January 31, 1991

MEMORANDUM FOR: Charles E. Rossi, Director
Division of Operational Events Assessment

FROM: Alfred E. Chaffee, Chief
Events Assessment Branch
Division of Operational Events Assessment

SUBJECT: THE OPERATING REACTORS EVENTS MEETING
JANUARY 30, 1991 - MEETING 91-02

On January 30, 1991, we conducted an Operating Reactors Events meeting (91-02) to inform senior managers from NRR, ACRS, SECY, OE, RES and regional offices of selected events that occurred since our last briefing on January 2, 1991. Enclosure 1 lists the attendees. Enclosure 2 presents the significant elements of the discussed events.

Enclosure 3 contains reactor scram statistics for the weeks ending 01/06/91, 01/13/91, 01/20/91 and 01/27/91. Enclosure 4 tabulates four significant events which were identified for input into the NRC performance indicator program.

DAVID C. FISCHER

/FOR/ Alfred E. Chaffee, Chief
Events Assessment Branch
Division of Operational Events Assessment

Enclosures:
As stated

cc w/Encl.:
See Next Page

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NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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David C. Fischer for

Alfred E. Chaffee, Chief
Events Assessment Branch
Division of Operational Events Assessment

Enclosures:
As stated

cc w/Encl.:
See Next Page

cc:
T. Murley, NRR
F. Miraglia, NRR
W. Russell, NRR
F. Gillespie, NRR
J. Partlow, NRR
S. Varga, NRR
R. Wessman, NRR
G. Lainas, NRR
D. Crutchfield, NRR
J. Zwolinski, NRR
B. Boger, NRR
W. Travers, NRR
J. Richardson, NRR
A. Thadani, NRR
F. Rosa, NRR
B. Grimes, NRR
F. Congel, NRR
J. Roe, NRR
T. Martin, RI
W. Kane, RI
C. Hehl, RI
S. Ebneter, RII
L. Reyes, RII
B. Davis, RIII
E. Greenman, RIII
R.D. Martin, RIV
S. Collins, RIV
J.B. Martin, RV
R. Zimmerman, RV
P. Boehnert, ACRS
E. Jordan, AEOD
T. Novak, AEOD
L. Spessard, AEOD
G. Zech, AEOD
E. Weiss, AEOD
S. Rubin, AEOD
M. Harper, AEOD
W. Bateman, EDO
R. Newlin, GPA
J. Cowan, INPO
E. Beckjord, RES
A. Bates, SECY
R. Lo, NRR
E. Adensam, NRR
L. Olshan, NRR
R. Barrett, NRR
G. West, NRR

ENCLOSURE 1

LIST OF ATTENDEES

OPERATING REACTORS EVENTS FULL BRIEFING (91-02)

January 30, 1991

NAME	ORGANIZATION	NAME	ORGANIZATION
A. Chaffee	NRR/DOEA	L. Engle	NRR/PDII-2
P. Baranowsky	NRR/DOEA	A. Lee	NRR/DET/E,EB
D. Fischer	NRR/DOEA	D. Spaulding	NRR/PDII-1
J. Carter	NRR/DOEA	W. Troskoski	OE
J. Thompson	NRR/DOEA	J. Jacobson	NRR/DRIS/SIB
K. Baumann	NRR/DOEA	G. West	NRR/LHFB
B. Grimes	NRR/DRIS	L. Olshan	NRR/PDIII-2
H. Alderman	ACRS	R. Van Houten	SECY
J. Roe	NRR/DLPQ	J. Knight	NRR/DST
W. Minners	RES		

ENCLOSURE 2

OPERATING REACTORS EVENTS BRIEFING 91-02
EVENTS ASSESSMENT BRANCH
LOCATION: 8B-11, WHITE FLINT
WEDNESDAY, JANUARY 30, 1991, 11:00 A.M.

H.B. ROBINSON 2	DIELECTRIC MACHINE TOOL WIRE INSULATION DEGRADATION CAUSED FAILURE OF SAFETY-RELATED EQUIPMENT
QUAD CITIES 1	REACTOR VESSEL DRAIN DOWN

H.B. ROBINSON, UNIT 2
DIELECTRIC MACHINE TOOL WIRE INSULATION DEGRADATION CAUSED FAILURE OF SAFETY-RELATED EQUIPMENT
JANUARY 4, 1991

PROBLEM:

ON JANUARY 4, 1991, THE "B" FEEDWATER ISOLATION VALVE FAILED TO CLOSE DURING SURVEILLANCE TESTING.

