

YANKEE ATOMIC ELECTRIC COMPANY

1671 Worcester Road, Framingham, Massachusetts 01701

2.C.2.1
FYR 82-72

July 1, 1982

United States Nuclear Regulatory Commission
Washington, D. C. 20555Attention: Mr. Dennis M. Crutchfield, Chief
Operating Reactors Branch No. 5
Division of LicensingReferences: (a) License No. DPR-3 (Docket No. 50-29)
(b) YAEC Letter to USNRC, dated March 30, 1982 (FYR 82-38)Subject: TMI ITEM II.D.1, Safety and Relief Valves

Dear Sir:

The following additional information on the testing of safety and relief valves as installed at the Yankee Plant is submitted in accordance with the requirements of NUREG 0578, Section 2.1.2, as later qualified by NUREG 0737, Item II.D.1 and the USNRC letter, dated September 29, 1981.

Reference (b) described the overpressure protection system, discussed the history of challenges to the system, provided a review of the limiting test conditions and discussed in-situ testing performed at the Plant. In summary, Yankee is a very conservatively designed plant which has never challenged the pressurizer power-operated relief valve (PORV) or safety valves. The most limiting conservatively analyzed transient without any valve operation would result in a maximum primary pressure of 2505 psia, and the valves were tested in-situ on three separate sets of tests with acceptable valve operation.

The attached additional plant specific information supported by test results is submitted to demonstrate the capability of the safety and relief valves to operate under the expected operating and accident conditions.

Attachment 1 summarizes the following:

- A. Test Condition Justification
- B. Safety Valve Operability
- C. Power Operated Relief Valve Operability
- D. Block Valve Operability
- E. Plant Specific Piping Evaluation

The September 29, 1981 USNRC letter requested that plant specific final evaluations be submitted by July 1, 1982. As the possibility was discussed in Reference (b), we have determined that a schedule extension will be necessary to complete piping re-analysis. Therefore, the required information will be submitted according to the following schedule:

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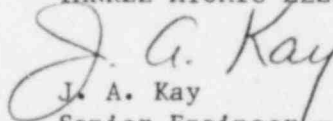
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1. Detailed Plant Specific Test Condition Justification - 8/1/82
2. Final Plant Specific Piping Evaluation - 1/1/83
3. New Safety Valve Operability Justification - 1/1/83

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

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY



J. A. Kay
Senior Engineer - Licensing

JAK/jl

Attachment

ATTACHMENT 1

A. TEST CONDITION JUSTIFICATION

As indicated in Ref. (b), the limiting high pressure transient or accident for the Yankee Plant is the loss of load. The peak primary pressure without relief valve or safety valve actuation is 2505 psia. The maximum ramp rate is 34.2 psi/sec.

The shutoff head on high pressure safety injection (HPSI) is well below the PORV setpoint of 2400 psig such that an extended HPSI cannot lift any of the valves. Therefore, steam only conditions can be imposed on either the PORV or safety valves at pressures above normal operating pressures.

The PORV is utilized for low temperature overpressure protection (LTOP). The limiting LTOP event is due to the startup of a reactor coolant pump during a filled pressurizer condition. That transient results in a saturated liquid discharge with a peak pressure of 523 psig and a peak temperature of 475°F. The pressurization rate at valve opening is 13.3 psig/sec.

B. SAFETY VALVE OPERABILITY

Further evaluation of the 2 x 3 Dresser safety valves reveals that several minor design differences exist between our valves and the Dresser valves tested by the PWR Industry and the Combustion Engineering Test Facility in Windsor, Connecticut.

The primary design difference is a body bowl pressure closure assistance orifice which allows a lower spring rate than scaling rules would indicate. Therefore, in spite of the successful in-situ tests performed, Yankee Atomic is currently in the process of placing an order for two new pressurizer code safety valves whose design can be traced to those safety valves recently tested by the PWR Industry. Based on delivery time, these valves will be replaced at the first extended cold shutdown following receipt of the new valves.

C. POWER OPERATED RELIEF VALVE (PORV) OPERABILITY

As stated in Ref. (b), the installed PORV is a Dresser 2-1/2-31533Vx consolidated Electromatic Relief Valve which is a duplicate of the valve successfully tested by the PWR Industry Test Program at the Marshall Steam Station in Terrill, North Carolina and at the Wyle Test Site at Norco, California.

D. BLOCK VALVE OPERABILITY

The PORV block valve is a 2-inch wedge gate valve built by Pacific Valve. It is equipped with a Limitorque SMA-00-10 operator. The valve is mounted vertically in the relief valve inlet piping. The inlet piping is 2-inch schedule 160.

The Pacific wedge gate valve is very similar in design to the Velan bolted annet valve tested in the Industry Tests at Marshall Station. That model in test was equipped with a Limitorque SME-00-10 operator. The operator torque switch was set at 1.0 producing a torque of 82 ft-lbs. for closure.

The Pacific Valve is a 2-inch valve versus the Velan Valve which is a 3-inch valve. Operator sizing calculations are a function of valve size. The smaller gate in our valve requires less torque to close than a similar 3-inch valve like the Velan valve.

Investigation of the closing torque on our valve indicated the operator was set to close the valve with 50 ft-lbs. of torque.

Shortly after the TMI accident, Yankee Atomic checked with the valve manufacturer to insure that the closure torque was adequate to close against the full system pressure if required. The manufacturer confirmed that the current torque setting was adequate.

The manufacturer has been contacted again since the results became available from the PWR Industry Tests at Marshall Station. The manufacturer is currently verifying the required torque to close in light of those tests.

Yankee Atomic has procured the required operator components which will allow an increase in torque if required. Any modifications that might be required will be performed during the scheduled refueling outage in the Fall of 1982.

E. PLANT SPECIFIC PIPING EVALUATION

Our piping configuration has a short (less than 2 feet) inlet piping to the safety valves which then discharges approximately 30 feet downstream into a common safety and relief valve header to a rupture disc located at the Brass Drain Box inside the biological shield. The PORV is located approximately 2 feet from the pressurizer nozzle with the 2-inch block valve between the pressurizer nozzle and the PORV. The PORV discharges approximately 35 feet downstream into the common safety and relief valve header to the rupture disc located at the bottom of the containment. All inlet and outlet lines are arranged to insure that no water can collect in the lines. Therefore all safety and relief valve piping both inlet and outlet, do not experience conditions other than steam loads for all postulated conditions other than low temperature overpressure protection.

The piping was analyzed for those loads in 1978 when the LTOP system was installed. Some downstream piping supports were added to the original piping at that time. The piping is currently being re-analyzed by a contractor for Yankee Atomic. Preliminary evaluation by the contractor indicates that the past analysis was sufficiently conservative such that no further changes should be required.

Yankee will submit the results of that plant specific reanalysis which will be benchmarked by the contractor to the PWR Industry Safety and Relief Valve Test Program results before 1/1/83.