

October 5, 1995

MEMORANDUM TO: Dennis M. Crutchfield, 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  
 SEPTEMBER 27, 1995 - BRIEFING 95-12

On September 27, 1995, we conducted an Operating Reactors Events Briefing (95-12) to inform senior managers from offices of the Commission, ACRS, AEOD, RES, NRR and regional offices of selected events that occurred since our last briefing on September 13, 1995. Attachment 1 lists the attendees. Attachment 2 presents the significant elements of the discussed events.

Attachment 3 contains reactor scram statistics for weeks ending September 10, September 17, and September 24, 1995. One significant event was identified for input into the NRC Performance Indicator Program (Attachment 4).

Attachments: As stated (4)

cc w/atts:  
 See next page

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

Distribution:  
 Central Files w/atts  
 PUBLIC  
 LKilgore, SECY w/atts  
 OECB R/F w/atts

DOCUMENT NAME: G:\KAG\ORTRANS

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure  
 "N" = No copy

OFFICE	PECB:DRPM	E	PECB:DRPM	E	SEC/PECB:DRPM	N	C/PECB:DRPM	N
NAME	KGray:kag <i>KGray</i>		JCarter		RDennis		AChaffee	
DATE	10/02/95		10/3/95		09/21/95		09/15/95	

OFFICIAL RECORD COPY

*OM-6 - Meetings*  
*X - IDR-5-1 Operating Experience*

9510110339 951005  
 PDR ORG NRR  
 PDR

RETURN TO REGULATORY CENTRAL FILES

6085 *DRB*

October 5, 1995

MEMORANDUM TO: Dennis M. Crutchfield, 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  
SEPTEMBER 27, 1995 - BRIEFING 95-12

On September 27, 1995, we conducted an Operating Reactors Events Briefing (95-12) to inform senior managers from offices of the Commission, ACRS, AEOD, RES, NRR and regional offices of selected events that occurred since our last briefing on September 13, 1995. Attachment 1 lists the attendees. Attachment 2 presents the significant elements of the discussed events.

Attachment 3 contains reactor scram statistics for weeks ending September 10, September 17, and September 24, 1995. One significant event was identified for input into the NRC Performance Indicator Program (Attachment 4).

Attachments: As stated (4)

cc w/atts:  
See next page

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

Distribution:  
Central Files w/atts  
PUBLIC  
LKilgore, SECY w/atts  
OECB R/F w/atts

DOCUMENT NAME: G:\KAG\ORTRANS

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure  
"N" = No copy

OFFICE	PECB:DRPM	E	PECB:DRPM	E	SEC/PECB:DRPM	N	C/PECB:DRPM	N
NAME	KGray:kag		J Carter		RDennis		AChaffee	
DATE	10/02/95		10/3/95		09/21/95		09/15/95	

OFFICIAL RECORD COPY

cc:

W. Russell, NRR (O-12G18)  
F. Miraglia, NRR (O-12G18)  
F. Gillespie, NRR (O-12G18)  
R. Zimmerman, NRR (O-12G18)  
A. Thadani, NRR (O-12G18)  
S. Varga, NRR (O-14E4)  
J. Zwolinski, NRR (O-14H3)  
J. Roe, NRR (O-13E4)  
E. Adensam, NRR (O-13E4)  
B. Sheron, NRR (O-7D26)  
G. Lainas, NRR (O-7D26)  
G. Holahan, NRR (O-8E2)  
M. Virgilio, NRR (O-8E2)  
S. Rosenberg, NRR (O-10E4)  
R. L. Spessard, NRR (O-9A2)  
B. Boger, NRR (O-10H5)  
D. Coe, ACRS (T-2E26)  
E. Jordan, AEOD (T-4D18)  
C. Rossi, AEOD (T-4A9)  
F. Congel, AEOD (T-4D28)  
K. Brockman, AEOD (T-4A23)  
S. Rubin, AEOD (T-4D28)  
M. Harper, AEOD (T-4A9)  
V. McCree, EDO (O-17G21)  
F. Ingram, PA (O-2G5)  
D. Morrison, RES (T-10F12)  
A. Bates, SECY (O-16G15)  
T. Martin, Region I  
R. Cooper, Region I  
S. Ebnetter, Region II  
E. Merschoff, Region II  
S. Vias, Region II  
H. Miller, Region III  
W. Axelson, Region III  
L. Callan, Region IV  
J. Dyer, Region IV  
K. Perkins, Region IV/WCFO  
S. Newton, INPO  
J. Zimmer, DOE

