TENNESSEE VALLEY AUTHORITY
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JUL 31 1990

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of the Application of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) - INSTRUMENT LINES CORRECTIVE ACTION PROGRAM (CAP) PLAN - PROPOSED FINAL SAFETY ANALYSIS REPORT (FSAR) REVISIONS

This letter provides proposed updates to FSAR Sections 7.1.2.2, 7.2.1.1.5, 7.2.2.3.3, and Figure 7.2-3 concerning the Instrument Lines CAP Plan.

The additional wording proposed for Section 7.1.2.2 is required to fully describe instrument sense line independence for safety-related systems. The changes to Sections 7.2.1.1.5, 7.2.2.3.3, and Figure 7.2-3 are to delete unnecessary detailed information from the FSAR. The enclosure provides an advance copy of the proposed updates to those sections so that current information concerning the Instrument Lines CAP Plan at WBN is available for your review. These proposed revisions will be submitted in a subsequent FSAR amendment.

If there are any questions concerning this matter, please contact R. J. Stevens at (615) 365-8650.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

E. G. Wallace, Manager
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Enclosures
cc: See page 2

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ENCLOSURE

PROPOSED REVISION TO FINAL SAFETY
ANALYSIS REPORT (FSAR) SECTIONS
7.1.2.2
7.2.1.1.5
7.2.2.3.3
FIGURE 7.2-3

provided during the design and installation is discussed in Chapter 17 which addresses the Quality Assurance programs applied by Westinghouse and TVA.

The electrical power supply instrumentation and control conductors for redundant circuits of a nuclear plant have physical separation including PAM Category I and protection set I, II, III and IV instrumentation and control. Their cables are run in separate raceways to preserve divisional integrity and to ensure that no single credible event will prevent operation of the associated function due to electrical conductor damage. Detailed information pertaining to electrical cable for safety-related systems is given in Section 8.3.1.4. Critical circuits and functions include: power, control, and protection instrumentation channels associated with the operations of the Reactor Trip System or Engineered Safety Features Actuation System. Credible events shall include, but not be limited to, the effects of short circuits, pipe rupture, missiles, etc., and are considered in the basic plant design. Control board details are given in Section 7.7.1.10. In the control board, separation of redundant circuits is maintained as described in Section 7.1.2.2.2. 63 63

INSERT A

7.1.2.2.1 General

1. Cables of redundant circuits are run in separate cable trays, conduits, ducts, penetrations, etc.

2. Circuits for nonredundant functions should be run in cable trays or conduit separated from those used for redundant circuits. Where this can not be accomplished, nonredundant circuits may be run in a cable tray, conduit, etc., assigned to a redundant function. When so routed, it must remain with that particular redundant circuit routing and shall not cross over to other redundant groups.

3. Horizontal and vertical separation shall be maintained between cable trays associated with redundant circuits.

4. Where it is impractical for reasons of equipment arrangement to provide separate cable trays, cables of redundant circuits may be isolated by physical barriers or be installed in separate metallic conduit or proven safe by test or analysis.

5. Power and control cables rated at 600 volts or below shall not be placed in cable trays with cables rated above 600 volts.

6. Low-level type signal cables shall not be routed in cable trays containing power cables. Higher level protection instrumentation analog and signal cables (above 100 mv) may be 63

INSERT A

Instrument sensing lines (including capillary systems) which serve safety-related systems identified in Section 7.1.1.1 are designed to meet the independence requirements of criterion 22 of the 1971 General Design Criteria and IEEE 279-1971 Section 4.6. The requirements consider the following events: (1) normal activities in the area (e.g., maintenance); (2) high and moderate energy jet streams, missiles, and pipe whip; and (3) possible damage caused by falling loads from the plant lifting systems (e.g., cranes, monorails). Exceptions to these requirements shall be evaluated for technical adequacy and documented in Design Basis Documents.

Where:

$\Delta T°_i$ is the full power ΔT in the ith loop

$S°_{ji}$ = manually input bias which corrects the individual T hot RTD value to the loop average.

The individual temperature signals are subjected to a quality checking routine to establish a quality status of the group value.

63

Delta T and T average are calculated as follows:

$$\Delta T_i = T^f_{h_{ave_i}} - T^f_{c_i}$$

$$T_{avg_i} = (T^f_{h_{ave_i}} + T^f_{c_i})/2.0$$

The calculated values for Delta T and T Average are then utilized for both the remainder of the Overtemperature and Overpower Delta T protection channel and channel outputs for control purposes.

7.2.1.1.5 Pressurizer Water Level Reference Leg Arrangement

The design of the pressurizer water level instrumentation includes a slight modification of the usual tank level arrangement using differential pressure between an upper and a lower tap. as shown in Figure 7.2-3. The modification consists of the use of a sealed reference leg instead of the conventional open column of water. Refer to Section 7.2.2.3.4 for an analysis of this arrangement.

DELETE

Overpressure protection is based upon the positive surge of the reactor coolant produced as a result of turbine trip under full load, assuming the core continues to produce full power. The self-actuated safety valves are sized on the basis of steam flow from the pressurizer to accommodate this surge at a setpoint of 2500 psia and an accumulation of 3 percent. Note that no credit is taken for the relief capability provided by the power-operated relief valves during this surge.

In addition, operation of any one of the power-operated relief valves can maintain pressure below the high pressure trip point for most transients. The rate of pressure rise achievable with heaters is slow, and ample time and pressure alarms are available to alert the operator of the need for appropriate action.