CAUSE:

THE LICENSEE'S INVESTIGATION REVEALED THE PRESENCE OF A CLEAR, HARDENED COATING ON A SINGLE CONTACTOR FOR ONE PHASE OF THE FORWARD AND REVERSE CONTACTORS IN THE ASSOCIATED 208V CLASS 1E MOTOR CONTROL CENTER (MCC) #9 FOR THE FEEDWATER ISOLATION VALVE, PREVENTING ELECTRICAL CONTACT.

SAFETY SIGNIFICANCE:

THIS PHENOMENON CAN POTENTIALLY AFFECT CLASS 1E EQUIPMENT IN PLANTS THAT WERE OPERATING OR UNDER CONSTRUCTION IN THE EARLY TO MID-SIXTIES.

DISCUSSION:

- ON JANUARY 4, 1991, DURING A UNIT 2 REFUELING OUTAGE, THE "B" FEEDWATER ISOLATION VALVE FAILED TO CLOSE DURING A SURVEILLANCE TEST.

- INVESTIGATION BY THE LICENSEE REVEALED A GREEN LIQUESCENT SUBSTANCE OOZING OUT OF THE POWER SUPPLY WIRES THAT GO FROM THE ASSOCIATED MCC ELECTRICAL BREAKER TO ITS FORWARD AND REVERSE CONTACTORS.

CONTACT: JOHN THOMPSON, OEAB (X21171)

SIGEVENT: YES

REFERENCE: MORNING REPORT DATED 01/18/91

AIT: NO

- A GREEN, CLEAR COATING HAD HARDENED ON THE FORWARD AND REVERSE CONTACTORS PREVENTING ELECTRICAL CONTACT AND PREVENTED THE "B" FIV FROM CLOSING.

- LAB ANALYSIS BY LICENSEE IDENTIFIED THE GREEN SUBSTANCE AS A VEGETABLE OIL PLASTICIZER WITH CHLORINE (LEACHING FROM THE PVC INSULATION) AND COPPER OXIDE (GIVING THE GREEN COLOR).

- THE ANALYSIS ALSO INDICATED THAT THE GREEN SUBSTANCE IS A CONDUCTOR IN LIQUID FORM, BUT WHEN DRIED, MAY EITHER BE A CONDUCTOR OR AN INSULATOR, DEPENDING ON THE AMOUNT OF COPPER OXIDE SALTS PRESENT.

- THE LICENSEE FOR H.B. ROBINSON IDENTIFIED THE WIRE AS BEING MARKED AS DIELECTRIC MACHINE TOOL WIRE - 105 DEGREES C (AWG #12) WITH A TEMPERATURE RATING OF 105 DEGREES C.

- THE MACHINE TOOL WIRE MANUFACTURER(S) HAS NOT BEEN IDENTIFIED TO DATE.

- LICENSEE IDENTIFIED 4 MCCs (APPROX. 50 COMPARTMENTS PER MCC) (CLASS 1E AND NONCLASS 1E MIX) THAT COULD POTENTIALLY BE AFFECTED BY THIS PROBLEM.

SIMILAR EVENTS:

- ONE WEEK PRIOR TO THE JANUARY 4, 1991 EVENT, A HVAC CONTAINMENT FAN COOLER RETURN RADIATION MONITOR ISOLATION VALVE FAILED. THIS IS CURRENTLY BELIEVED TO BE OF A SIMILAR FAILURE MODE AS THE JANUARY 4, 1991 EVENT.

- IN 1988, A SIMILAR EVENT OCCURRED AT SONGS UNIT 1, WHEN THE LICENSEE WAS PERFORMING CLEANING ON SEVERAL ELECTRICAL LEADS ATTACHED TO 480-TO-120 VOLT CONTROL TRANSFORMERS, LOCATED ON A CLASS 1E MCC CUBICLE.

- THE LICENSEE FOR SONGS STATED THAT THE GREEN SUBSTANCE WAS PRESENT ON THE ENTIRE LENGTH OF THE WIRE AND THAT THE GREEN MATERIAL WAS A COMBINATION OF CORROSION PRODUCTS FORMED BETWEEN THE COPPER WIRE AND CHLORIDE LEACHING FROM THE PVC INSULATION.

