

DEC 30 1992

MEMORANDUM FOR: Brian K. Grimes, Director
Division of Operating Reactor Support

FROM: Alfred E. Chaffee, Chief
Events Assessment Branch
Division of Operating Reactor Support

SUBJECT: OPERATING REACTORS EVENTS BRIEFING
DECEMBER 23, 1992 - BRIEFING 92-22

On December 23, 1992, we conducted an Operating Reactors Events Briefing (92-22) to inform senior managers from offices of the Commission, AEOD, ACRS, NRR, and regional offices of selected events that occurred since our last briefing on December 16, 1992. Attachment 1 lists the attendees. Attachment 2 presents the significant elements of the discussed events.

Attachment 3 contains reactor scram statistics for the week ending 12/20/92. No significant events were identified for input into the NRC performance indicator program.

Original signed by

Alfred E. Chaffee, Chief
Events Assessment Branch
Division of Operating
Reactor Support

Attachments: As stated

cc w/attachments:
See next page

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cc:

T. Murley, NRR (12G18)
F. Miraglia, NRR (12G18)
F. Gillespie, NRR (12G18)
J. Partlow, NRR (12G18)
S. Varga, NRR (14E4)
J. Calvo, NRR (14A4)
G. Lainas, NRR (14H3)
J. Roe, NRR (13E4)
J. Zwolinski, NRR (13H24)
M. Virgilio, NRR (13E4)
W. Russell, NRR (12G18)
J. Richardson, NRR (7D26)
A. Thadani, NRR (8E2)
S. Rosenberg, NRR (10E4)
C. Rossi, NRR (9A2)
B. Boger, NRR (10H3)
F. Congel, NRR (10E2)
D. Crutchfield, NRR (11H21)
W. Travers, NRR (11B19)
D. Coe, ACRS (P-315)
E. Jordan, AEOD (MN-3701)
T. Novak, AEOD (MN-9112)
L. Spessard, AEOD (MN-3701)
K. Brockman, AEOD (MN-3206)
S. Rubin, AEOD (MN-5219)
M. Harper, AEOD (MN-9112)
J. Grant, EDO (17G21)
R. Newlin, GPA (2G5)
E. Beckjord, RES (NLS-007)
A. Bates, SECY (16G15)
G. Rammling, OCM (16G15)
T. Martin, Region I
W. Kane, Region I
C. Hehl, Region I
S. Ebnetter, Region II
E. Merschhoff, Region II
B. Davis, Region III
E. Greenman, Region III
J. Milhoan, Region IV
B. Beach, Region IV
J.B. Martin, Region V
K. Perkins, Region V

J. Shea, (PDI-2)
C. Miller, (PDI-2)

bcc: Mr. Sam Newton, Manager
Events Analysis Department
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, GA 30339-3064

ATTACHMENT 1

LIST OF ATTENDEES

OPERATING REACTORS EVENTS FULL BRIEFING (92-22)

DECEMBER 23, 1992

<u>NAME</u>	<u>OFFICE</u>	<u>NAME</u>	<u>OFFICE</u>
R. DENNIG	NRR	C. MILLER	NRR
J. CARTER	NRR	G. MARCUS	NRR
K. GRAY	NRR	F. RINALDI	NRR
T. KOSHY	NRR	C. THOMAS	NRR
E. GOODWIN	NRR	S. LONG	NRR
J. TSAC	NRR	G. HUBBARD	NRR
C. BERLINGER	NRR	S. BAJWA	NRR
B. GRIMES	NRR	M. FLEISHMAN	OCM/KR
S. VARGA	NRR	V. BENAROYA	AEOD
C. ZECH	NRR	D. COE	ACRS
C. ROSSI	NRR		

TELEPHONE ATTENDANCE
(AT ROLL CALL)

Regions

Region I
Region II
Region III
Region IV
Region V

Resident Inspectors

Peach Bottom (J. Lyash)

AIT Team Leaders

Misc.

OPERATING REACTORS EVENTS BRIEFING 92-22
EVENTS ASSESSMENT BRANCH

LOCATION: 10 B11, WHITE FLINT
WEDNESDAY, DECEMBER 23, 1992, 11:00 A.M.

