

January 28, 1994

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
 JANUARY 26, 1994 - BRIEFING 94-04

On January 26, 1994, we conducted an Operating Reactors Events Briefing (94-04) to inform senior managers from offices of the Commission, EDO, ACRS, AEOD, NRR, and regional offices of selected events that occurred since our last briefing on January 19, 1994. Enclosure 1 lists the attendees. Enclosure 2 presents the significant elements of the discussed events.

Enclosure 3 contains reactor scram statistics for the week ending January 23, 1994. One significant event was identified for input into the NRC Performance Indicator Program (Enclosure 4).

Robert Dennig
 /for/ Alfred E. Chaffee, Chief
 Events Assessment Branch
 Division of Operating
 Reactor Support

Enclosures: As stated

cc w/enclosures:
 See next page

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*WERS-1 (Operating Experience)
 1004-6 (Chaffee)*

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

January 28, 1994

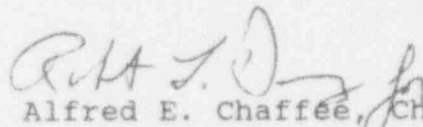
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Alfred E. Chaffee, Chief
Events Assessment Branch
Division of Operating
Reactor Support

Enclosures: As stated

cc w/enclosures:
See next page

cc:

T. Murley, NRR (12G18)
F. Miraglia, NRR (12G18)
F. Gillespie, NRR (12G18)
Acting ADPR, NRR (12G18)
S. Varga, NRR (14E4)
J. Calvo, NRR (14A4)
G. Lainas, NRR (14H3)
J. Roe, NRR (13E4)
J. Zwolinski, NRR (13H24)
E. Adensam, NRR (13E4)
W. Russell, NRR (12G18)
M. Hodges (Acting), 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)
G. Holahan, AEOD (MN-9112)
L. Spessard, AEOD (MN-3701)
K. Brockman, AEOD (MN-3206)
S. Rubin, AEOD (MN-5219)
M. Harper, AEOD (MN-9112)
G. Grant, EDO (17G21)
Acting Director, PA (2G5)
E. Beckjord, RES (NLS-007)
A. Bates, SECY (16G15)
T. Martin, Region I
R. Cooper, Region I
S. Ebnetter, Region II
E. Merschhoff, Region II
S. Vias, Region II
J. Martin, Region III
E. Greenman, Region III
L. Callan, Region IV
A. Beach, Region IV
K. Perkins, Region V
S. Richards, Region V

J. Clifford (PDV)
T. Quay (PDV)

bcc: Mr. Sam Newton, Manager
Events Analysis Department
Institute of Nuclear Power Operations
700 Galleria Parkway
Atlanta, GA 30339-5957

ENCLOSURE 1

LIST OF ATTENDEES

OPERATING REACTORS EVENTS FULL BRIEFING (94-04)

JANUARY 26, 1994

<u>NAME</u>	<u>OFFICE</u>	<u>NAME</u>	<u>OFFICE</u>
A. CHAFFEE	NRR	G. MARCUS	NRR
E. GOODWIN	NRR	E. BENNER	NRR
K. GRAY	NRR	B. GRIMES	NRR
D. SKEEN	NRR	J. CARTER	NRR
N. HUNEMULLER	NRR	B. BOGER	NRR
S. ROSENBERG	NRR	P. CAMPBELL	NRR
L. COHEN	NRR	E. ROSSI	NRR
M. MARKLEY	NRR	M. PAYNE	NRR
L. PLISCO	NRR	J. ROE	NRR
F. BURROWS	NRR	V. MCCREE	OEDO
J. HANNON	NRR	J. MITCHELL	OEDO
C. CARPENTER	NRR	D. DOE	ACRS
E. ADENSAM	NRR	M. RUNYAN	RIV
T. QUAY	NRR	K. PERKINS	RV
S. PETERSON	NRR	V. BENAROYA	AEOD
P. KANG	NRR	E. BAKER	OCM
R. FRAHM	NRR		

TELEPHONE ATTENDANCE
(AT ROLL CALL)

Regions

Region I
Region II
Region III
Region IV
Region V

Resident Inspectors

Vogtle
P. Johnson (WNP-2)

IIT/AIT Team Leaders

Misc.