F. Rinaldi (O-14E21)  
J. Stolz (O-14E21)

LIST OF ATTENDEES

OPERATING REACTORS EVENTS FULL BRIEFING (95-12)

SEPTEMBER 27, 1995

<u>NAME</u>	<u>OFFICE</u>	<u>NAME</u>	<u>OFFICE</u>
A. CHAFFEE	NRR	G. HAMMER	NRR
J. CARTER	NRR	M. DAVIS	NRR
R. DENNIG	NRR	I. JUNG	NRR
D. SKEEN	NRR	D. WESSMAN	NRR
N. HUNEMULLER	NRR	R. JONES	NRR
E. GOODWIN	NRR	R. GALLO	NRR
A. BYRDSONG	NRR	C. CARPENTER	EDO
W. BURTON	NRR	M. MARKLEY	ACRS
B. GRIMES	NRR	M. WEGNER	AEOD
B. HUGHES	NRR	E. ROSSI	AEOD
F. PINALDI	NRR	J. SORENSEN	OMC/KE
S. LEE	NRR	F. CHERNY	RES
T. CHAN	NRR	A. SERKIZ	RES

TELEPHONE ATTENDANCE  
(AT ROLL CALL)

Regions

Region I  
Region II  
Region III  
Region IV

Resident Inspectors

Misc.

K. Jenison, Region I

Attachment 1

**OPERATING REACTORS EVENTS BRIEFING 95-12**

**LOCATION: C-10 B11, WHITE FLINT  
WEDNESDAY, SEPTEMBER 27, 1995, 11:00 A.M.**

**LIMERICK, UNIT 1**

**TRANSIENT INVOLVING  
OPEN SAFETY RELIEF  
VALVE FOLLOWED BY  
COMPLICATIONS**

**PRESENTED BY:**

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

LIMERICK, UNIT 1  
TRANSIENT INVOLVING OPEN SAFETY RELIEF  
VALVE FOLLOWED BY COMPLICATIONS  
SEPTEMBER 11, 1995

PROBLEM

WHILE OPERATING AT 100 PERCENT POWER, A MAIN STEAM LINE SAFETY RELIEF VALVE (SRV) OPENED; SUBSEQUENTLY, DURING OPERATION TO REMOVE HEAT FROM THE SUPPRESSION POOL, OPERATION OF ONE RESIDUAL HEAT REMOVAL (RHR) PUMP BECAME ERRATIC.

CAUSE

THE SRV, A TWO STAGE TARGET ROCK VALVE WHICH HAD BEEN "LEAKING", SUDDENLY FAILED OPEN, BELIEVED TO BE DUE TO EXCESSIVE STEAM LEAKAGE THRU THE PILOT VALVE.

SAFETY SIGNIFICANCE

THIS IS THE FIRST INSTANCE OF THIS TYPE OF SRV FAILING OPEN. ERRATIC OPERATION OF THE RHR PUMP APPEARS TO BE ANOTHER EXAMPLE OF CLOGGING OF A SUCTION STRAINER LOCATED IN THE SUPPRESSION POOL.

DISCUSSION

- REACTOR WAS BEING OPERATED AT 100 PERCENT POWER.
- THE "A" RHR PUMP HAD BEEN OPERATING IN THE SUPPRESSION POOL COOLING MODE SINCE 11:16 AM TO REMOVE HEAT CAUSED BY LEAKING SRVs.

