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FROM: Carolina Power & Light Raleigh, N.C. 27602 Mr. E.E. Utley		DATE OF DOC 11-22-74	DATE REC'D 11-26-74	LTR X	TWX	RPT	OTHER
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CLASS	UNCLASS XXX	PROP INFO	INPUT	NO CYS REC'D 40	DOCKET NO: 50-261		

DESCRIPTION:

Ltr reporting an abnormal Occurrence at the H.B. Robinson Nuclear Unit #2....trans the following.....

ENCLOSURES:

Abnormal Occurrence No. 50-261/74-24 concerning failure of Valve V-2-16C....

ACKNOWLEDGED

(40 cys encl rec'd)

PLANT NAME:

H.B. Robinson

DO NOT REMOVE

FOR ACTION/INFORMATION

11-27-74

JB

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Carolina Power & Light Company

November 22, 1974

Regulatory Docket File

50-261

File: NG-3513 (R)

Serial: NG-74-1399

Mr. Norman C. Moseley, Director
Directorate of Regulatory Operations
U. S. Atomic Energy Commission
Region II, Suite 818
230 Peachtree Street, N.W.
Atlanta, Georgia 30303



Mr. Donald Knuth, Director
Directorate of Regulatory Operations
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Sirs:

H. B. ROBINSON UNIT NO. 2
LICENSE NO. DPR-23
FAILURE OF VALVE V2-16C TO OPEN

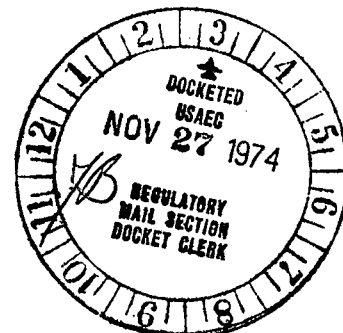
In accordance with 6.6.2.a of the Technical Specifications for H. B. Robinson Unit No. 2, the attached Abnormal Occurrence Report is submitted for your information. This report fulfills the requirement for a written report within ten days of an Abnormal Occurrence and is in accordance with the format set forth in Regulatory Guideline 1.16, Revision 1.

Yours very truly,

E. E. Utley
Vice-President
Bulk Power Supply

JBM:DBW:mvp
Attachment

cc: Messrs. N. B. Bessac
W. B. Howell
J. B. McGirt
D. V. Menscer
D. B. Waters



12059

ABNORMAL OCCURRENCE REPORT

1. Report No. 50-261/74-24
- 2a. Date November 19, 1974
- 2b. Occurrence Date November 13, 1974
3. Facility H. B. Robinson Unit No. 2
Hartsville, South Carolina 29550

4. Identification of Occurrence

Valve V2-16C, Auxiliary Feedwater Pump discharge valve to "C" Steam Generator, failed to open.

5. Conditions Prior to Occurrence

The plant was at 100% nuclear power with all conditions normal.

6. Description of Occurrence

On November 13, 1974, it was determined that the check valves located in the three auxiliary feedwater (AFW) pumps discharge lines were not seated properly allowing feedwater to leak back to the pumps. This leakage was causing abnormal overheating of the AFW pumps. At 0017, "A" AFW pump was started in an attempt to reseal the check valves and stop the leakage. The motor operated isolation valves in the discharge lines are designed to open upon start of an AFW pump. However, status lights on the RTGB indicated that valve V2-16C, discharge valve to "C" steam generator, had failed to open. After determining the valve was inoperative the Steam Driven Auxiliary Feedwater Pump was test operated to insure feedwater flow to all steam generators would be maintained during an emergency condition. An investigation was undertaken to determine the cause of V2-16C's failure.

7. Designation of Apparent Cause of Occurrence

The valve plug was found to be tightly wedged against the seat rings. Heat was applied to the valve body in order to expand the valve seat and free the plug. The Limitorque operator was removed and taken to the maintenance shop for disassembly and inspection.

Inspection of the torque switch revealed that the roller on the torque switch arm (see attached drawing) had an excessive amount of play in it. This caused the torque switch to delay shutting off the drive motor when the valve was being closed. The delay resulted in excessive torque being applied to seat the valve. Therefore, the valve plug was jammed against the seat rings so tightly that the drive motor could not develop enough torque to pull the valve plug free.