PEACH BOTTOM, UNIT 3

EXCEEDING BOTTOM HEAD
PRESSURE/TEMPERATURE LIMITS

VARIOUS PLANTS

ELECTRICAL CABLE DEFICIENCY

PEACH BOTTOM, UNIT 3
EXCEEDING BOTTOM HEAD PRESSURE/TEMPERATURE LIMITS
OCTOBER 16, 1992

PROBLEM

DURING A COOLDOWN FOLLOWING A REACTOR SCRAM, THE TEMPERATURE OF THE REACTOR VESSEL BOTTOM HEAD WENT BELOW THE MINIMUM TEMPERATURE/PRESSURE VALUES SPECIFIED BY TECHNICAL SPECIFICATIONS FOR ASSURING REACTOR VESSEL INTEGRITY.

CAUSE

INADEQUATE PROCEDURES AND OPERATOR AWARENESS OF REACTOR VESSEL BOTTOM HEAD PRESSURE/TEMPERATURE LIMITATIONS.

SAFETY SIGNIFICANCE

REDUCTION IN NDT MARGIN OF SAFETY.

DISCUSSION

- REACTOR EXPERIENCED A CONTAINMENT ISOLATION CAUSED BY BUMPING A SWITCH
-- MSIVs CLOSED AND REACTOR SCRAMMED
- HPCI AND RCIC AUTOMATICALLY INITIATED AND RECIRC PUMPS WERE STOPPED ON LOW LOW WATER LEVEL.
- SAFETY RELIEF VALVES LIFTED AND RESEATED.

CONTACTS: J. CARTER, NRR/DORS
J. LYASH, SRI

AIT: NO
SIGEVENT: TBD

REFERENCES: 10 CFR 50.72 #24437
AND LER 92-008

- HPCI, RCIC, AND SAFETY VALVES USED TO CONTROL LEVEL AND PRESSURE.
- CRD WATER CONTINUED TO FLOW INTO THE REACTOR BOTTOM HEAD AREA.
- RESULTING THERMAL STRATIFICATION (>145 F) PREVENTED RESTARTING RECIRC PUMPS.
- SUBSEQUENT EVALUATION OF RECORDED DATA BY REACTOR INSPECTOR IDENTIFIED THAT THE BOTTOM HEAD TEMPERATURE DECREASED TO ABOUT 112 F WITH A SYSTEM PRESSURE OF 600 PSI
 - THIS IS ABOUT 40 F LOWER THAN TECHNICAL SPECIFICATION LIMIT
 - TEMPERATURE BELOW LIMIT CURVE FOR ABOUT 6 HOURS
- NOTICE OF VIOLATION ISSUED.
- LICENSEE ENGAGED GE TO EVALUATE THE EFFECT ON REACTOR INTEGRITY
 - PRELIMINARY RESULTS ARE THAT ADEQUATE SAFETY MARGIN EXISTED
 - FINAL REPORT DUE IN MARCH
- OPERATORS LOGGED TEMPERATURES BUT DID NOT ASSOCIATE THEM WITH BOTTOM HEAD LIMITS; PROCEDURES DID NOT REQUIRE CHECKING LIMIT CURVE FOR ACCEPTABILITY.

- RECORDED DATA AVAILABLE IN CONTROL ROOM; COMMINGLED WITH OTHER DATA.
- INPO EVALUATED EVENT AND ISSUED SEN ON 12/15/1992
 - GE PREVIOUSLY ISSUED SIL 251 IN 1977 AND SIL 430 IN 1985
- LICENSEE REVISING PROCEDURES AND ALERTING OPERATORS.

SIMILAR EVENTS

- STRATIFICATION EVENTS OCCURRED AT HATCH AND SUSQUEHANNA.

FOLLOWUP

- REGION IS EVALUATING EVENT
 - PLANS TO ASSESS CURRENTLY AVAILABLE INFORMATION
 - CONCERNED ABOUT WHAT IS CRITICAL CRACK SIZE
- NEED FOR INFORMATION NOTICE IS BEING EVALUATED.
- NRR WILL ASSIST REGION IN EVALUATING GE ANALYSIS.