CONTACT: J. CARTER, NRR/DRPM/PECB  
REFERENCE: 10 CFR 50.72 #29316

AIT: NO  
SIGEVENT: TBD

- HISTORICALLY, SOME SRVs LEAKED; CURRENTLY, FIVE SRVs WERE CONSIDERED TO BE "LEAKERS".
- THE "M" SRV OPENED AT 12:47 PM; SHORTLY THEREAFTER THE "B" RHR PUMP WAS STARTED.
- ATTEMPTS TO CLOSE THE SRV WERE NOT SUCCESSFUL.
  - MAXIMUM COOLDOWN RATE WAS 130 F/HR
- AT 13:30, THE "A" RHR PUMP SECURED DUE TO FLUCTUATING CURRENT AND FLOW.
- MAXIMUM TEMPERATURE OF POOL WATER WAS LESS THAN 125 F.
- AFTER CHECKING OUT THE "A" RHR PUMP IT WAS RESTARTED AT 13:45 AND OPERATED AT SLIGHTLY LOWER FLOWS WITH NO FURTHER PROBLEM NOTICED.
- THE RECORDED PUMP SUCTION PRESSURE DECREASED WITH CONSTANT FLOW; THIS IS INDICATIVE OF AN INCREASING PRESSURE DROP ACROSS THE STRAINER.
- PLANT SHUTDOWN WAS NORMAL EXCEPT FOR THE ABOVE OUTLINED PROBLEMS.