8. Analysis of Occurrence

There were no personal injuries nor was any radioactive materials involved in the occurrence.

The failure of this valve would have prevented addition of water to "C" Steam Generator from the motor driven Auxiliary Feedwater Pumps. However, feedwater to all steam generators was being supplied by the main feedwater pumps. Therefore, the safe operation of the plant was not affected during the occurrence. During normal plant operation the AFW pumps are automatically started on low level in a steam generator, loss of both MFW pumps, loss of normal plant power, or by safeguards actuation. In the event of a similar failure of V2-16C during an automatic start of the AFW pumps, the safety of the plant would not be endangered unless in the unlikely event both MFW pumps and the Steam Driven FW Pump were out of service. Even then two steam generators would be operable, allowing time for corrective action to be taken. (Technical Specification 3.1.1.2 states that whenever average primary coolant temperature is above 350°F at least two steam generators must be operable.)

Valve V2-16C was out of service for 16 hours.

9. Corrective Action

The torque switch on the operator from V2-16C was replaced. However, because of the high failure rate of this particular valve it was decided to swap this operator with an identical Limitorque operator on V2-20B, cross-connect between AFW pumps discharge lines "B" and "C." V2-16C and V2-20B were reassembled and test operated several times without failure.

After the previous failure on October 15, 1974, a study was made of replacing the valve operator on V2-16C with the same model operator from a non-safety related system. Such a substitute was not available on the other systems. Therefore the above substitution was made.

In switching the valve operators the variables of valve and operator have been separated. Therefore, if any further failure should occur in either valve the major component causing the problem will be defined. To date no repetitive mode of failure has been identified. The result of each occurrence has been a failure of the valve to open due to it being "frozen" on the valve seat. However, the identified cause of the failure has differed in each case as listed in Section 10 below.

It is apparent that the failures of this operator are not a generic nature in that the other two valves on the auxiliary feedwater pump discharge are the same model, are equipped the same, and have experienced no failures.

The installation of an operator that has no failure history on valve V2-16C increases the reliability of this critical application. In addition to this action a replacement operator is to be ordered for use in the event of future failures and/or replacement of the troublesome valve such that it may be shop tested to isolate the failure mode.

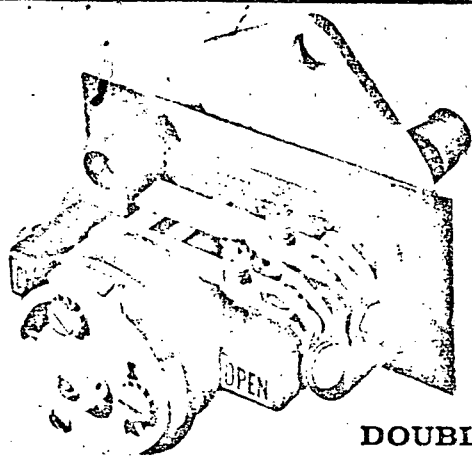
10. Failure Data

A. Four previous malfunctions of this valve have occurred:

1. On August 21, 1973, a damaged worm drive gear in the Limitorque operator prevented valve stem movement. The worm gear was replaced and the valve returned to service.
2. On December 17, 1973, binding in the operator gear drive prevented the valve from fully opening. The operator was repaired and returned to service.
3. On August 31, 1974, a burr on the valve seat wedged the valve plug against the seat rings preventing movement. The burr was filed off and returned to service.
4. On October 15, 1974, an intermittent torque switch caused the valve plug to be driven in too tightly against the seat rings. The drive motor could not develop enough torque to pull the valve free. The torque switch was adjusted and the valve returned to service.