DELETE

Redundancy is not compromised by having a shared tap since the logic for this trip is two out of four. If the shared tap is plugged, the affected channels will remain static. If the impulse line bursts, the indicated pressure will drop to zero. In either case the fault is easily detectable, and the protective function remains operable.

7.2.2.3.4 Pressurizer Water Level

Three pressurizer water level channels are used for reactor trip. Isolated signals from these channels are used for pressurizer water level control. A failure in the level control system could fill or empty the pressurizer at a slow rate (on the order of half an hour or more). 44

Experience has shown that hydrogen gas can accumulate in the upper part of the condensate pot on conventional open reference leg systems in pressurizer water level service. At Reactor Coolant System operating pressures, high concentrations of dissolved hydrogen in the reference leg water are possible. On sudden depressurization accidents, it has been hypothesized that rapid effervescence of the dissolved hydrogen could blow water out of the reference leg and cause a large level error, measuring higher than actual level. Accurate calculations of this effect have been difficult to obtain. To eliminate the possibility of such effects, a bellows is used in a pot at the top of the reference leg to provide an interface seal and prevent dissolving of hydrogen gas into the reference leg water. Supplier tests were run which confirmed a time response of less than 1.0 second for return to system accuracy requirements.

The reference leg is uninsulated and will remain at local ambient temperature. This temperature will vary somewhat over the length of the reference leg piping under normal operating

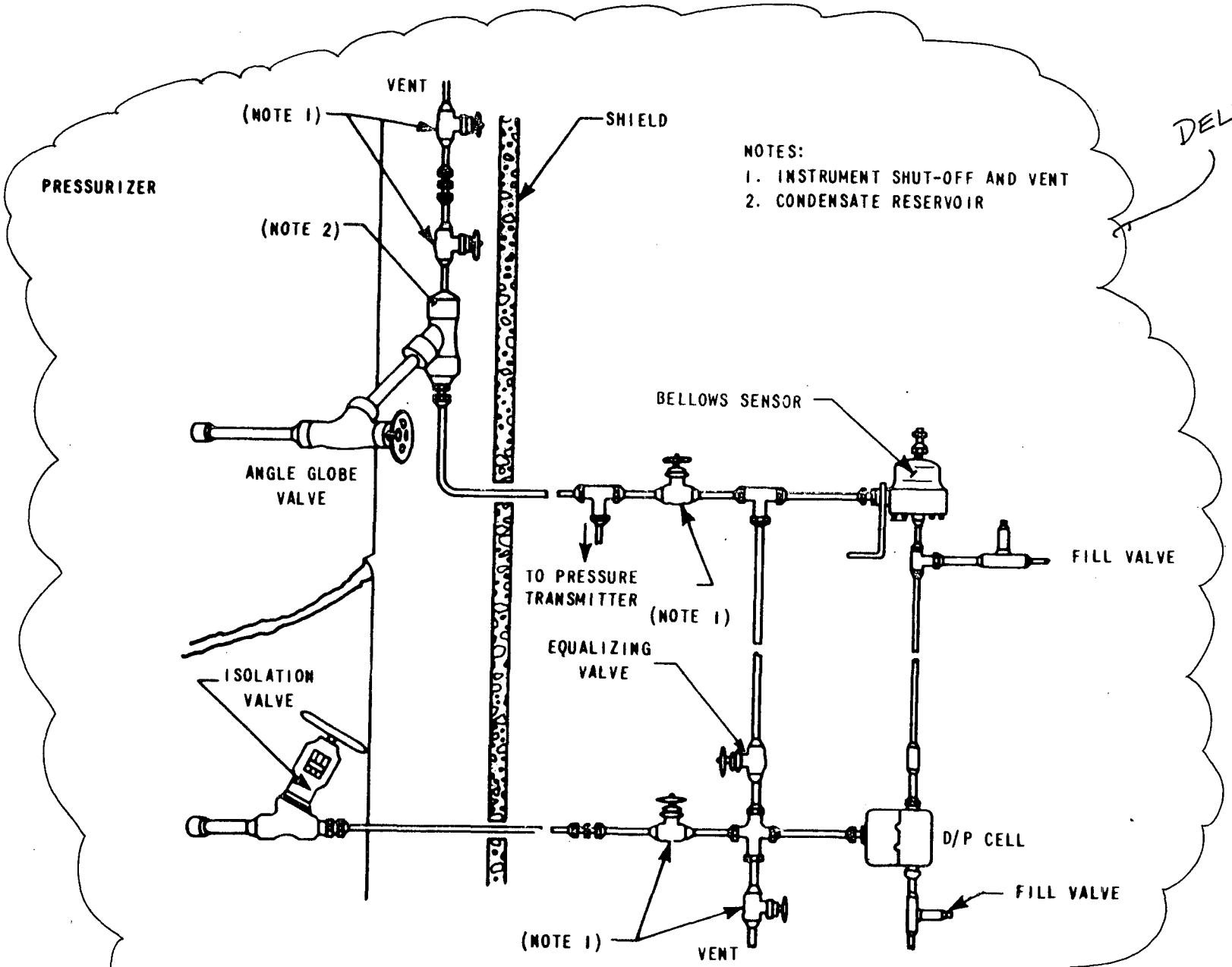

Figure 7.2-3 Pressurizer Sealed Reference Leg Level System

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