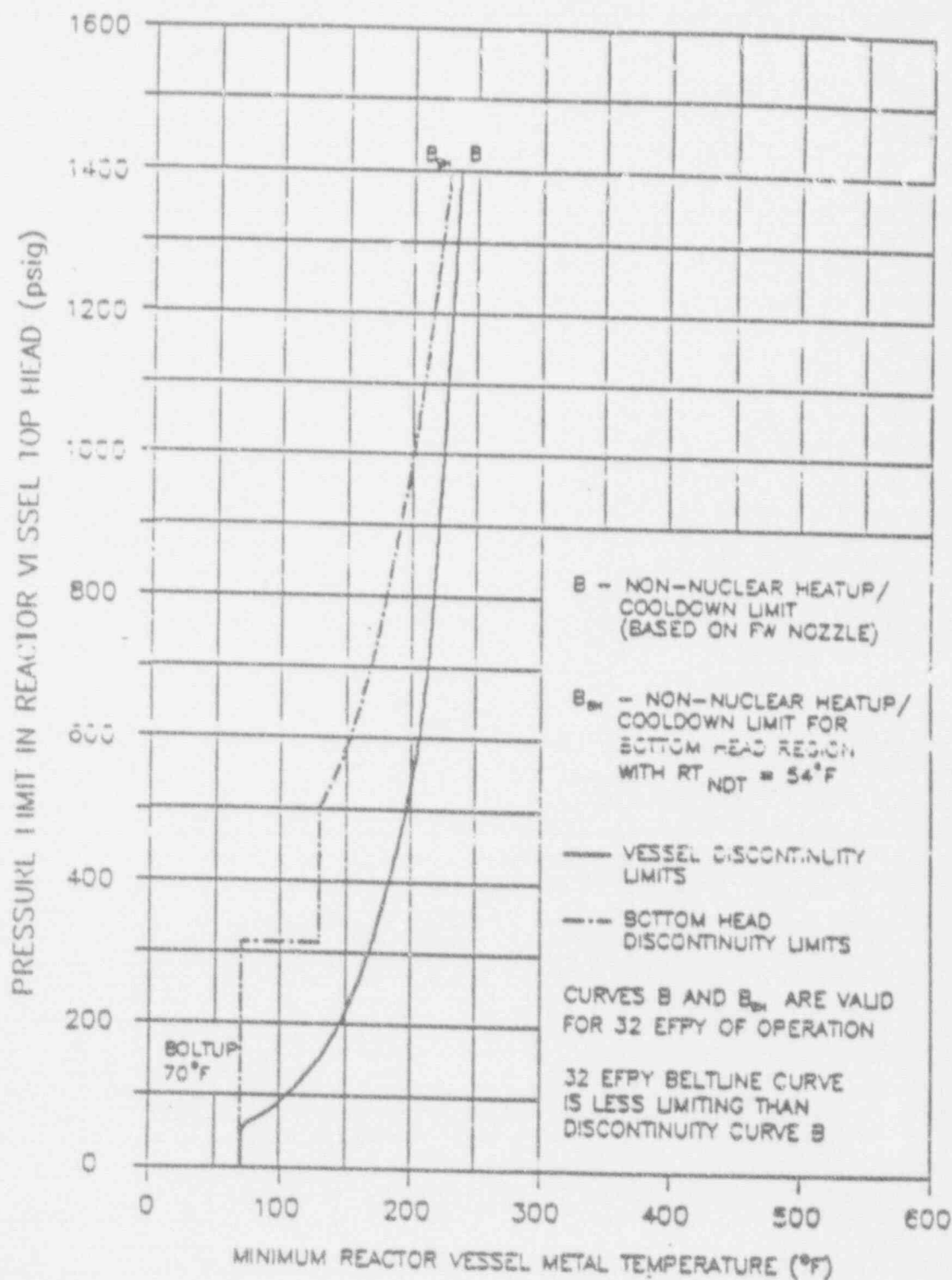


Figure 3.6.2 Peach Bottom 3 minimum Temperature for Mechanical Heatup or Cooldown Following Nuclear Shutdown

**POTENTIAL DEFICIENCY
OF ELECTRICAL CABLES WITH
BONDED JACKETS**

(Ref. 10 CFR 50.49)

**GEORGE HUBBARD
PLANT SYSTEMS BRANCH**

SAFETY SIGNIFICANCE

**RECENT SANDIA TEST RESULTS INDICATE THAT BONDED-JACKET
CABLES MAY FAIL DURING A LOCA BEFORE 40 YEARS IF THESE CABLES
ARE USED AT TEMPERATURES GREATER THAN 50 °C (122 °F)**

SANDIA TEST PROGRAM

ACCELERATED AGING TESTS OF OKONITE SINGLE-CONDUCTOR,
12 GAUGE, 600V CONTROL CABLES WITH BONDED HYPALON JACKET
WERE PERFORMED TO DETERMINE:

- THE POSSIBILITY OF EXTENDING CABLE QUALIFICATION TO 60 YEARS FOR LICENSE RENEWAL.
- THE EFFECTS OF CABLE DAMAGE DURING INSTALLATION.

