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YANKEE ATOMIC ELECTRIC COMPANY

B.3.2.1
WYR 80-82

20 Turnpike Road Westborough, Massachusetts 01581

July 22, 1980

United States Nuclear Regulatory Commission
Washington, DC 20555

Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

References: (a) License No. DPR-3 (Docket No. 50-29)
(b) YAEC Letter to USNRC dated December 31, 1979 (WYR 79-163)
(c) USNRC Letter to YAEC dated October 30, 1979

Subject: Category "A" Item 2.1.9 - Reactor Coolant System Venting

Dear Sir:

In Reference (b) we provided a description of our proposed system to vent both the reactor vessel head and the pressurizer. This letter submits a revised description of the proposed modification. These revisions are the result of additional engineering and evaluation of equipment to meet the required design criteria. Enclosed are pages 18, 19, and Sketch A of the Attachment to Reference (b) which have been modified to reflect those changes. The major changes are summarized below.

1. The vessel head vent will be piped directly to the containment atmosphere. This area is more suitable for reactor vessel venting purposes. Adequate ventilation is provided to insure mixing of the gases.

2. A motor operated valve with suitable restriction orifice will be installed in the pressurizer vent path, and vent directly to the containment atmosphere.

Sketch A shows the proposed vent path modifications for the reactor vessel head and pressurizer. The equipment will be installed by January 1, 1981. As indicated in Reference (c), a proposal review by the staff is required prior to installation. Since our effort to implement this modification will proceed in parallel, we request that your evaluation be performed in a timely fashion.

If you have any questions or require additional information, please contact us.