- THE SONGS LICENSEE ALSO STATED THAT THE STICKY TEXTURE OF THE MATERIAL WAS A RESULT OF A SLIGHT DEPOLYMERIZATION OF THE INNER SURFACE OF THE INSULATION AND THAT MOISTURE FROM THE ENVIRONMENT HAD BEEN TRANSPORTED, BY CAPILLARY ACTION, INTO THE WIRE STRAND BUNDLES.

- IN ADDITION, THE SONGS LICENSEE STATED THAT THE CHEMICAL REACTION BETWEEN THE WIRE INSULATION AND WIRE WAS ACCELERATED BY THE HIGH VOLTAGE POTENTIAL EXHIBITED BY THE NORMAL LOADING WITHIN THE MCC CONTROL TRANSFORMER.

- THE SONGS WIRING IS LABELED "DIELECTRIC 600V MACHINE TOOL 14" WITH A TEMPERATURE RATING OF 105 DEGREES C.

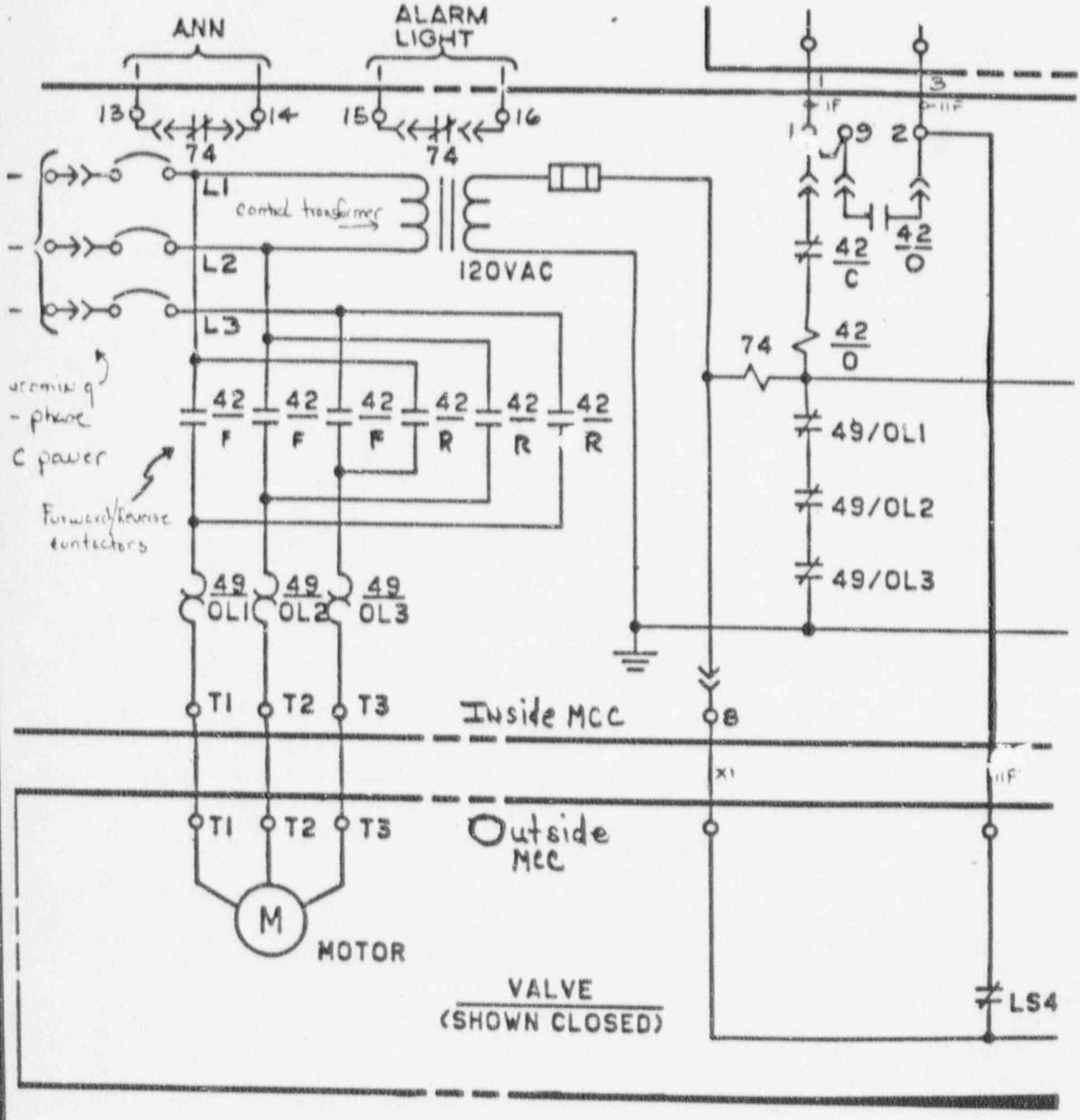
- THE SONGS LICENSEE IDENTIFIED 31 OUT OF 96 MCCs THAT SHOWED EVIDENCE OF THIS GREEN SUBSTANCE.