NOTE: TESTING BY SANDIA WAS CONSISTENT WITH IEEE 323-1974
REQUIREMENTS

TEST RESULTS

ALL OKONITE CABLES PASSED AT THESE TEST CONDITIONS:

- 100°C/212°F FOR 3 MONTHS FOLLOWED BY LOCA TEST (EQUIVALENT TO 40 YEARS AT 48°C/118°F)
- 100°C FOR 6 MONTHS FOLLOWED BY LOCA TEST (EQUIVALENT TO 40 YEARS AT 52°C/126°F)

FAILURES OCCURRED AT MORE SEVERE AGING CONDITIONS:

- ONE OF FOUR SAMPLES FAILED DURING LOCA TEST, AGED AT 100°C/212°F FOR 9 MONTHS FOLLOWED BY LOCA TEST (EQUIVALENT TO 40 YEARS AT 56°C/133°F)
- ALL SAMPLES FAILED DURING LOCA TEST, AGED AT 158°C/316°F FOR 336 HOURS FOLLOWED BY LOCA TEST (EQUIVALENT TO 40 YEARS AT 69°C/156°F)

TEST RESULTS (CONTINUED)

DEKORON DEKORAD CABLES:

- ONE OF THREE SAMPLES FAILED DURING LOCA TEST, AGED AT 100°C/212°F FOR 3 MONTHS FOLLOWED BY LOCA TEST (EQUIVALENT TO 40 YEARS AT 48°C/118°F)
- ALL CABLES PASSED, AGED AT 100°C FOR 6 MONTHS FOLLOWED BY LOCA TEST (EQUIVALENT TO 40 YEARS AT 52°C/126°F)
- ONE OF FOUR CABLES FAILED DURING LOCA TEST, AGED AT 100°C FOR 9 MONTHS FOLLOWED BY LOCA TEST (EQUIVALENT TO 40 YEARS AT 56°C/133°F)

OKONITE QUALIFICATION SUMMARY

QUALIFICATION PERFORMED ON 600-VOLT, #12, 30-MIL EPR SINGLE-CONDUCTOR CONTROL CABLE AND 2KV, #6, 55-MIL EPR POWER CABLE WITH 30-MIL BONDED JACKET

AGING

- 3 WEEKS AT 150°C
- 200 MEGARADS AT <1 MEGARAD/HOUR

LOCA TEST

- IEEE 323-1974 30-DAY LOCA TEST PLUS 100 DAYS

QUALIFIED FOR 40 YEARS AT 90°C

DEKORON QUALIFICATION SUMMARY

AGING

- 163°C FOR 7 DAYS, EPR ONLY
- JACKET APPLIED BEFORE RADIATION AGING
- 25 MEGARADS
- 121°C FOR 7 DAYS
- 175 MEGARADS ACCIDENT DOSE

LOCA TEST

- IEEE 323-1974 30-DAY LOCA TEST

QUALIFIED FOR 40 YEARS AT 52°C

SHORT-TERM SAFETY SIGNIFICANCE

- MOST SIGNIFICANT FOR CABLES IN CONTAINMENT
- FEW SAFETY-RELATED CABLES IN CONTAINMENT ARE AFFECTED
- CABLES IN CONTAINMENT HAVE BEEN IN SERVICE FOR <40 YEARS
- BWR DRYWELL TEMPERATURES TYPICALLY 57-66°C
- PWR CONTAINMENT TEMPERATURES 37-43°C OUTSIDE REACTOR CAVITY

SHORT-TERM SAFETY SIGNIFICANCE (CONTINUED)

- PROBABILITY OF A LARGE-BREAK LOCA IS APPROXIMATELY 10^{-4} PER REACTOR YEAR
- THERE ARE UNCERTAINTIES IN ESTIMATING CABLE LIFE USING THE ARRHENIUS EQUATION
- BASED ON EPRI DATA, OKONITE CABLE IS USED IN CONTAINMENT AT 25 POWER REACTORS.
 - DO NOT KNOW HOW MUCH OF THIS CABLE IS JACKETED OR HOW MUCH IS IN SAFETY APPLICATIONS

LONG-TERM SAFETY SIGNIFICANCE DEPENDS ON PLANT-SPECIFIC APPLICATIONS.