Very truly yours,

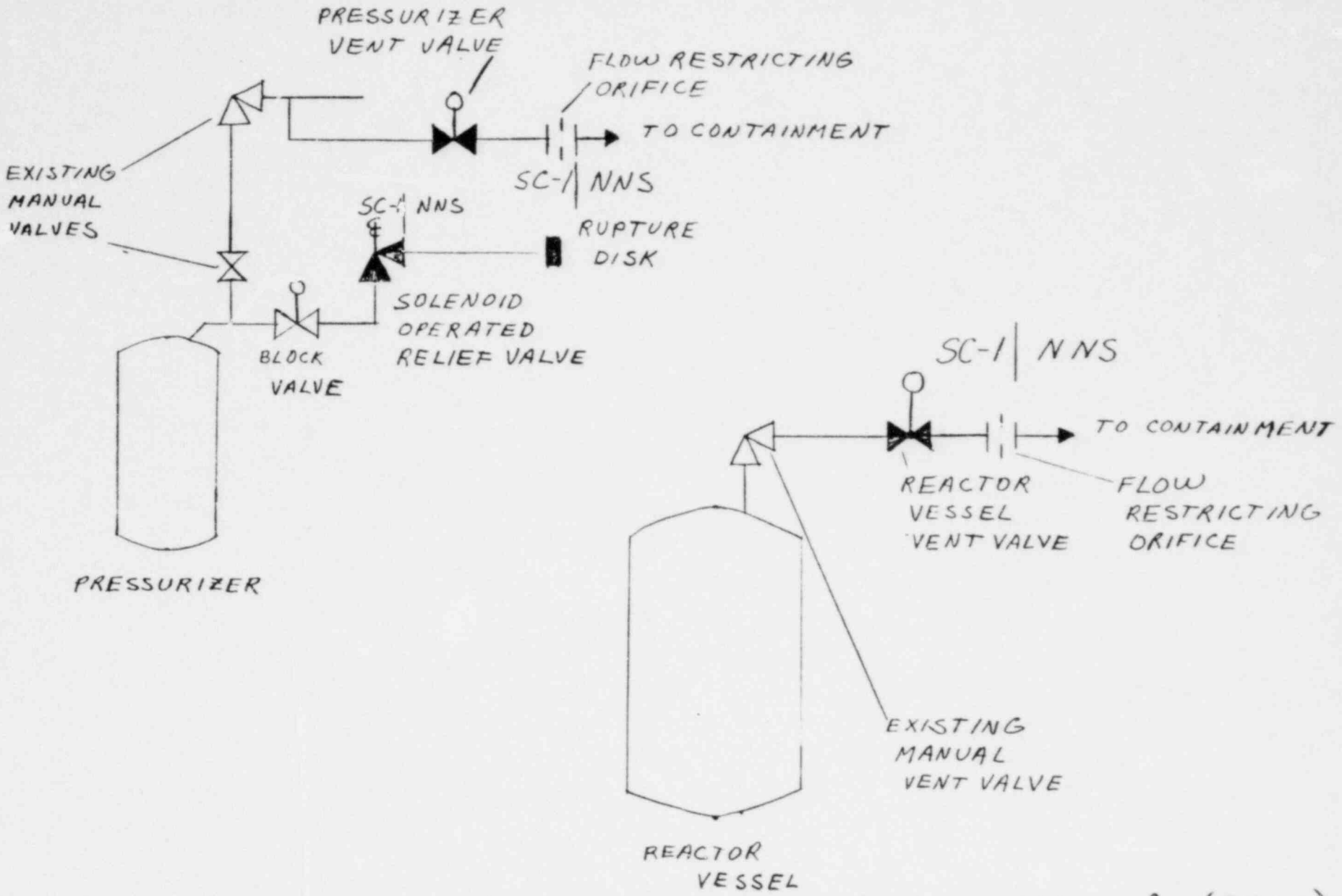
YANKEE ATOMIC ELECTRIC COMPANY

J. A. Kay

J. A. Kay
Senior Engineer - Licensing

JAK/ncj

Enclosure



SKETCH A (REV. 1)

YR- PROPOSED MAIN COOLANT VENT SYSTEM

ATTACHMENT (REVISION 1)

Section 2.1.9 Reactor Coolant System Venting

Yankee will install equipment to vent both the reactor vessel head and the pressurizer by January 1, 1981. This equipment will meet the requirements of NUREG-0578 as clarified by your letter of October 30, 1979.

Sketch A, attached, provides a flow diagram of the proposed system. The reactor vessel head vent consists of a 1" motor operated valve, installed downstream of an existing manual vent valve. A flow restriction limits flow rates through the vent path to below the charging system makeup capability. The vessel head vent is piped directly to the containment atmosphere. Adequate ventilation is provided to provide sufficient mixing.

The pressurizer vent consists of a motor operated valve and suitable restriction orifice installed downstream of an existing manual valve. This design is similar to that used for the reactor vessel head vent.

The vent paths will be safety class 1 for all portions where a piping failure would result in a LOCA. The valves meet the single failure criteria when considerrd together, i.e., two vent valves, one on the reactor vessel head and a redundant vent on the pressurizer. These vents will meet the requirements of IEEE-279.

The following addresses specific NRC design considerations specified in the October 30, 1979 clarification letter.

A.1 The vent system has been designed to enhance the plant's ability to provide core cooling and maintain containment integrity.

A.2 Procedures addressing the use of the RCS vents will be provided by January 1, 1981 or before the system is placed into operation, whichever is sooner.

C.1 The hot legs are vented through the reactor vessel head vent. A procedure to insure that sufficient decay heat removal is provided in the U-tube region will be provided by January 1, 1981. The vent system provides the capability to vent the pressurizer.

C.2 The nominal volume of the main coolant system is 3200 ft^3, while the nominal capacity of the three positive displacement charging pumps is 100 gpm total. The failure of one charging pump reduces this capacity to approximately 66 gpm which is equivalent to approximately 533 ft^3/hr. Therefore, it will take 3 hours to vent 1/2 of the main coolant system volume while still providing makeup capability with the charging system.

Both reactor vessel and pressurizer systems are designed such that inadvertent opening of the valve will not exceed the makeup capactiy of

the charging system. This is accomplished by providing a flow restriction downstream of the motor operated vent valve.

The 533 ft^3/hr of charging pump capacity is equivalent to approximately 1200 SCFM of hydrogen displacement with the main coolant system at 2000 psi.

Both vents will discharge directly into the containment atmosphere. In accordance with your criteria, the vent systems have been sized to vent 1/2 of the reactor coolant system volume, as gas, in one hour. This exceeds the capability of our system to generate this quantity of gas by metal - water reaction.

C.3 A flow restriction is provided at the reactor vessel head and pressurizer vent location to limit RCS mass flow out the vent to less than the capacity of the charging system.

C.4 The motor operated vent valves will have direct position indication in the control room.

C.5 Each vent valve will be remotely operable from the control room via operator action.

C.6 Seismic design of each vent will be consistent with the present plant seismic design. When the SEP seismic review is completed, the vent will be seismically qualified to plant seismic values.

C.7 The system is designed to appropriate safety grade requirements. In addition, the valves at each vent location are powered from different emergency buses.

C.8 Not applicable.

C.9 Each motor operated vent valve control circuit is provided with dual motor starters in series, with separate control switches for each motor starter, one of which is key-locked under administrative control. A coil in each motor starter must be energized to operate the valve. This circuit prevents a single failure, spurious signal, or single operator error from inadvertently opening the valve.

C.10 Both vent systems discharge directly to the containment atmosphere. Air mixing is provided by existing ventilation.

Cooling is provided by the metal vapor container which is the ultimate heat sink.

C.11 The inadvertent opening of the reactor vessel and pressurizer vent is an unlikely occurrence because of system design and administrative controls placed on system operation. The inadvertent opening of these vents do not constitute a LOCA. Direct position indication is sufficient to determine inadvertent operation.