FOLLOW-UP:

- REGION II, THE SENIOR RESIDENT INSPECTOR AT H.B. ROBINSON, AND OEAB ARE PREPARING AN INFORMATION NOTICE BASED ON THE ABOVE TWO EVENTS.

- SELB WILL DECIDE IF FURTHER GENERIC ACTION IS WARRANTED.

Typical MCC Cubical



AC MOTOR OPERATED VALVES
ECCS VALVES
REQUIRED TO OPEN FOR SAFETY

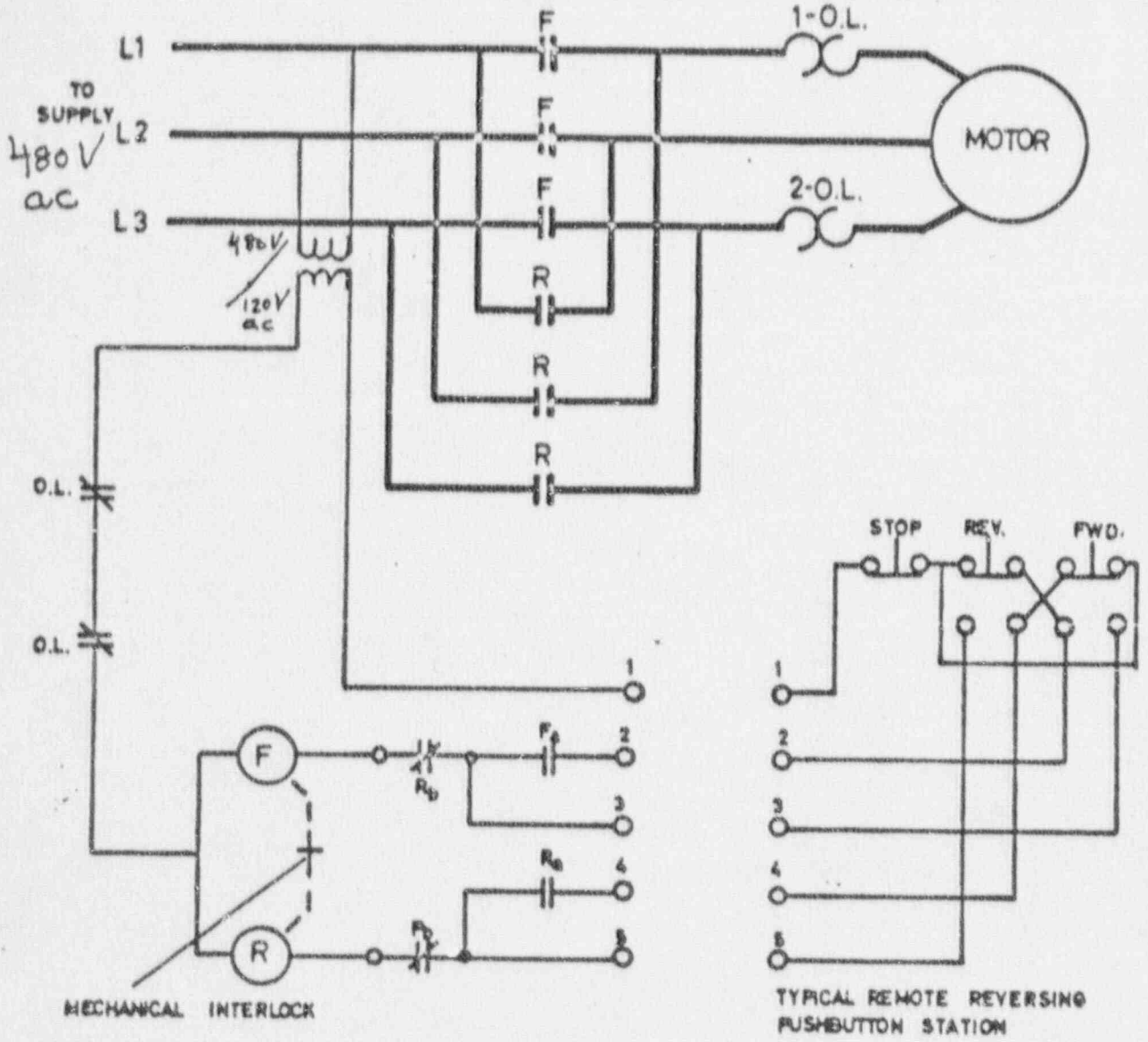


FIG. 2.03 SCHEMATIC DIAGRAM OF A.C. MAGNETIC REVERSING STARTER WITH FORWARD-REVERSE-STOP PUSHBUTTON STATION

QUAD CITIES, UNIT 1
REACTOR VESSEL DRAIN DOWN
JANUARY 24, 1991

PROBLEM:
WATER IN THE REACTOR VESSEL WAS LOWERED TWO TIMES BY IMPROPER VALVE MANIPULATION.

CAUSE:
A LACK OF FUNCTIONAL CONTROL DURING MAINTENANCE AND IMMEDIATE UNDERSTANDING OF THE PLANT AND ITS STATUS.

SAFETY SIGNIFICANCE:
TWO COOLANT LOSS EVENTS FROM MULTIPLE PERSONNEL ERRORS WHICH MAY BE INDICATIVE OF WEAKNESSES IN ADMINISTRATIVE CONTROLS.

DISCUSSION:
