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POWER BUILDING
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81-014-032

WILLIAM O. PARKER, JR.
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March 9, 1981

Mr. James P. O'Reilly, Director
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Re: Oconee Nuclear Station
Docket No. 50-269

Dear Mr. O'Reilly:

Please find attached Reportable Occurrence Report RO-269/81-5. This report is submitted pursuant to Oconee Nuclear Station Technical Specification 6.6.2.1.a(9), which concerns the discovery of a condition that requires corrective action to prevent the existence of a potentially unsafe condition.

Very truly yours,

William O. Parker, Jr. by PKB

William O. Parker, Jr.

FTP:pw
Attachment

cc: Director
Office of Management & Program Analysis
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Director
Office of Nuclear Reactor Regulation
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DUKE POWER COMPANY
OCONEE NUCLEAR STATION

Report Number: RO-269/81-5

Report Date: March 9, 1981

Occurrence Date: February 22, 1981

Facility: Oconee Unit 1, Seneca, South Carolina

Identification of Occurrence: Leaking LPI Check Valve

Conditions Prior to Occurrence: RCS Heatup (~300°F, 750 psig)

Description of Occurrence: At approximately 1800 hours on February 22, 1981, a check valve in the Unit 1 Low Pressure Injection (LPI) System was discovered to be leaking excessively during the performance of an intersystem LOCA leak test. The leaking valve was 1 CF-12, which is the final valve in LPI loop "B" before reaching the reactor vessel (see Figure 1). The leakage of the valve is considered to constitute a condition that requires corrective action to prevent the existence of a potentially unsafe condition, and is thus reportable pursuant to Technical Specification 6.6.2.1.a(9).

Apparent Cause of Occurrence: 1 CF-12 is a 14-inch Crane Co. 1500 PSI Alloy Steel Swing Check Valve (design pressure of 2500 PSIG). Figure 2 provides some details about this type of valve. The disc in this type of valve has a cylindrical "knob" on its back which is inserted through a hole in the hinge arm and then has a retainer ring welded to it to hold the assembly together (see Figure 3). This method of assembly allows the valve disc to pivot to a certain extent on the hinge arm. By pivoting, the disc is allowed to find its seat properly should the mating surfaces become slightly altered. A manufactured tolerance of 3 to 11 mils between the disc "knob" and the hinge at the pivot prevents the disc from swaying too freely.

Examination of the valve disc-hinge assembly in 1 CF-12 has shown that the disc had become frozen at the pivot in a cocked position. Consequently, only about half of the disc was seating. The "freezing" of the disc at the pivot was apparently caused by a buildup of deposits in the gap between the hinge and the disc "knob" on the side of the knob closest to the hinge pin. While there is flow through the valve, the disc is normally in a cocked position, and it is postulated that the flow could carry deposits into the pivot gap area, where they could accumulate. The accumulation of deposits could then cause the disc to remain slightly cocked when the flow was stopped.

During examination of the valve disc, the retaining ring was removed and unsuccessful attempts were made to remove the disc from the hinge. Both the hinge and disc are made of the same type of stainless steel (ASTM Spec. No. A351 GR. CF8M) and under the high temperature of unit operation, some galling could have occurred. At the time of this report, the disc is still connected to the hinge.

Analysis of Occurrence: Prior to the testing of 1 CF-12, backup check valves 1 CF-11 and 1 LP-47 (see Figure 1) had been leak tested and both had shown zero leakage. In addition, the LPI loop "B" motor operated valve 1 LP-18 was in its normal closed position during this period of time. Thus, the prevention of leakage from the RCS to the low pressure section of the LPI system was assured.

Examination of 1 CF-12 showed that although the disc was not seating properly, it remained capable of swinging up to its cocked position under LPI flow conditions. Additionally, all equipment required to mitigate the consequences of an accident at the conditions during the time of this incident were operable. Therefore, LPI flow through loop "B" was always available if needed.

