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OCT 0 2 1992

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Gentlemen:

| | | |
|---|---|---|
| In the Matter of the Application of | ) | Docket Nos. 50-390 |
| Tennessee Valley Authority | ) | 50-391 |

WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2 - NUREG-0737, ITEM.II.B.1 - REACTOR COOLANT SYSTEM (RCS) VENTS

This letter provides a revised response to TVA's letter dated August 12, 1982, concerning the subject NUREG-0737 item.

The referenced letter is being revised and superseded because of the removal of the Upper Head Injection (UHI) System. Revisions to the referenced letter are indicated by revision bars in the margin.

If you have any questions, please telephone John Vorees at (615) 365-8819.

Very truly yours,

W. J. Museler

William J. Museler

Enclosure
cc: See page 2



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ENCLOSURE

WATTS BAR NUCLEAR PLANT (WBN)
NUREG-0737, ITEM II.B.1
REACTOR COOLANT SYSTEM (RCS) VENTS

The following provides an update to TVA's previous letter dated August 12, 1982. Revisions to the referenced letter are noted by the revision bars. The response to the subject NUREG item is being revised because of Upper Head Injection (UHI) System removal.

Design Basis

The basic function of the Reactor Vessel Head Vent System (RVHVS) is to remove noncondensable gases or steam from the reactor vessel head. This system is designed to mitigate a possible condition of inadequate core cooling or impaired natural circulation resulting from the accumulation of noncondensable gases in the Reactor Coolant System (RCS). Also, the RVHVS is a safety grade letdown path for inventory control. During emergency or abnormal situations, the system is capable of providing a safety grade means of reactor coolant letdown for inventory control during boration.

General Description

The RVHVS is designed to remove noncondensable gases or steam from the RCS via remote manual operations from the Control Room. The RVHVS is connected above the reactor vessel to one of the standpipes from the now removed UHI System and discharges into the pressurizer relief tank (PRT). The RVHVS is designed to vent a volume of hydrogen at system design pressure and temperature approximately equivalent to one-half of the RCS volume in one hour.

The flow diagram of the RVHVS is shown in Figure 1. The system consists of one flow path with two sets of isolation valves located in series. Each set consists of two parallel isolation valves. The venting operation uses only one of these valves in each set at any one time. The equipment design parameters are listed in Table 1.

The active portion of the RVHVS consists of four one-inch solenoid operated valves. The inboard solenoid operated valves are open/close isolation valves. The outboard valves, located in the branch lines to the PRT are remotely operated throttle valves capable of regulating the flow rate through the system. With any combination of two (2) valves in series, the possibility of reactor coolant pressure boundary leakage is minimized. One inboard isolation valve is powered by one vital power supply, and the other inboard isolation valve is powered by a second vital power supply. The isolation valves are fail closed, normally closed active valves. Similarly, the throttle valve in one branch is powered by one vital power supply, and the throttle valve in the second branch line is powered by a second vital power supply. Those valves are also fail closed, normally closed valves. The isolation and throttle valves are included in the Westinghouse Valve

Operability Program which is an acceptable alternative to Regulatory Guide 1.48. These valves are qualified to IEEE Standard 323-1974, 344-1975, and 382-1972.

The system ensures that a vent path is available, even with a postulated single active failure. Similarly, the two sets of valves in series provide a single failure proof method of isolating the venting system. With two sets of valves in series, the failure of any one valve or power supply will not inadvertently open a vent path. Thus, the combination of safety-grade train assignments and valve failure modes will not prevent vessel head venting nor venting isolation with any single active failure.

The RVHVS has two normally deenergized valves in series in each flow path. This arrangement eliminates the possibility of a spuriously opened flow path due to the spurious movement of one valve. As such, power lockout to any valve is not considered necessary.

The RVHVS valves are operated from the Control Room. The operator procedures restrict fast opening of the outboard valves. This restrictive action precludes the possibility of large pressure changes across the valves. The isolation valves have stem position switches. The position indicator for each isolation valve is monitored in the Control Room by status lights. The throttle valve position is monitored by a linear voltage differential transmitter.