OPERATING REACTORS EVENTS BRIEFING 94-04

LOCATION: 10 B11, WHITE FLINT
WEDNESDAY, JANUARY 26, 1994 11:00 A.M.

MULTIPLE PLANTS

COLD WEATHER EFFECTS ON
OFFSITE POWER

WASHINGTON NUCLEAR PROJECT,
UNIT 2

LEAKING ISOLATION VALVES
BETWEEN LOW PRESSURE RHR
AND REACTOR SYSTEM

PRESENTED BY: EVENTS ASSESSMENT BRANCH
DIVISION OF OPERATING REACTOR
SUPPORT, NRR

MULTIPLE PLANTS
COLD WEATHER EFFECTS ON OFFSITE POWER

PROBLEM

COLD WEATHER CHALLENGES TO OFFSITE POWER RESULT IN REACTOR TRIP AT VOGTLE UNIT 2 AND CHALLENGES TO OFFSITE POWER AT PEACH BOTTOM UNITS, MONTICELLO, POINT BEACH, AND CLINTON.

CAUSE

DEGRADATION OF HIGH VOLTAGE BREAKER AIR SYSTEM DUE TO LOW TEMPERATURE AND INCREASED LEAKAGE AT THE GASKETS.

SAFETY SIGNIFICANCE

- REACTOR TRIP FROM LOSS OF LOAD.
- POTENTIAL DEGRADATION OF VOLTAGE AND AVAILABILITY OF OFFSITE POWER SYSTEM.

EVENTS

VOGTLE 2

- TWO 500KV BREAKERS INCLUDING ONE OF THE GENERATOR LOAD BREAKERS TRIPPED ON A FAULT. TRIP CAUSED LOW PRESSURE AT TWO 500KV BREAKERS. THIS LOW PRESSURE CAUSED THE REMAINING MAIN GENERATOR BREAKER TO TRIP. TURBINE TRIPPED ON LOSS OF LOAD AND THE REACTOR TRIP FOLLOWED.

CONTACT: E. GOODWIN/T. KOSHY, NRR/DORS/OEAB AIT: NO
REFERENCE: 10 CFR 50.72 REPORT #26583 SIGEVENT: TBD

- PLANT OFFSITE POWER REMAINED AVAILABLE.
- LICENSEE IDENTIFIED A PRESSURE SWITCH PROBLEM THAT CAUSED LESS THAN NOMINAL PRESSURE IN THE AIR HEADER.
- LICENSEE RAISED THE SETPOINT IN THE AIR HEADER TO PREVENT LOW PRESSURE FROM CONCURRENT BREAKER TRIPS.

PEACH BOTTOM UNIT 2 & 3 ✓

- DURING ICE STORM, A "HIGH MOISTURE ALARM" WAS GENERATED FOR THE AIR SYSTEM FOR TWO HIGH VOLTAGE BREAKERS IN THE SWITCHYARD. BOTH POWER SUPPLIES FOR AIR SYSTEM COMPRESSORS HAD BEEN LOST FOR 45 MINUTES. THERE WERE NO BREAKER TRIPS.
- EACH OF THESE BREAKERS HAD TWO AIR COMPRESSORS AND TWO SOURCES OF POWER.

MONTICELLO ✓

- 345KV CIRCUIT BREAKER MONITORING SYSTEM ALARMED ON LOW AIR PRESSURE. PROBLEM COULD HAVE RESULTED FROM INOPERABLE HEATERS, LOW GAS PRESSURE, OR LEAKAGE FROM SEALS.

POINT BEACH

- LOW AIR PRESSURE ALARMS WERE RECEIVED FOR HIGH VOLTAGE BREAKERS. THESE BREAKERS WERE REFURBISHED BEFORE COLD WEATHER. THE NEW GASKETS WERE MADE OF A DIFFERENT MATERIAL. LICENSEE SUPPLIED NITROGEN TO BOOST PRESSURE.

CLINTON

- GAS (SF6) BREAKERS INDICATED LOW PRESSURE. HISTORICALLY, SF6 HAS BEEN CHARGED IN WINTER AND BLED OFF IN SUMMER.

