER B&W PLANTS DO NOT OPERATE WITH COMMON HPI SUCTION
  - OTHER B&W PLANTS DO NOT HAVE COMMON REFERENCE LEG FOR LDST LEVEL INSTRUMENTS

- REGION EVALUATING LICENSEE'S DISPOSITION OF NRC AND INDUSTRY DOCUMENTATION ON OTHER EVENTS INVOLVING FAILED OR DEGRADED INSTRUMENT REFERENCE LEGS.

- JCO FOR UNIT 1 OPERATION TO JUNE 14, 1997.

- INFORMATION NOTICE IN DRAFT.



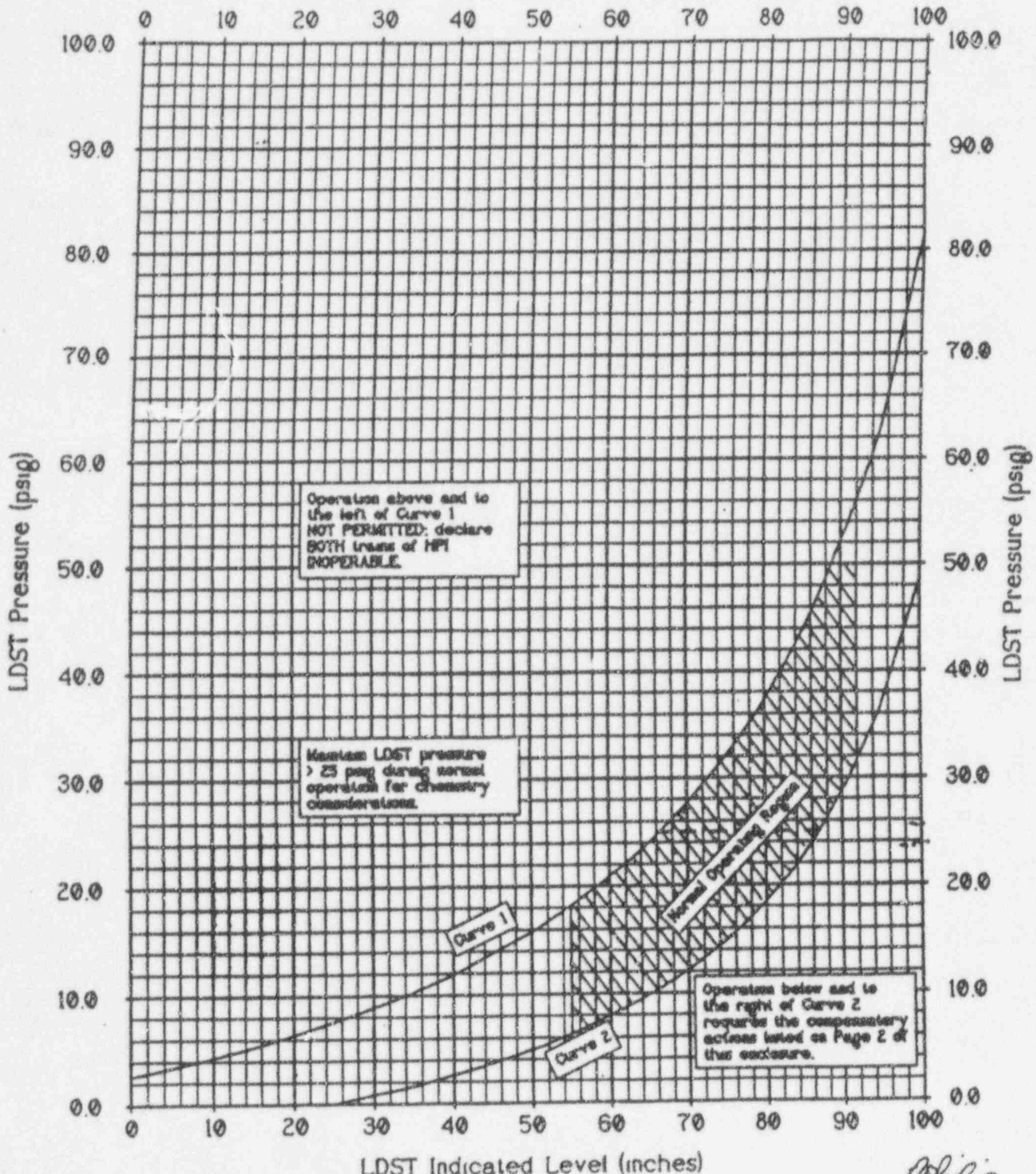
OCONEE NUCLEAR STATION
HIGH PRESSURE INJECTION SYSTEM