ACTIONS TAKEN

- MEETING WITH OKONITE, SANDIA, AND NUMARC 11/23/92
- MEMO TO COMMISSION 12/10/92
- INFORMATION NOTICE ISSUED 12/11/92

OKONITE'S CONCERNS

- AGING RADIATION & ACCIDENT RADIATION DOSE WAS APPLIED BEFORE ANY THERMAL AGING.
- THE CABLE WAS OVERAGED DURING THERMAL AGING (336 HOURS VS 200 HOURS)

INFORMATION NOTICE

- SANDIA TEST PROGRAM
- FAILURES OF OKONITE EPR/HYPALON CABLES
- FAILURES OF DEKORON EPR/HYPALON CABLES

CONCLUSION

- BONDED JACKETS MAY CAUSE CABLE FAILURES
- SOME BONDED-JACKET CABLES HAVE BEEN QUALIFIED WITHOUT A JACKET
- QUALIFICATION TESTS PERFORMED WITHOUT THE BONDED JACKET ARE NOT REPRESENTATIVE OF ACTUAL CABLE PERFORMANCE
- CONCERNS AT SERVICE TEMPERATURES $> 50^{\circ}\text{C}$

ACTIONS PLANNED

LETTER DRAFTED ASKING NUMARC TO TAKE THE LEAD IN COORDINATING INDUSTRY'S RESPONSE

- IDENTIFY WHICH PLANTS ARE USING THIS CABLE
- IDENTIFY SPECIFIC APPLICATIONS
- INSPECT TO DETERMINE MATERIAL CONDITION OF CABLES

BASED ON INDUSTRY ACTIONS, THE STAFF WILL CONSIDER ADDITIONAL ACTIONS

- ASSESS NEED FOR ADDITIONAL GENERIC COMMUNICATIONS
- DETERMINE LONG TERM SAFETY SIGNIFICANCE
- DETERMINE AND IMPLEMENT ACTION REQUIRED FOR RESOLUTION

REACTOR SCRAM SUMMARY
WEEK ENDING 12/20/921. PLANT SPECIFIC DATA⁽¹⁾

DATE	SITE	UNIT	POWER	SIGNAL	CAUSE	COMPLI- ⁽³⁾ CATIONS	YTD ABOVE 15%	YTD BELOW 15%	YTD TOTAL
12/14/92	CATAWBA	2	100	A	PERSONNEL	NO	2	0	2
12/20/92	PILGRIM	1	70	A	PERSONNEL	NO	2	0	2

II. COMPARISON OF WEEKLY STATISTICS WITH INDUSTRY AVERAGES

SCRAMS FOR WEEK ENDING 12/20/92

SCRAM CAUSE	NUMBER OF SCRAMS	1992 WEEKLY AVERAGE (YTD)	1991 WEEKLY AVERAGE	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE
POWER GREATER THAN 15%						
EQUIPMENT RELATED	0	2.6	2.9	3.4	3.1	3.0
PERSONNEL RELATED (2)	2	0.8	0.6	0.5	1.0	1.0
OTHER (4)	0	0.0	0.0	0.0	0.1	0.4
Subtotal	2	3.4	3.5	3.9	4.2	4.4
POWER LESS THAN 15%						
EQUIPMENT RELATED	0	0.5	0.3	0.4	0.3	0.6
PERSONNEL RELATED (2)	0	0.2	0.2	0.1	0.3	0.4
OTHER (4)	0	0.0	0.0	0.0	0.0	0.2
Subtotal	0	0.7	0.5	0.5	0.6	1.2
TOTAL	2	4.1	4.0	4.4	4.8	5.6

MANUAL VS AUTO SCRAMS

TYPE	NO. OF SCRAMS	1992 WEEKLY AVERAGE (YTD)	1991 WEEKLY AVERAGE	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE
MANUAL SCRAMS	0	1.0	0.7	1.2	0.9	1.1
AUTOMATIC SCRAMS	2	3.1	3.3	3.2	3.9	4.5

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	--(YTD 12/20/92)--	207