DISCUSSION

USE OF COMPRESSED AIR IN HIGH VOLTAGE SWITCHYARD CIRCUIT BREAKERS:

- COMPRESSED AIR USED FOR ARC EXTINGUISHING ON LARGE HIGH VOLTAGE AIR CIRCUIT BREAKERS AND MAY BE USED FOR CONTACT OPERATION FOR BOTH OPENING AND CLOSING FOR AIR, SF6, OIL AND VACUUM EXTINGUISHING HIGH VOLTAGE BREAKERS
- DESIGN AIR PRESSURE 150-2000 PSIG DEPENDING ON MANUFACTURER
- GENERALLY, A SEPARATE AIR RECEIVER SUPPLIED FOR EACH CIRCUIT BREAKER SIZED FOR ONE/THREE TRIP-CLOSE CYCLES

- COMPRESSORS MAY BE SUPPLIED FOR EACH BREAKER OR COMMON HEADER AND COMPRESSOR(S) SUPPLIED FOR ENTIRE YARD OR SECTION OF YARD
- COMPRESSORS MAY OR MAY NOT BE REDUNDANT OR HAVE DIVERSE POWER SUPPLIES
- AIR BLAST BREAKERS WILL OPEN ON LOW AIR PRESSURE BEFORE AIR PRESSURE IS INSUFFICIENT TO TRIP BREAKER WHEN REQUIRED
- MOST BREAKERS CANNOT BE CLOSED WITHOUT ADEQUATE AIR PRESSURE

VULNERABILITIES OF COMPRESSED AIR TO LOSS:

- LOW AIR PRESSURE DUE TO TEMPERATURE LOSS
- FAILED SEALS DUE TO COLD
- FAILED SEALS AND BUSHINGS DUE TO SEISMIC SHOCK
- MECHANICAL FAILURES OF COMMON COMPRESSED AIR HEADER(S)
- LOSS OF POWER TO COMPRESSOR(S)
- MODERN SINGLE VOLTAGE SWITCHYARDS SEEM MOST VULNERABLE

POSSIBLE CONSEQUENCES OF SWITCHYARD AIR DEGRADATION:

- INCREASED PROBABILITY OF LOSS OF OFFSITE POWER SEQUENCE
- INCREASED DIFFICULTY IN RECOVERING FROM LOOP SEQUENCES
- POSSIBLE LOOP AND/OR STATION TRIP DURING PERIODS OF EXTREME COLD OR DURING EARTHQUAKES

FOLLOW UP

- RESIDENT INSPECTORS AND THE REGIONS ARE MONITORING LICENSEE ACTIONS.

Sec. 10-110 POWER-SYSTEM ELECTRICAL EQUIPMENT

The 138-kV air-blast circuit breaker was the first fully outdoor development in the United States.

An air-blast breaker by General Electric and an SF₆ unit by Westinghouse are illustrated in Figs. 10-28 and 10-30, respectively. The outdoor circuit breaker was first applied in the United States in 1956. They are now available in voltage and current ratings up to 765 kV and 3,000 A continuous to meet the latest USASI standard requirements. The available ratings are listed in the USASI Standard C37.06, Table 4.

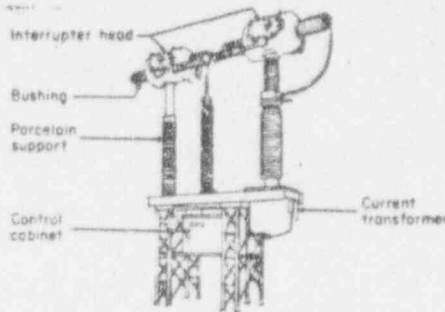


FIG. 10-28. 230-kV air-blast circuit breaker, rated 1,600 A, 20,000 MVA, operating at 500 lb/in² gage. (General Electric Company.)

The live-tank construction by the General Electric Company, shown in Fig. 10-28, uses 500 lb/in² gage compressed air in the interrupter heads. The air is blown across the arcs at the two contacts when the breaker is opened, through operation of an air-