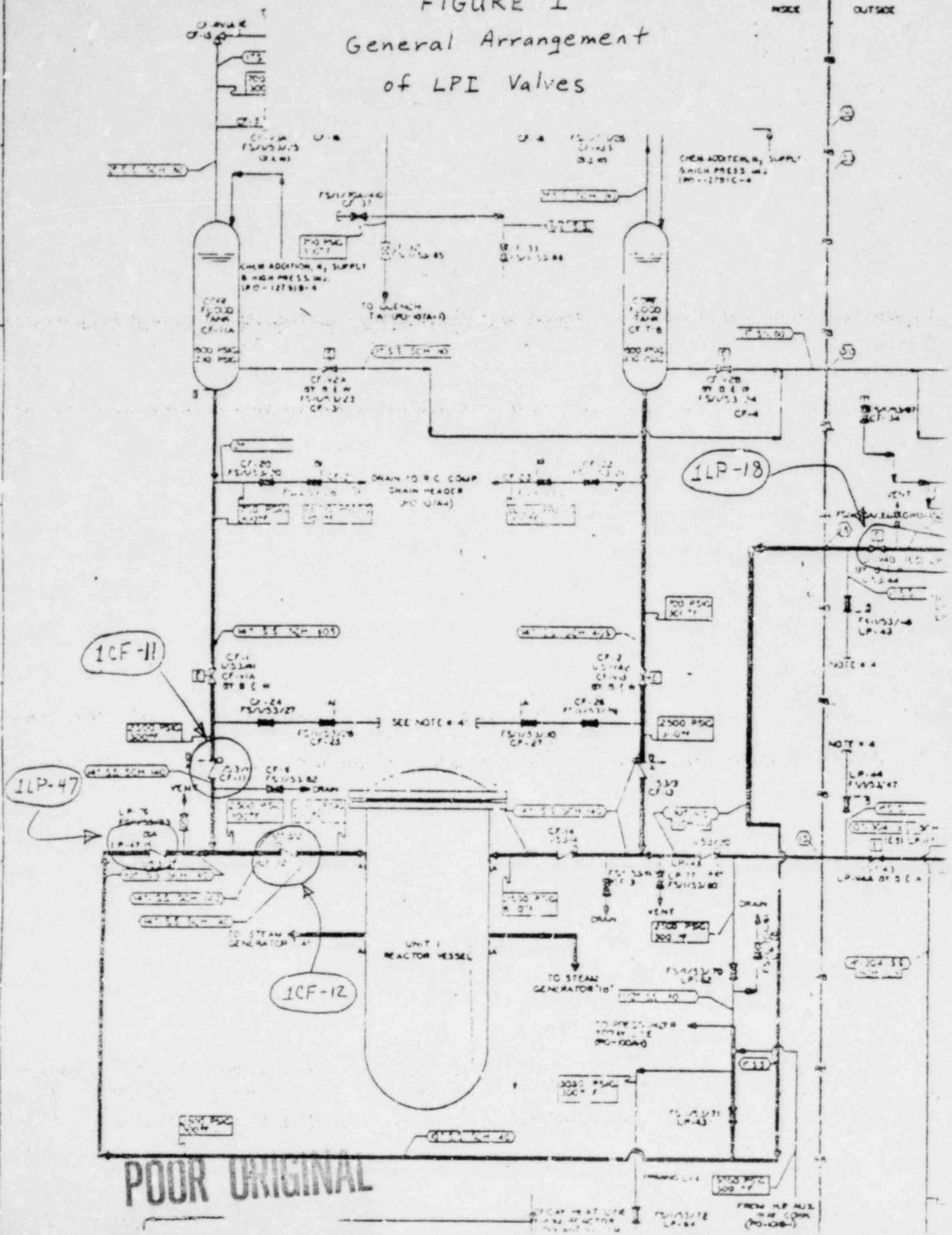
1 CF-12 is the first valve, out of a total of 18 of the same type of valve leak tested at Oconee, which has shown any leakage problem. During the final preparation of this report, another check valve of the same type was found to be leaking on Oconee Unit 3. The details of this incident will be provided in a separate report. Duke Power Company will be continuing its investigation into the leakage problems observed with these two valves to determine if generic implications exist. Duke will keep the NRC informed of any significant developments during this investigation.

Corrective Action: The unit was returned to cold shutdown conditions so that the valve could be repaired. The valve seat of 1 CF-12 was lapped and the internals (disc, hinge, and hinge pin) were replaced with new parts. The valve was retested on March 2, 1981 and revealed zero leakage by the seat.

An analysis will be performed on the substance in the pivot gap of the valve to determine its origin. Extreme contamination of the 1 CF-12 internals, however, has made examination of these parts undesirable at this point with respect to personnel exposure. These parts remain in the Unit 1 reactor building. It is expected that examination of these internals will be feasible during the Unit 1 refueling outage scheduled for this summer. A report on the results of the analysis of the pivot gap substance in 1 CF-12 will be provided to the NRC when this information becomes available.