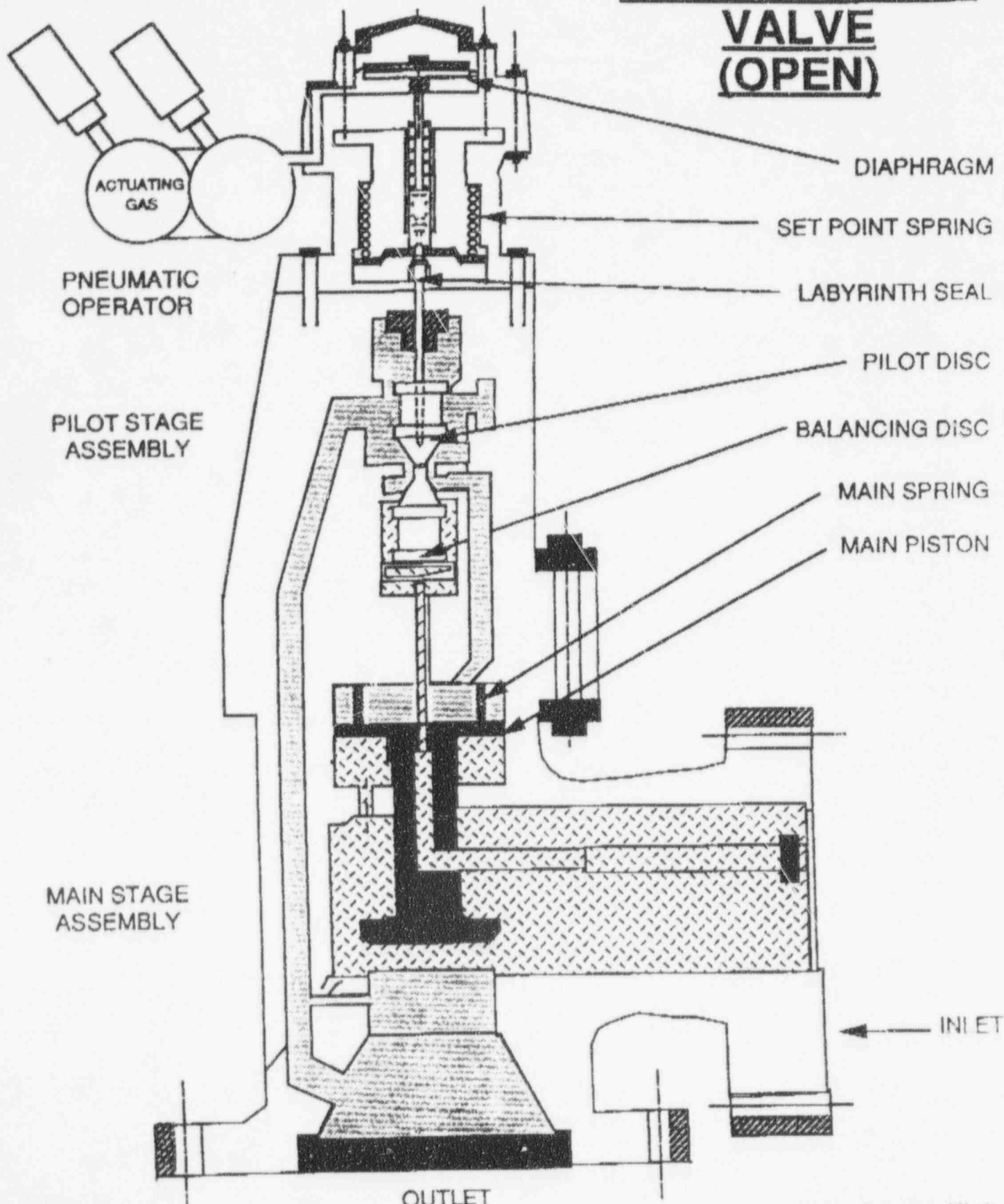
#### FOLLOWUP

- SPECIAL INSPECTION TEAM WAS ASSEMBLED AT THE SITE:
  - NRR HAD POOL STRAINER EXPERT ON TEAM
  - VALVE SPECIALIST ALSO ON TEAM

- A DIVER ENTERED THE POOL AND FOUND THAT THE "A" SUCTION STRAINER SURFACE HAD SUBSTANTIAL FOREIGN MATERIAL, FIBROUS AND SLUDGE:
  - FIBROUS MATERIAL WAS IDENTIFIED AS A PLASTIC, AND NOT FROM THE POOL
- THE OTHER STRAINERS ONLY HAD A "DUSTING".
- STRAINER IS A "T" ARRANGEMENT HAVING TWO TRUNCATED CONES WITH 5/8 INCH HOLES ON 7/8 INCH CENTER:
  - COVERED WITH WIRE MESH 12x12; WIRE DIAMETER IS 0.023 INCHES
- THE LEAKING SRVs WERE SENT OFF SITE FOR EVALUATION:
  - PROBLEM WAS THAT THE "M" SRV PILOT VALVE WAS LEAKING; NOT THE MAIN VALVE AS WERE THE OTHER SRVs.
    - LEAK RATE WAS ESTIMATED AS 3000 LBS/HR; TIGHT VALVE LESS THAN 30 LBS/HR
  - SIGNIFICANT EROSION WAS NOTED ON THE PILOT DISK; LESS ON SEAT
    - DISK AND PUSH ROD HAD DROPPED ABOUT 0.075 INCH
    - VALVES HAD BEEN REFURBISHED AND RECALIBRATED BY WESTINGHOUSE
    - INSITU TESTED AT 500 PSI
- DRAFT BULLETIN AND REGULATORY GUIDE ISSUED FOR PUBLIC COMMENT.
- INFORMATION NOTICE TO BE PREPARED.



# SAFETY RELIEF VALVE (OPEN)



ACTUATING GAS  
PNEUMATIC OPERATOR



PILOT STAGE ASSEMBLY

MAIN STAGE ASSEMBLY

DIAPHRAGM  
SET POINT SPRING  
LABYRINTH SEAL  
PILOT DISC  
BALANCING DISC  
MAIN SPRING  
MAIN PISTON

INLET

OUTLET

 System High Pressure  
 System Low Pressure

REACTOR SCRAM

Reporting Period: 09/04/95 to 09/10/95

<u>DATE</u>	<u>PLANT &amp; 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>
09/05/95	KEWAUNEE 1	96	SA	Equipment Failure	NO	1	1	2
09/05/95	FITZPATRICK 1	100	SA	Maintenance Error	NO	1	0	1
09/06/95	DIABLO CANYON 1	100	SA	Equipment Failure	NO	1	0	1
09/08/95	COOK 2	100	SM	Operating Error	NO	4	0	4