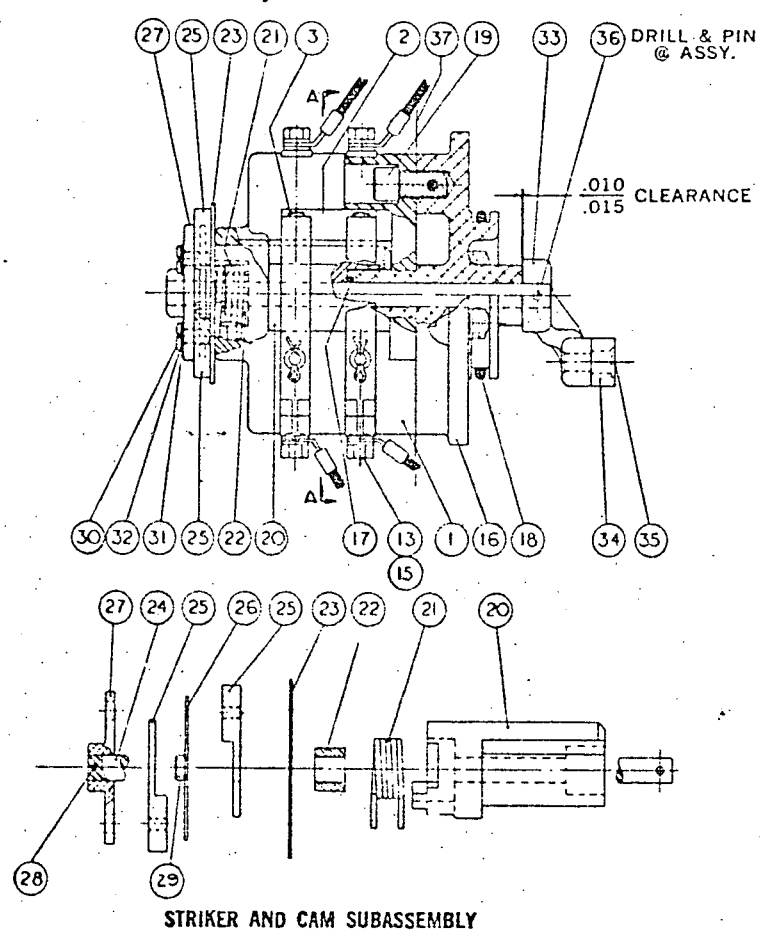
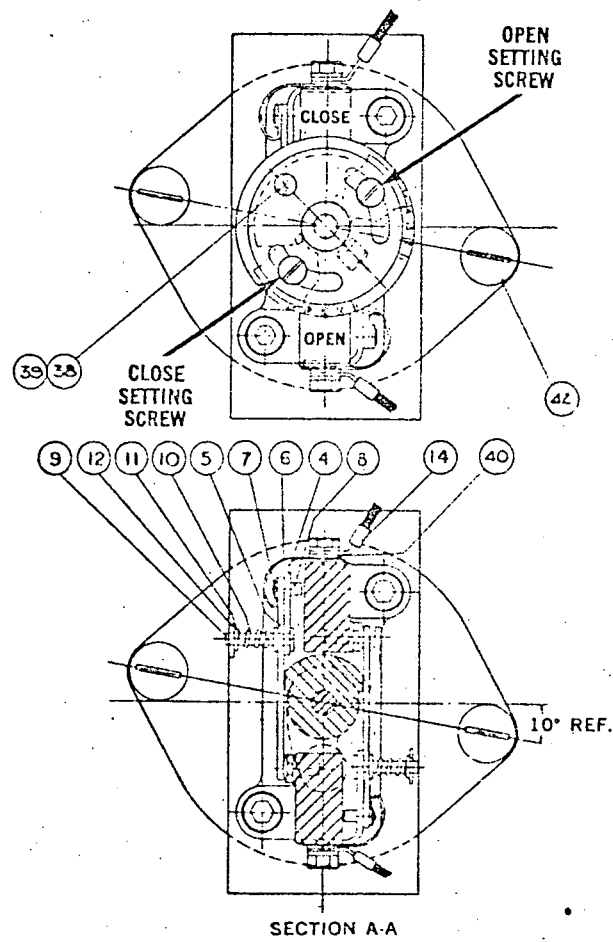
B. Valve V2-16C is a Chapman, 4", L-900 W.E.O.S. Pressure Seal Gate valve with a SMB-00, 10 ft-lb Limitorque operator.

FIGURE 1 PROCEDURE FOR SETTING TORQUE SWITCH FC SMB-00/SMB-000



1. Torque setting must be made with switch mounted in Limitorque.
2. Make sure all electric power is off.
3. Loosen pan head screws, pc. #30.
4. For open or close operation set striker pc. #25 to required torque setting, matching the edge of the striker with desired number. Output torque increases with higher numbers.
5. Tighten pc. #30.
6. Operate valve electrically to seat valve, insuring tight shut-off.