FSAR 6-1

Oconee, Unit 3
Brief 97-05
Figure 2

LETDOWN STORAGE TANK
Pressure vs Indicated Level

(Instrument Error Included)



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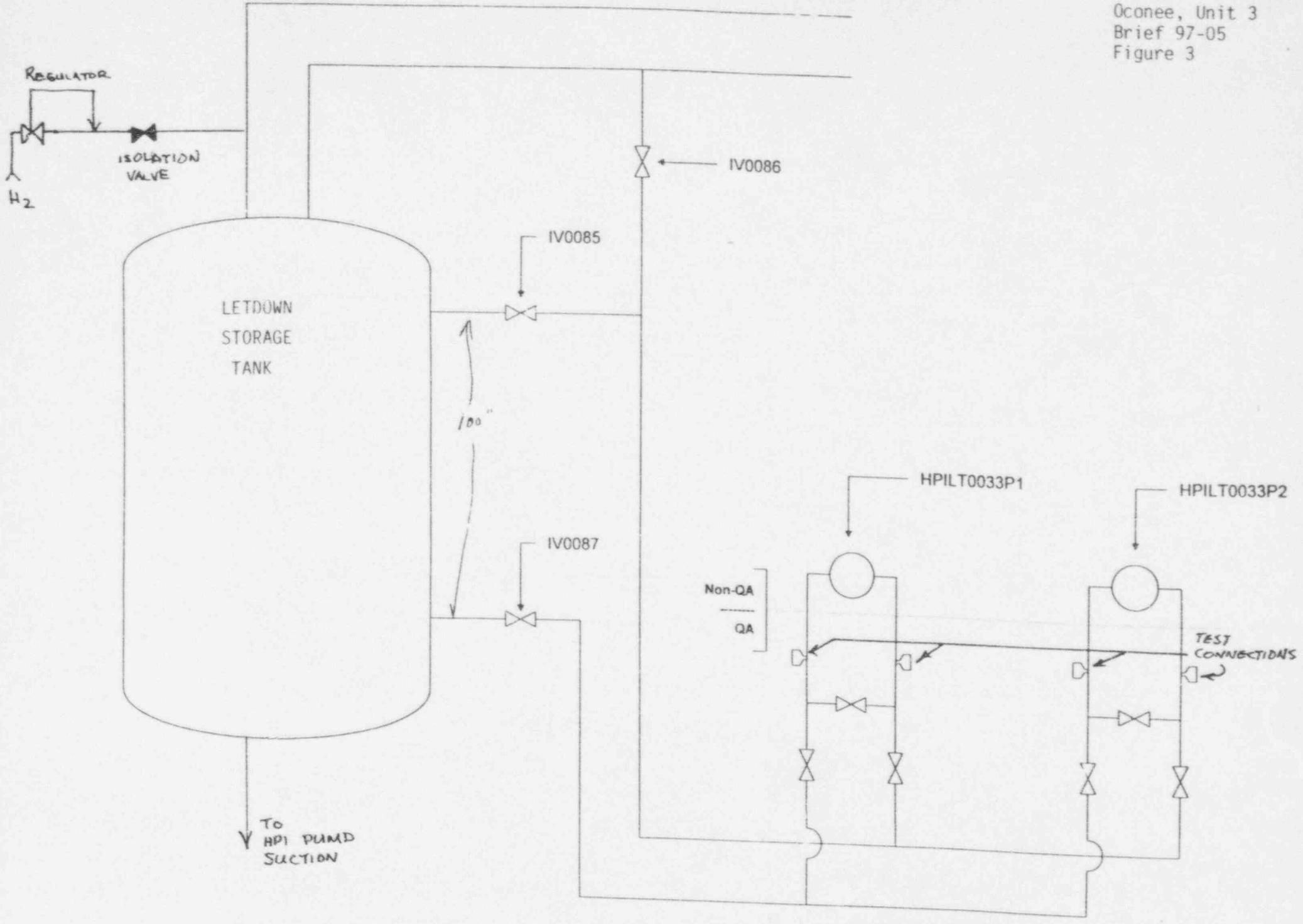
Oconee, Unit 3
Brief 97-05
Figure 3