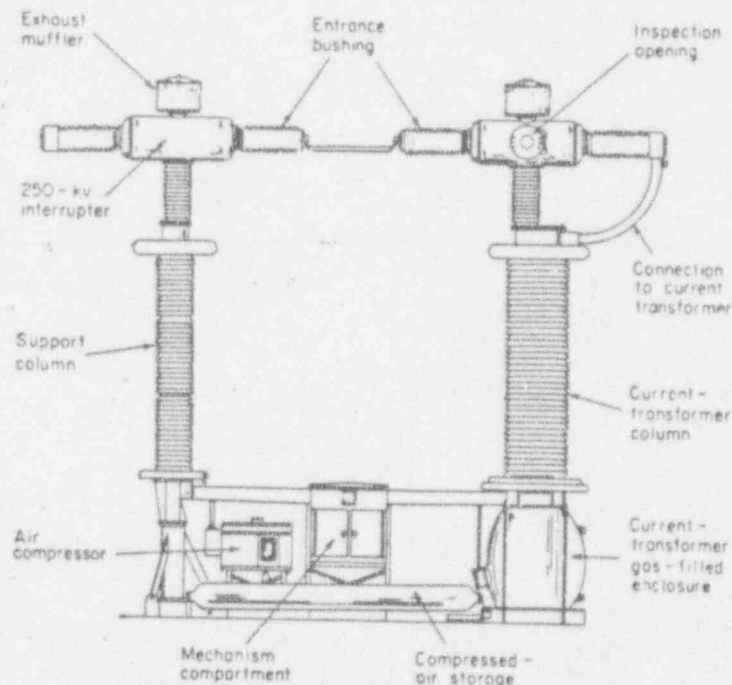


FIG. 10-29. 500-kV 3,000-A 38,000-MVA air-blast circuit breaker. (General Electric Company.)

WASHINGTON NUCLEAR PLANT, UNIT 2
LEAKING ISOLATION VALVES BETWEEN LOW
PRESSURE RHR AND REACTOR SYSTEM
JANUARY 21, 1994

PROBLEM

PRESSURE ISOLATION VALVES ON THE REACTOR COOLANT SYSTEM LEADING TO THE SHUTDOWN COOLING SYSTEM WERE LEAKING AT AN ESTIMATED 0.25 GPM.

CAUSE

UNKNOWN AT PRESENT TIME.

SAFETY SIGNIFICANCE

AN INCREASE IN LEAKAGE PAST THE VALVES COULD POTENTIALLY LEAD TO A FAILURE OF THE LOW PRESSURE SYSTEM, AND HENCE AN INTER-FACING SYSTEM LOCA.

DISCUSSION

- REACTOR IS OPERATING AT 100 PERCENT POWER.
- LICENSEE OBSERVED LEAKAGE THROUGH THE TWO SERIES ISOLATION VALVES, V-8 AND V-9.
 - RECEIVED A HIGH PRESSURE ALARM (SET AT 168 PSI) ON SUCTION LINE.
 - THE RELIEF VALVE SET AT 175 PSI BEGAN RELIEVING INTERMITTENTLY.

CONTACT: J. CARTER, NRR/DORS
REFERENCE: MORNING REPORT 5-94-0009

AIT: NO
SIGEVENT: TBD

- LEAK RATE WAS MEASURED AS 0.2 AND 0.28 GPM RESPECTIVELY.
- TECHNICAL SPECIFICATION LIMIT IS 1.0 GPM.
- VALVES ARE 28 INCH VELAN WITH A ONE PIECE WEDGE.
- COMPARISON TO PREVIOUS LEAKAGE MEASUREMENTS SHOW THAT V-8 HAS INCREASED.
 - MOST RECENT PREVIOUSLY MEASURED LEAK RATE WAS 0.1 GPM.

FOLLOWUP

- LICENSEE IS CONSIDERING OPTIONS AND PLANS TO PREPARE JUSTIFICATION FOR OPERABILITY.
 - CONTINUE RELIEVING THROUGH RELIEF VALVE TO SUPPRESSION POOL
 - DRAW OFF LEAK THROUGH A DRAIN VALVE TO THE REACTOR BUILDING DRAIN SYSTEM
 - OPEN ANOTHER BLOCK VALVE, V-6A, AND HAVE LEAKAGE GO TO SUPPRESSION POOL.
- STAFF IS PREPARING AN INFORMATION NOTICE ON A SIMILAR EVENT THAT OCCURRED AT COOPER THAT INVOLVED SPLIT WEDGE VALVE BY ANCHOR DARLING.
- PROJECTS AND REGIONAL STAFFS ARE MONITORING LICENSEES ACTIONS.