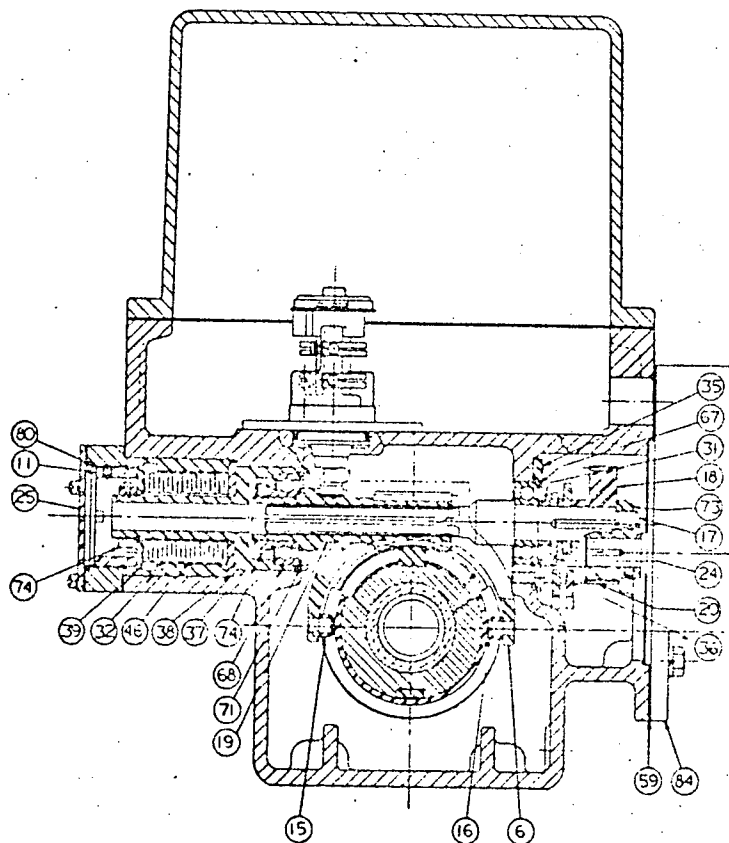
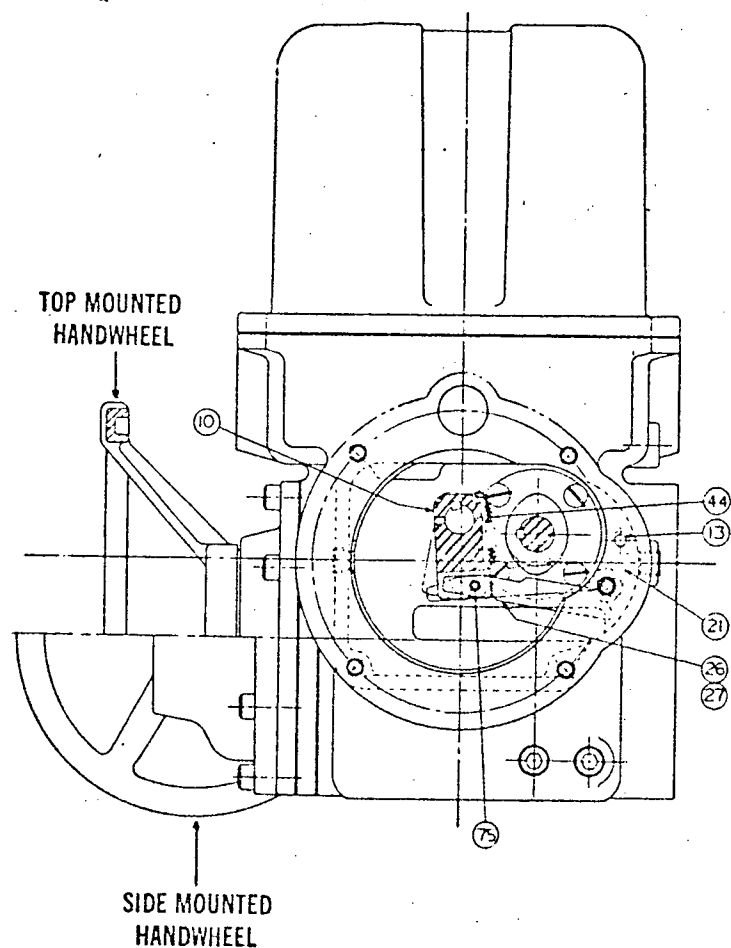
DOUBLE TORQUE SWITCH SMB-00/SMB-000