The inactive portion of the system consists of the piping, an orifice, one normally open manual valve, a refueling spool piece to accommodate reactor vessel head removal and one normally closed manual valve for possible high point venting. The reactor vent piping is orificed to 3/8-inch. This is orificed to limit the blowdown from a break downstream of the orifice to within the capacity of one of the centrifugal charging pumps. A break of the RVHVS line upstream of the orifice would result in an intermediate loss of coolant accident (LOCA) from the standpipes off of the reactor vessel head. Such a break is similar to those analyzed in the Final Safety Analysis Report (FSAR).

The system provides for venting the reactor vessel head by using only safety-grade equipment. From the orifice to the first anchor downstream of the throttle valves, the equipment is designed and fabricated in accordance with ASME Code, Section III, Class 2 requirements. The remainder of the piping is non-nuclear safety. The RVHVS satisfies applicable requirements and industry standards including the ASME Code classification, safety classification, single-failure criteria, and environmental qualification.

Function Restoration (FR)-I.3, "Response to Voids in Reactor Vessel," describes the procedure for venting the reactor.

With regard to venting of the pressurizer, TVA has replaced the previously installed air-operated relief valves with qualified solenoid-operated valves (power-operated relief valves) similar to those in the RVHVS to provide a qualified venting path. This modification has been implemented in lieu of a separate pressurizer vent system. This venting path also serves as part of the Cold Overpressure Mitigation System (COMS) that provides low temperature protection against overpressure.

TABLE 1

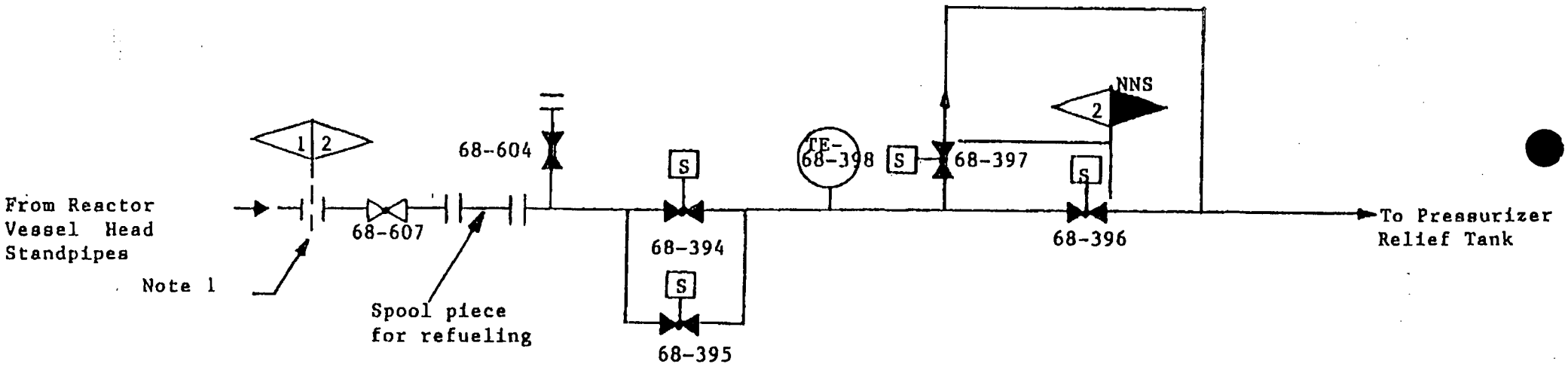
REACTOR VESSEL HEAD VENT SYSTEM EQUIPMENT
DESIGN PARAMETERS

Valves

| | |
|---|---|
| Number (includes two manual valves) | 6 |
| Design pressure, psig | 2,485 |
| Design temperature, °F | 650 |

Piping

| | |
|---|---|
| Vent line, nominal diameter, in. | 1 |
| Design pressure, psig | 2,485 |
| Design temperature, °F | 650 |
| Maximum operating temperature, °F | 620 |




Note 1 - Flow Restriction Allows Transition From ANSI Safety Class 1 to 2

Figure 1 - Reactor Vessel Head Vent System