FIGURE 1

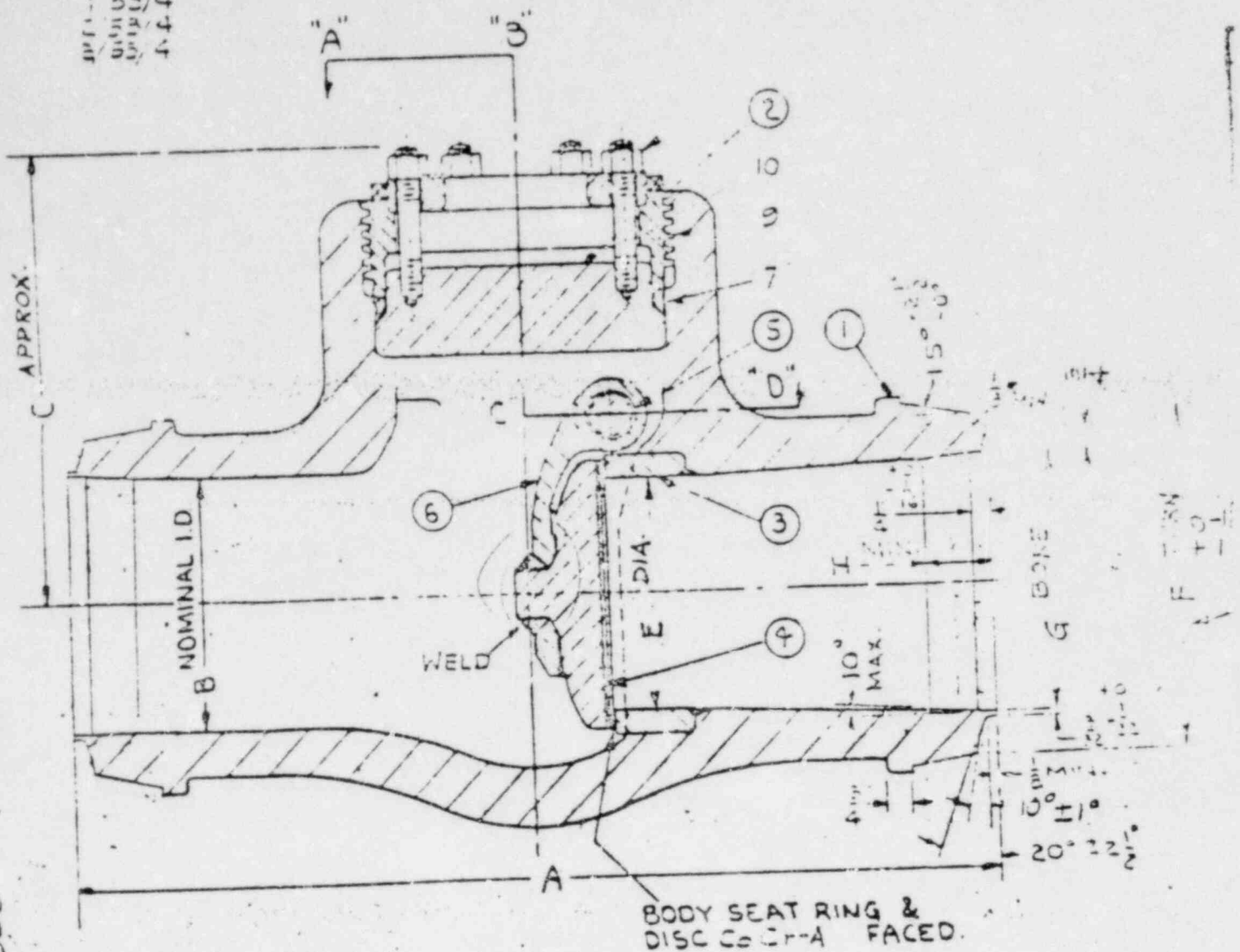
General Arrangement of LPI Valves



SECTION A-A.

FIGURE 2

Crane Check Valve Detail



VALVE SIZE	A	B	C	D	E	F	G	H	PIPE SCHED No.	QUANTITY
10	34	8 1/2	15	18	7 3/4	10 15/16	8.959 / 8.969	1.5	140	6
12	39	10 1/8	17 1/4	21	9 1/4	12 31/32	10 1/2	1 11/16		
14	42	11 3/16	19 1/4	23 3/4	10 5/8	14 1/4	11.771 / 11.751	1.875	140	

FIGURE 3

VIEW OF DISC PIVOT

10" TO 14" 1500 PSI ALLOY STEEL SWING CHECK VALVE