01-474-0016-4

PC. NO.	NO. REQD.	DESCRIPTION	PC. NO.	NO. REQD.	DESCRIPTION	PC. NO.	NO. REQD.	DESCRIPTION
1	1	TERMINAL BLOCK	15	4	LOCKWASHER SHAKEPROOF	29	1	#4 SWAGE NUT
2	2	CONTACT BRIDGE	16	1	TORQUE SW. MTG. BRACKET	30	2	PAN HD. SCREW #8-32 x 1/16 LG. SLOTTED
3	4	CONTACT SCREW	17	1	"O" RING	31	2	LOCKWASHER SHAKEPROOF
4	4	FINGER HOLDER	18	1	"O" RING	32	2	FLATWASHER 1/16 I.D. x 1/16 O.D. x .032 THK.
5	4	FINGER	19	2	SOC. HD. CAP SCR. 1/4-20 x 1/2 LG.	33	1	ARM
6	4	SHUNT	20	1	CAM	34	1	ROLLER
7	4	SHUNT WASHER 1/4 O.D. 1/2 I.D. 1/2 THK.	21	1	TORSION SPRING	35	1	ROLLER PIN
8	4	RIVET	22	1	SPRING MANDREL	36	1	GROOVE PIN 1/2 DIA. x 1/2
9	4	FINGER SPRING STUD	23	1	DIAL	37	1	ARC BARRIER
10	4	COMPRESSION SPRING	24	1	SHAFT	38	1	PAN HD. SCR. #4-40 x 1/2
11	8	SPRING CUP WASHER	25	2	STRIKER	39	1	LOCKWASHER, EXTERNAL TOOTH
12	4	COTTER PIN (1/16 x 1/2)	26	1	TORQUE LIMITING PLATE	40	4	WASHER 1/16 O.D. x 1/16 I.D. x 1/2 THK.
13	4	HEX. HD. MACH. SCR. #10-32 x 1/2	27	1	STRIKER HUB	42	2	RD. HD. MACH. SCR. 1/16-18 x 1/2
14	4	RING TORQUE CONNECTOR 18" #16 AWG TYPE TU PIGTAIL	28	1	ROLL PIN 1/16 Ø x 1/2			

FIGURE 2



01-403-0035-4

PC. NO.	DESCRIPTION	PC. NO.	DESCRIPTION	PC. NO.	DESCRIPTION
65	ROLLER BEARING CUP	85	G. L. SW. CART. ASS'Y	100	BEVEL GEAR
66	ROLLER BEARING CONE	86	G. L. GEAR BOX SUB-ASS'Y	101	HANDWHEEL BEVEL PINION
67	BALL BEARING	87	G. L. SW. PANEL SUB-ASS'Y	102	BEARING SPACER
68	BALL BEARING	PARTS FOR TOP MOUNTED HANDWHEEL		103	"O" RING SPACER
70	RETAINING RING	88	HOUSING COVER	104	HANDLE
71	RETAINING RING	89	HANDWHEEL	105	HANDLE ROD
73	LOCKNUT	90	HOUSING COVER GASKET	106	GASKET
74	LOCKNUT	92	RETAINING RING	107	GASKET
75	SPRING PIN	93	GREASE FITTING	109	BALL BEARING
76	BUSHING	94	QUAD RING	110	BALL BEARING
77	MOTOR TERMINAL BLOCK	95	"O" RING	111	RETAINING RING
78	QUAD RING	PARTS FOR SIDE MOUNTED HANDWHEEL		112	RETAINING RING
79	QUAD RING	96	BEVEL GEAR HOUSING	113	GREASE FITTING
80	"O" RING	97	BEVEL PINION CAP	114	QUAD RING
83	TORQUE SWITCH ASS'Y	98	BEVEL GEAR CARTRIDGE	115	"O" RING
84	MOTOR ASS'Y	99	HANDWHEEL		