- o REACTOR AT COLD SHUTDOWN
- o OPEN DRAIN LINE TO REACTOR BUILDING SUMP; "43D" VALVE OPENED WITHOUT PERMISSION OF CONTROL ROOM AND CLOSURE OF VALVE "50"
- o MAINTENANCE PERSONNEL PERMITTED TO OPERATE FACILITY VALVES PER PLANT MEMO
- o TECHNICIANS PROMPTLY DETECTED PROBLEM AND INITIATED CLOSURE OF VALVE "43D"

CONTACT: J. CARTER, OEAB (x21153)
SIGEVENT: YES
REFERENCE: 10 CFR 50.72 #20320
AIT: NO

- o DRAIN DOWN EXISTED FOR 80 SECONDS
  - 1000 GALLONS LEAKED FROM VESSEL

- o CONTROL ROOM OPERATOR CLOSED ISOLATION VALVE "50"
  - AUTO CLOSURE ON LOW WATER LEVEL IN REACTOR

- o OPERATOR SUBSEQUENTLY OPENED VALVE "50"
  - DRAINED 1800 GALLONS FROM VESSEL

- o QUAD CITIES INVOLVED IN CRITICALITY EVENT IN OCTOBER 1990.

- o BRAIDWOOD EXPERIENCED COOLANT LEAK TO OUTSIDE CONTAINMENT IN OCTOBER 1990.

FOLLOWUP:

SPECIAL INSPECTION ESTABLISHED JANUARY 25, 1991. TEAM REVIEWING HUMAN FACTORS ASPECTS.