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  
09/10/95

SCRAM CAUSE	NUMBER OF SCRAMS	PERIOD ENDING 09/10/95				
		1995 WEEKLY AVERAGE (YTD)	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE	1992 WEEKLY AVERAGE	1991* WEEKLY AVERAGE
POWER GREATER THAN OR EQUAL TO 15%						
EQUIPMENT FAILURE*	2	1.91	1.52	1.83	2.62	2.83
DESIGN/INSTALLATION ERROR*	0	0.17	0.08	0.04	-	0.02
OPERATING ERROR*	1	0.17	0.21	0.27	0.31	0.04
MAINTENANCE ERROR*	1	0.44	0.54	0.52	0.50	-
EXTERNAL*	0	0.25	0.17	0.13	-	-
OTHER*	0	0.03	-	0.02	-	0.62
Subtotal	4	2.97	2.52	2.81	3.43	3.51
POWER LESS THAN 15%						
EQUIPMENT FAILURE*	0	0.14	0.27	0.38	0.42	0.27
DESIGN/INSTALLATION ERROR*	0	0.00	0.02	-	-	-
OPERATING ERROR*	0	0.17	0.08	0.13	0.15	-
MAINTENANCE ERROR*	0	0.11	-	0.02	0.08	-
EXTERNAL*	0	0.00	-	0.04	-	-
OTHER*	0	0.00	-	-	-	0.19
Subtotal	0	0.42	0.37	0.57	0.65	0.46
TOTAL	4	3.39	2.89	3.38	4.08	3.97

SCRAM TYPE	NO. OF SCRAMS	PERIOD ENDING 09/10/95				
		1995 WEEKLY AVERAGE (YTD)	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE	1992 WEEKLY AVERAGE	1991 WEEKLY AVERAGE
TOTAL AUTOMATIC SCRAMS	3	2.24	2.19	2.44	3.06	3.25
TOTAL MANUAL SCRAMS	1	1.13	0.69	0.94	1.02	0.69

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

REACTOR SCRAM

Reporting Period: 09/11/95 to 09/17/95

<u>DATE</u>	<u>PLANT &amp; 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>
09/11/95	LIMERICK 1	100	SM	Equipment Failure	NO	2	1	3
09/11/95	PERRY 1	100	SA	Equipment Failure	NO	2	1	3
09/14/95	INDIAN POINT 3	54	SM	Equipment Failure	NO	1	1	2
09/17/95	GRAND GULF 1	100	SA	Equipment Failure	NO	5	0	5

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  
09/17/95

<u>SCRAM CAUSE</u>	NUMBER OF SCRAMS	1995 WEEKLY AVERAGE (YTD)	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE	1992 WEEKLY AVERAGE	1991* WEEKLY AVERAGE
POWER GREATER THAN OR EQUAL TO 15%						
EQUIPMENT FAILURE*	4	1.97	1.52	1.83	2.62	2.83
DESIGN/INSTALLATION ERROR*	0	0.16	0.08	0.04	-	0.02
OPERATING ERROR*	0	0.16	0.21	0.27	0.31	0.04
MAINTENANCE ERROR*	0	0.43	0.54	0.52	0.50	-
EXTERNAL*	0	0.24	0.17	0.13	-	-
OTHER*	0	0.03	-	0.02	-	0.62
Subtotal	4	2.99	2.52	2.81	3.43	3.51
POWER LESS THAN 15%						
EQUIPMENT FAILURE*	0	0.13	0.27	0.38	0.42	0.27
DESIGN/INSTALLATION ERROR*	0	0.00	0.02	-	-	-
OPERATING ERROR*	0	0.16	0.08	0.13	0.15	-
MAINTENANCE ERROR*	0	0.11	-	0.02	0.08	-
EXTERNAL*	0	0.00	-	0.04	-	-
OTHER*	0	0.00	-	-	-	0.19
Subtotal	0	0.40	0.37	0.57	0.65	0.46
TOTAL	4	3.39	2.89	3.38	4.08	3.97