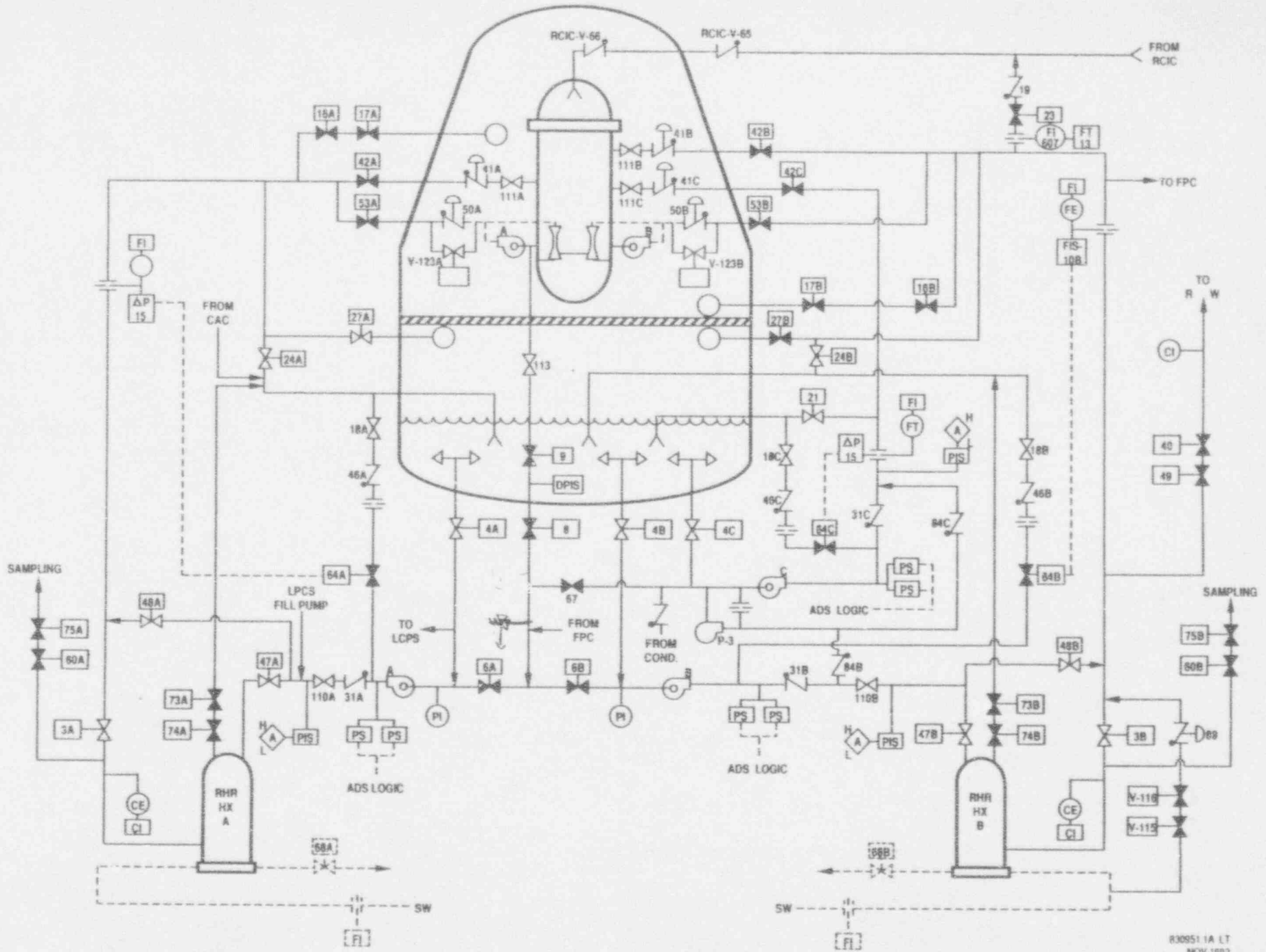


FIGURE 1. RHR SYSTEM
NORMAL STANDBY CONFIGURATION

83051 1A LT
NOV 1992
RHR

REACTOR SCRAM

Reporting Period: 01/17/94 to 01/23/94

<u>DATE</u>	<u>PLANT & UNIT</u>	<u>POWER</u>	<u>TYPE</u>	<u>CAUSE</u>	<u>COMPLICATIONS</u>	<u>YTD ABOVE 15%</u>	<u>YTD BELOW 15%</u>	<u>YTD TOTAL</u>
01/18/94	LASALLE 2	9	SA	Operating Error	NO	0	1	1
01/19/94	VOGTLE 2	100	SA	Equipment Failure	NO	2	0	2
01/20/94	SUSQUEHANNA 2	100	SA	Equipment Failure	NO	1	0	1
01/22/94	LASALLE 1	74	SA	Equipment Failure	NO	1	0	1
01/22/94	NORTH ANNA 2	95	SA	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
01/23/94