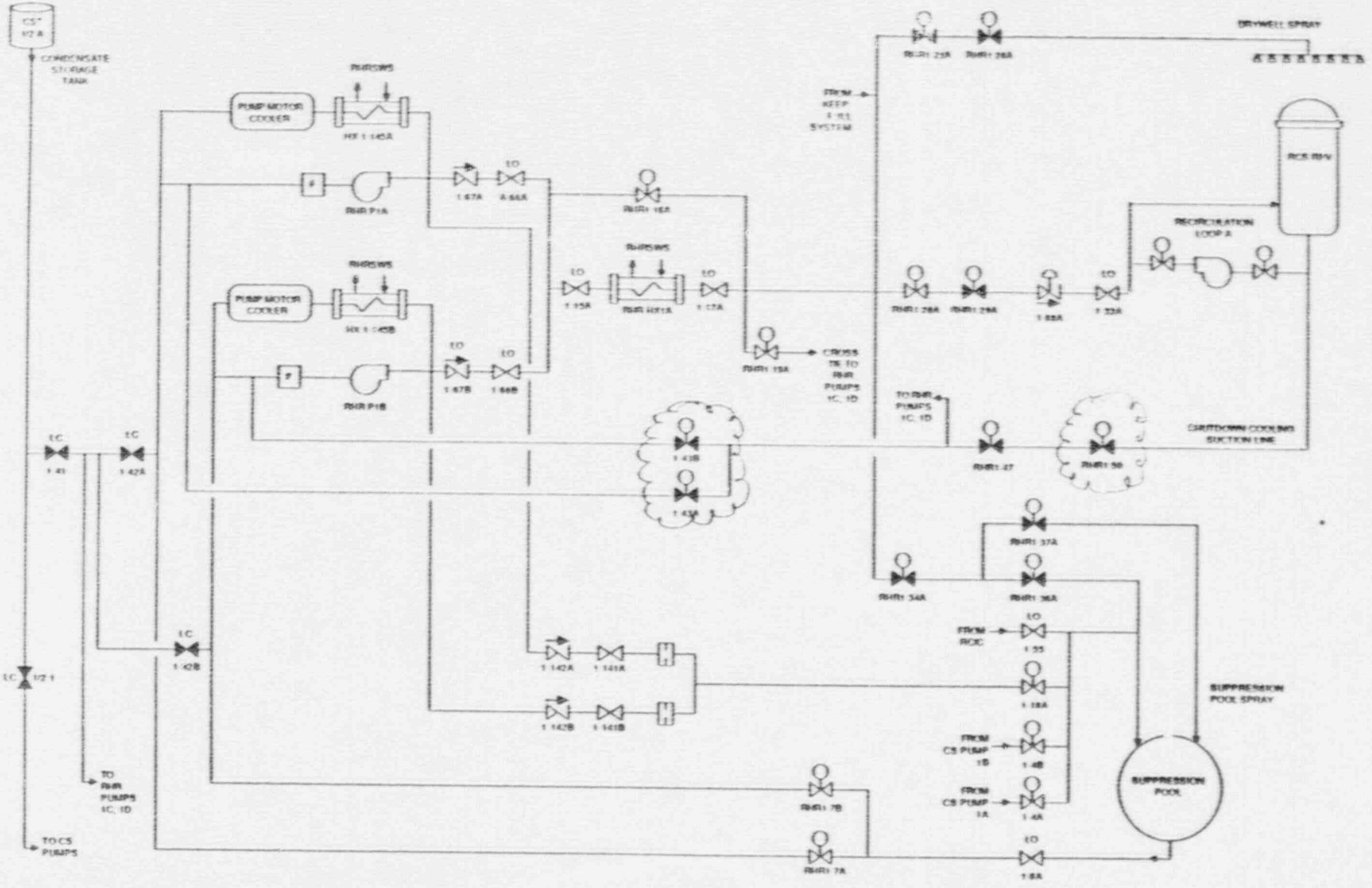


Figure 3.3-5. Quad Cities 1 Residual Heat Removal System, Pumps 1A and 1B

REACTOR SCRAM SUMMARY

WEEK ENDING 01/06/91

I. PLANT SPECIFIC DATA(1)

DATE	SITE	UNIT	POWER	SIGNAL	(2) CAUSE	(3) COMPLI-CATIONS	YTD ABOVE 15%	YTD BELOW 15%	YTD TOTAL
01/06/91	Duane Arnold	1	65	M	Equipment	No	1	0	1

REACTOR SCRAM SUMMARY

WEEK ENDING 01/13/91

I. PLANT SPECIFIC DATA(1)

DATE	SITE	UNIT	POWER	SIGNAL	(2) CAUSE	(3) COMPLI-CATIONS	YTD ABOVE 15%	YTD BELOW 15%	YTD TOTAL
01/07/91	Indian Point	2	97	A	Equipment	No	1	0	1
01/09/91	South Texas	2	100	M	Personnel	No	1	0	1
01/10/91	Millstone	2	90	A	Equipment	No	1	0	1
01/10/91	Arkansas	1	100	A	Equipment	No	1	0	1