<u>SCRAM TYPE</u>	NO. OF SCRAMS	1995 WEEKLY AVERAGE (YTD)	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE	1992 WEEKLY AVERAGE	1991 WEEKLY AVERAGE
TOTAL AUTOMATIC SCRAMS	2	2.23	2.19	2.44	3.06	3.25
TOTAL MANUAL SCRAMS	2	1.16	0.69	0.94	1.02	0.69

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

REACTOR SCRAM

Reporting Period: 09/18/95 to 09/24/95

<u>DATE</u>	<u>PLANT &amp; 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>
09/23/95	DIABLO CANYON 2	50	SM	Other	NO	1	0	1
09/24/95	LASALLE 1	98	SM	Equipment Failure	NO	2	0	2

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  
09/24/95

<u>SCRAM CAUSE</u>	NUMBER OF SCRAMS	1995 WEEKLY AVERAGE (YTD)	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE	1992 WEEKLY AVERAGE	1991* WEEKLY AVERAGE
POWER GREATER THAN OR EQUAL TO 15%						
EQUIPMENT FAILURE*	1	1.94	1.52	1.83	2.62	2.83
DESIGN/INSTALLATION ERROR*	0	0.16	0.08	0.04	-	0.02
OPERATING ERROR*	0	0.16	0.21	0.27	0.31	0.04
MAINTENANCE ERROR*	0	0.42	0.54	0.52	0.50	-
EXTERNAL*	0	0.24	0.17	0.13	-	-
OTHER*	1	0.05	-	0.02	-	0.62
Subtotal	2	2.97	2.52	2.81	3.43	3.51
POWER LESS THAN 15%						
EQUIPMENT FAILURE*	0	0.13	0.27	0.38	0.42	0.27
DESIGN/INSTALLATION ERROR*	0	0.00	0.02	-	-	-
OPERATING ERROR*	0	0.16	0.08	0.13	0.15	-
MAINTENANCE ERROR*	0	0.10	-	0.02	0.08	-
EXTERNAL*	0	0.00	-	0.04	-	-
OTHER*	0	0.00	-	-	-	0.19
Subtotal	0	0.39	0.37	0.57	0.65	0.46
TOTAL	2	3.36	2.89	3.38	4.08	3.97

<u>SCRAM TYPE</u>	NO. OF SCRAMS	1995 WEEKLY AVERAGE (YTD)	1994 WEEKLY AVERAGE	1993 WEEKLY AVERAGE	1992 WEEKLY AVERAGE	1991 WEEKLY AVERAGE
TOTAL AUTOMATIC SCRAMS	0	2.18	2.19	2.44	3.06	3.25
TOTAL MANUAL SCRAMS	2	1.18	0.69	0.94	1.02	0.69

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	-----	175
Manual and Automatic Scrams for 1994	-----	150
Manual and Automatic Scrams for 1995	--(YTD 09/24/95)--	128



OPERATING REACTOR PLANTS SIGNIFICANT EVENTS

No Sort Specified

QUERY> Event Type SIG & Close Out Date >= 07/01/95 & Close Out Date <= 07/31/95

<u>PLANT &amp; UNIT</u>	<u>DATE OF</u> <u>EVENT</u>	<u>50.72</u> <u>NUMBER</u>	<u>DESCRIPTION OF EVENT</u>	<u>SIGNIFICANCE</u>	<u>OR</u> <u>BRIEFING</u>	<u>PRESENTER</u>	<u>CLOSEOUT</u> <u>RECORD</u>
BRAIDWOOD 2	02/15/95	0	Braidwood assessed 100K civil penalty for maintenance errors that created a containment bypass through the hydrogen monitors.	Containment		TAPPERT J.	HIGHLIGHT