SCRAM CAUSE	NUMBER OF SCRAMS	1994 WEEKLY AVERAGE (YTD)	1993 WEEKLY AVERAGE	1992 WEEKLY AVERAGE	1991* WEEKLY AVERAGE	1990* WEEKLY AVERAGE
POWER GREATER THAN OR EQUAL TO 15%						
EQUIPMENT FAILURE*	4	2.1	1.8	2.6	2.9	3.4
DESIGN/INSTALLATION ERROR*	0	0.0	-	-	-	-
OPERATING ERROR*	0	0.0	0.3	0.2	0.6	0.5
MAINTENANCE ERROR*	0	0.6	0.5	0.4	-	-
EXTERNAL*	0	0.0	0.1	-	-	-
OTHER*	0	0.0	-	0.2	-	-
Subtotal	4	2.7	2.7	3.4	3.5	3.9
POWER LESS THAN 15%						
EQUIPMENT FAILURE*	0	0.0	0.4	0.4	0.3	0.4
DESIGN/INSTALLATION ERROR*	0	0.0	-	-	-	-
OPERATING ERROR*	1	0.3	0.1	0.1	0.2	0.1
MAINTENANCE ERROR*	0	0.0	-	0.1	-	-
EXTERNAL*	0	0.0	-	-	-	-
OTHER*	0	0.0	-	0.1	-	-
Subtotal	1	0.3	0.5	0.7	0.5	0.5
TOTAL	5	3.0	3.2	4.1	4.0	4.4

SCRAM TYPE	NO. OF SCRAMS	1994 WEEKLY AVERAGE (YTD)	1993 WEEKLY AVERAGE	1992 WEEKLY AVERAGE	1991 WEEKLY AVERAGE	1990 WEEKLY AVERAGE
TOTAL AUTOMATIC SCRAMS	5	2.4	2.4	3.1	3.3	3.2
TOTAL MANUAL SCRAMS	0	0.6	0.9	1.0	0.7	1.2

TOTALS MAY DIFFER BECAUSE OF ROUNDING OFF

* Detailed breakdown not in database for 1991 and earlier

- EXTERNAL cause included in EQUIPMENT FAILURE

- MAINTENANCE ERROR and DESIGN/INSTALLATION ERROR causes included in OPERATING ERROR

- OTHER cause included in EQUIPMENT FAILURE 1991 and 1990

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	-----	176
Manual and Automatic Scrams for 1994	--(YTD 01/23/94)--	10

OPERATING REACTOR PLANTS SIGNIFICANT EVENTS

No Sort Specified
 QUERY> Event Type SIG & Event Number >= 26060 & Event Number <= 26060

<u>PLANT & UNIT</u>	<u>DATE OF EVENT</u>	<u>SO. 72 NUMBER</u>	<u>DESCRIPTION OF EVENT</u>	<u>SIGNIFICANCE</u>	<u>OR BRIEFING</u>	<u>PRESENTER</u>	<u>CLOSEOUT RECORD</u>
LASALLE 1	09/14/93	26060	LOSS OF AUX TRANSFORMER 1 RESULTED IN SCRAM FROM 100% POWER AND LOSS OF OFFSITE POWER TO UNIT 1. COINCIDENT LOSS OF RPS BUS B RESULTED IN ISOLATIONS THAT INTERFERED WITH INSTRUMENT AIR, HYDROGEN SAMPLING, AND ACCESS TO RHR FOR COOLDOWN. UNIT 2 LOST SPENT FUEL POOL COOLING FOR A TIME.	Reactor Protection System	93-36	GREENE T.	HIGHLIGHT

Distribution

Docket File

NRC & Local PDRs

WBN Reading

S. Varga

G. Lainas

F. Hebdon

B. Clayton

P. Tam

C. Jackson

OGC

ACRS (10)

E. Merschoff, RII

P. Fredrickson, RII

R. Crlenjak, RII

cc: Plant Service list