II. COMPARISON OF WEEKLY STATISTICS WITH INDUSTRY AVERAGES

SCRAMS FOR WEEK ENDING
01/06/91

SCRAM CAUSE	NUMBER OF SCRAMS	1991 WEEKLY AVERAGE (YTD)	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE	1987 WEEKLY AVERAGE
POWER GREATER THAN 15%						
EQUIPMENT RELATED	1	1.2	3.4	3.1	3.0	3.9
PERSONNEL RELATED (2)	0	0.0	0.5	1.0	1.0	1.3
OTHER (4)	0	0.0	0.0	0.1	0.4	1.1
Subtotal	1	1.2	3.9	4.2	4.4	6.3
POWER LESS THAN 15%						
EQUIPMENT RELATED	0	0.0	0.4	0.3	0.6	1.2
PERSONNEL RELATED	0	0.0	0.1	0.3	0.4	0.6
OTHER	0	0.0	0.0	0.0	0.2	0.3
Subtotal	0	0.0	0.5	0.6	1.2	2.1
TOTAL	1	1.2	4.4	4.8	5.6	8.4

MANUAL VS AUTO SCRAMS

TYPE	NO. OF SCRAMS	1991 WEEKLY AVERAGE (YTD)	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE	1987 WEEKLY AVERAGE
MANUAL SCRAMS	1	1.2	1.2	0.9	1.1	1.4
AUTOMATIC SCRAMS	0	0.0	3.2	3.9	4.5	7.0

II. COMPARISON OF WEEKLY STATISTICS WITH INDUSTRY AVERAGES

SCRAMS FOR WEEK ENDING
01/13/91

SCRAM CAUSE	NUMBER OF SCRAMS	1991 WEEKLY AVERAGE (YTD)	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE	1987 WEEKLY AVERAGE
POWER GREATER THAN 15%						
EQUIPMENT RELATED	3	2.2	3.4	3.1	3.0	3.9
PERSONNEL RELATED (2)	1	0.5	0.5	1.0	1.0	1.3
OTHER (4)	0	0.0	0.0	0.1	0.4	1.1
Subtotal	4	2.7	3.9	4.2	4.4	6.3
POWER LESS THAN 15%						
EQUIPMENT RELATED	0	0.0	0.4	0.3	0.6	1.2
PERSONNEL RELATED	0	0.0	0.1	0.3	0.4	0.6
OTHER	0	0.0	0.0	0.0	0.2	0.3
Subtotal	0	0.0	0.5	0.6	1.2	2.1
TOTAL	4	2.7	4.4	4.8	5.6	8.4

MANUAL VS AUTO SCRAMS

TYPE	NO. OF SCRAMS	1991 WEEKLY AVERAGE (YTD)	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE	1987 WEEKLY AVERAGE
MANUAL SCRAMS	1	1.1	1.2	0.9	1.1	1.4
AUTOMATIC SCRAMS	3	1.6	3.2	3.9	4.5	7.0

REACTOR SCRAM SUMMARY
WEEK ENDING 01/20/91

I. PLANT SPECIFIC DATA

DATE	SITE	UNIT	POWER	SIGNAL	CAUSE	COMPLI-CATIONS	YTD ABOVE 15%	YTD BELOW 15%	YTD TOTAL
01/16/91	PEACH BOTTOM	3	60	A	EQUIPMENT	NO	1	0	1
01/18/91	HATCH	1	100	A	EQUIPMENT	NO	1	0	1

REACTOR SCRAM SUMMARY
WEEK ENDING 01/27/91

I. PLANT SPECIFIC DATA

DATE	SITE	UNIT	POWER	SIGNAL	CAUSE	COMPLI-CATIONS	YTD ABOVE 15%	YTD BELOW 15%	YTD TOTAL
01/23/91	COMANCHE PEAK	1	98	A	EQUIPMENT	NO	1	0	1
01/25/91	BRUNSWICK	2	100	A	PERSONNEL	NO	1	0	1