REACTOR SCRAM

Reporting Period: 05/05/97 to 05/11/97

DATE	PLANT & UNIT	POWER	TYPE	CAUSE	COMPLICATIONS	YTD ABOVE 15%	YTD BELOW 15%	YTD TOTAL
05/06/97	RIVER BEND 1	99	SM	Maintenance Error	NO	1	0	1
05/10/97	SEABROOK 1	8	SA	Operating Error	NO	0	1	1

Attachment 3

Note: Year To Date (YTD) Totals Include Events Within The Calendar Year Indicated By The End Date Of The Specified Reporting Period

COMPARISON OF WEEKLY SCRAM STATISTICS WITH INDUSTRY AVERAGES

PERIOD ENDING
05/11/97

SCRAM CAUSE	NUMBER OF SCRAMS	1997 WEEKLY AVERAGE (YTD)	1996 WEEKLY AVERAGE	1995 WEEKLY AVERAGE	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE
POWER GREATER THAN OR EQUAL TO 15%						
EQUIPMENT FAILURE	0	0.75	1.52	1.83	1.52	1.83
DESIGN/INSTALLATION ERROR	0	0.21	0.10	0.12	0.08	0.04
OPERATING ERROR	0	0.11	0.08	0.15	0.21	0.27
MAINTENANCE ERROR	1	0.32	0.50	0.38	0.54	0.52
EXTERNAL	0	0.05	0.13	0.21	0.17	0.13
OTHER	0	0.05	0.10	0.06	-	0.02
Subtotal	1	1.49	2.43	2.75	2.52	2.81
POWER LESS THAN 15%						
EQUIPMENT FAILURE	0	0.21	0.23	0.10	0.27	0.38
DESIGN/INSTALLATION ERROR	0	0.00	-	-	0.02	-
OPERATING ERROR	1	0.05	0.10	0.13	0.08	0.13
MAINTENANCE ERROR	0	0.05	0.06	0.08	-	0.02
EXTERNAL	0	0.00	-	-	-	0.04
OTHER	0	0.00	-	-	-	-
Subtotal	1	0.31	0.39	0.31	0.37	0.57
TOTAL	2	1.80	2.82	3.06	2.89	3.38

SCRAM TYPE	NO. OF SCRAMS	1997 WEEKLY AVERAGE (YTD)	1996 WEEKLY AVERAGE	1995 WEEKLY AVERAGE	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE
TOTAL AUTOMATIC SCRAMS	1	1.12	1.71	1.92	2.19	2.44
TOTAL MANUAL SCRAMS	1	0.69	1.10	1.13	0.69	0.94

TOTALS MAY DIFFER BECAUSE OF ROUNDING OFF

REACTOR SCRAM

Reporting Period: 05/12/97 to 05/18/97

DATE	PLANT & UNIT	POWER	TYPE	CAUSE	COMPLICATIONS	YTD ABOVE 15%	YTD BELOW 15%	YTD TOTAL
05/14/97	MCGUIRE 1	0	SA	Maintenance Error	NO	0	1	1
05/14/97	INDIAN POINT 3	60	SM	Equipment Failure	NO	1	0	1

Note: Year To Date (YTD) Totals Include Events Within The Calendar Year Indicated By The End Date Of The Specified Reporting Period