II. COMPARISON OF WEEKLY STATISTICS WITH INDUSTRY AVERAGES

SCRAMS FOR WEEK ENDING
01/20/91

SCRAM CAUSE	NUMBER OF SCRAMS	1991 WEEKLY AVERAGE (YTD)	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE	1987 WEEKLY AVERAGE
POWER GREATER THAN 15%						
EQUIPMENT RELATED	2	2.1	3.4	3.1	3.0	3.9
PERSONNEL RELATED (2)	0	0.3	0.5	1.0	1.0	1.3
OTHER (4)	0	0.0	0.0	0.1	0.4	1.1
Subtotal	2	2.4	3.9	4.2	4.4	6.3
POWER LESS THAN 15%						
EQUIPMENT RELATED	0	0.0	0.4	0.3	0.6	1.2
PERSONNEL RELATED	0	0.0	0.1	0.3	0.4	0.6
OTHER	0	0.0	0.0	0.0	0.2	0.3
Subtotal	0	0.0	0.5	0.6	1.2	2.1
TOTAL	2	2.4	4.4	4.8	5.6	8.4

MANUAL VS AUTO SCRAMS

TYPE	NO. OF SCRAMS	1991 WEEKLY AVERAGE (YTD)	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE	1987 WEEKLY AVERAGE
MANUAL SCRAMS	0	0.7	1.2	0.9	1.1	1.4
AUTOMATIC SCRAMS	2	1.7	3.2	3.9	4.5	7.0

II. COMPARISON OF WEEKLY STATISTICS WITH INDUSTRY AVERAGES

SCRAMS FOR WEEK ENDING
01/27/91

SCRAM CAUSE	NUMBER OF SCRAMS	1991 WEEKLY AVERAGE (YTD)	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE	1987 WEEKLY AVERAGE
POWER GREATER THAN 15%						
EQUIPMENT RELATED	1	1.8	3.4	3.1	3.0	3.9
PERSONNEL RELATED (2)	1	0.5	0.5	1.0	1.0	1.3
OTHER (4)	0	0.0	0.0	0.1	0.4	1.1
Subtotal	2	2.3	3.9	4.2	4.4	6.3
POWER LESS THAN 15%						
EQUIPMENT RELATED	0	0.0	0.4	0.3	0.6	1.2
PERSONNEL RELATED	0	0.0	0.1	0.3	0.4	0.6
OTHER	0	0.0	0.0	0.0	0.2	0.3
Subtotal	0	0.0	0.5	0.6	1.2	2.1
TOTAL	2	2.3	4.4	4.8	5.6	8.4

MANUAL VS AUTO SCRAMS

TYPE	NO. OF SCRAMS	1991 WEEKLY AVERAGE (YTD)	1990 WEEKLY AVERAGE	1989 WEEKLY AVERAGE	1988 WEEKLY AVERAGE	1987 WEEKLY AVERAGE
MANUAL SCRAMS	0	0.5	1.2	0.9	1.1	1.4
AUTOMATIC SCRAMS	2	1.8	3.2	3.9	4.5	7.0

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 --(YTD 01/27/91)--	009

ENCLOSURE 4

PERFORMANCE INDICATORS SIGNIFICANT EVENTS

PLANT NAME	EVENT DATE	EVENT DESCRIPTION	QTR SIGNIFICANCE
DIABLO CANYON 1	12/24/90	PRESSURIZER SPRAY VALVE FAILED-OPEN RESULTING IN REACTOR TRIP AND SAFETY INJECTION WITH STEAM DUMP VALVE FAILURE	SCRAM WITH COMPLICATIONS
SEQUOYAH 1	12/12/90	USE OF APPROVED PROCEDURE CAUSED LOSS OF AUTOMATIC AND MANUAL (SINGLE PUSH BOTTOM) INITIATION OF ENGINEERED SAFETY FEATURES SYSTEMS	OPERATION OUTSIDE THE LIMITS OF THE TECH SPEC
MILLSTONE 3	12/31/90	RUPTURE OF HIGH PRESSURE CONDENSATE PIPING FROM CORROSION/EROSION	POTENTIAL INEFFECTIVE CORRECTIVE ACTIONS BY LICENSEE
WOLF CREEK 1	12/20/90	BOTH TRAINS OF SI TECHNICALLY INOPERABLE DUE TO FREEZING OF RECIRCULATION LINE TO RWST	POTENTIAL FOR OR ACTUAL DEGRADATION OF SAFETY-RELATED EQUIPMENT