COMPARISON OF WEEKLY SCRAM STATISTICS WITH INDUSTRY AVERAGES

PERIOD ENDING
05/18/97

SCRAM CAUSE	NUMBER OF SCRAMS	1997 WEEKLY AVERAGE (YTD)	1996 WEEKLY AVERAGE	1995 WEEKLY AVERAGE	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE
POWER GREATER THAN OR EQUAL TO 15%						
EQUIPMENT FAILURE	1	0.76	1.52	1.83	1.52	1.83
DESIGN/INSTALLATION ERROR	0	0.20	0.10	0.12	0.08	0.04
OPERATING ERROR	0	0.10	0.08	0.15	0.21	0.27
MAINTENANCE ERROR	0	0.30	0.50	0.38	0.54	0.52
EXTERNAL	0	0.05	0.13	0.21	0.17	0.13
OTHER	0	0.05	0.10	0.06	-	0.02
Subtotal	1	1.46	2.43	2.75	2.52	2.81
POWER LESS THAN 15%						
EQUIPMENT FAILURE	0	0.20	0.23	0.10	0.27	0.38
DESIGN/INSTALLATION ERROR	0	0.00	-	-	0.02	-
OPERATING ERROR	0	0.05	0.10	0.13	0.08	0.13
MAINTENANCE ERROR	1	0.10	0.06	0.08	-	0.02
EXTERNAL	0	0.00	-	-	-	0.04
OTHER	0	0.00	-	-	-	-
Subtotal	1	0.35	0.39	0.31	0.37	0.57
TOTAL	2	1.81	2.82	3.06	2.89	3.38

SCRAM TYPE	NO. OF SCRAMS	1997 WEEKLY AVERAGE (YTD)	1996 WEEKLY AVERAGE	1995 WEEKLY AVERAGE	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE
TOTAL AUTOMATIC SCRAMS	1	1.12	1.71	1.92	2.19	2.44
TOTAL MANUAL SCRAMS	1	0.71	1.10	1.13	0.69	0.94

TOTALS MAY DIFFER BECAUSE OF ROUNDING OFF

NOTES

1. PLANT SPECIFIC DATA BASED ON INITIAL REVIEW OF 50.72 REPORTS FOR THE WEEK OF INTEREST. PERIOD IS MIDNIGHT SUNDAY THROUGH MIDNIGHT SUNDAY. SCRAMS ARE DEFINED AS REACTOR PROTECTIVE ACTUATIONS WHICH RESULT IN ROD MOTION, AND EXCLUDE PLANNED TESTS OR SCRAMS AS PART OF PLANNED SHUTDOWN IN ACCORDANCE WITH A PLANT PROCEDURE. THERE ARE 111 REACTORS HOLDING AN OPERATING LICENSE.

2. PERSONNEL RELATED PROBLEMS INCLUDE HUMAN ERROR, PROCEDURAL DEFICIENCIES, AND MANUAL STEAM GENERATOR LEVEL CONTROL PROBLEMS.

3. COMPLICATIONS: RECOVERY COMPLICATED BY EQUIPMENT FAILURES OR PERSONNEL ERRORS UNRELATED TO CAUSE OF SCRAM.

4. "OTHER" INCLUDES AUTOMATIC SCRAMS ATTRIBUTED TO ENVIRONMENTAL CAUSES (LIGHTNING), SYSTEM DESIGN, OR UNKNOWN CAUSE.

OEAB SCRAM DATA

Manual and Automatic Scrams for 1987	435
Manual and Automatic Scrams for 1988	291
Manual and Automatic Scrams for 1989	252
Manual and Automatic Scrams for 1990	226
Manual and Automatic Scrams for 1991	206
Manual and Automatic Scrams for 1992	212
Manual and Automatic Scrams for 1993	175
Manual and Automatic Scrams for 1994	150
Manual and Automatic Scrams for 1995	159
Manual and Automatic Scrams for 1996	146
Manual and Automatic Scrams for 1997 --(YTD 05/18/97)--	36