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April 30, 1982

Docket Nos. 50-348
50-364

Director, Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. S. A. Varga

Gentlemen:

Joseph M. Farley Nuclear Plant - Units 1 & 2
NUREG-0737, Item II.B.1
Information Request for Reactor Coolant System Vents

In response to your letter of March 15, 1982, the enclosed answers to your questions are provided. For those questions to which a docketed response has already been submitted, reference has been made to that previous submittal.

If you have any questions, please advise.

Yours very truly,

F. L. Clayton, Jr.

FLCJr/JAR:lsh-D8
cc: Mr. R. A. Thomas
Mr. G. F. Trowbridge
Mr. J. P. O'Reilly
Mr. E. A. Reeves
Mr. W. H. Bradford

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ENCLOSURE

1. NRC Question:

Your submittals of June 25, 1981, February 21, 1980 and December 31, 1979 contained information concerning only the reactor vessel head vent. Provide information on the means for venting the pressurizer (reference NUREG-0737 Item II.B.1 Clarification C.(3)). If the existing power operated relief valve (PORV) system is designated as the required RCS vent for the pressurizer, verify that positive indication for the block valve is provided in the control room (reference NUREG-0737 Item II.B.1 Clarification A.(5)). Otherwise, provide a description of the pressurizer vent and its instrumentation, power and control system, appropriate drawings (with a legend of symbols and abbreviations), and a discussion of the pressurizer vent design with respect to each point of clarification of NUREG-0737 Item II.B.1.

APCo Response:

As described in Alabama Power Company's letter dated September 22, 1980 for Unit 2, the existing power operated relief valve (PORV) system is designated as the required RCS vent for the pressurizer. Positive indication for the block valves is provided in the control room by Limitorque limit switches in the valve operators. This is also applicable for Unit 1.

2. NRC Question:

Verify that the RCS vent flow restriction orifices are smaller than the size corresponding to the definition of a loss-of-coolant accident (10 CFR Part 50, Appendix A) by providing the pertinent design parameters of the reactor coolant makeup system and a calculation of the maximum rate of loss or reactor coolant through the flow restriction orifices (reference NUREG-0737 Item II.B.1 Clarification A.(4)).

APCo Response:

10 CFR Part 50, Appendix A defines a loss-of-coolant accident as one that results from the loss of reactor coolant at a rate in excess of the capability of the reactor coolant makeup system from breaks in the reactor coolant pressure boundary. APCo's June 25, 1981 letter to the NRC for Farley Unit 2 provides the design information and references to show that the RCS vent flow restriction orifices limit the blowdown from a downstream break to within the capacity of one of the centrifugal charging pumps, thus preventing a net loss of coolant. Farley Unit 1 also was made applicable by a subsequent letter to the NRC dated July 15, 1981. Westinghouse has performed a break analysis study (WCAP 9600) which envelops a break in the Reactor Head Vent Line. This analysis describes the applicable design parameters for break calculations.

3. NRC Question:

In addition to the generic guidelines for operation of the reactor vessel head vent provided as part of your response to NUREG-0737 Item II.B.1, provide the following additional information:

a. Procedural guidelines, similar to the previously submitted reactor vessel head vent guidelines, for venting of the pressurizer (references NUREG-0737 Item II.B.1 Position (2) and Clarification A.(2)).

b. Procedural guidelines which in lieu of venting will assure that sufficient liquid or steam will flow through the steam generator U-tube region so that decay heat can be effectively removed from the reactor coolant system (reference NUREG-0737 Item II.B.1 Clarification C.(2)).

APCo Response:

a. Approved procedures are in place for venting the pressurizer. These procedures provide guidelines for removing entrained and undissolved gas from the reactor coolant system (RCS) and calculating the probable size of a gas bubble in the RCS.

b. This concern is addressed in the Westinghouse Owners Group Emergency Response Guidelines for inadequate core cooling. If adequate temperatures are not being maintained in the core, the Reactor Coolant Pumps are bumped which will cause gases in the Reactor Coolant System (RCS) to mix and eventually come out in the warmer part of the RCS, i.e., the Reactor Vessel. The gases can then be vented via the reactor head vent system.

4. NRC Question:

The following items apply to new portions of the reactor vessel head vent and pressurizer vent that form a part of the reactor coolant pressure boundary, up to and including the second normally closed valve (reference NUREG-0737 Item II.B.1 Clarification A.(7)):

a. Verify that the new piping, valves, components and supports are classified Seismic Category 1.

b. Provide the design temperature and pressure of any new piping, valves, and components for the pressurizer vent, and verify that they are classified Safety Class 2 (Safety Class 1 where the size corresponds to the 10 CFR Part 50 Appendix A definition of a loss-of-coolant accident).

c. Describe the instrumentation that has been provided to detect and measure pressurizer and reactor vessel head vent isolation valve leakage (reference Appendix A to 10 CFR Part 50, General Design Criterion 30).

d. Verify that the materials of construction will be fabricated and tested in accordance with SRP Section 5.2.3, "Reactor Coolant Pressure Boundary Materials."

e. Demonstrate the internal missiles and the dynamic effects associated with the postulated rupture of piping will not prevent the essential operation of the vent system (i.e., at least one vent path remains functional) (reference Appendix A to 10 CFR Part 50, General Design Criterion 4).

APCo Response:

The existing PORV's are utilized for venting of the pressurizer and no new piping, valves, components or supports were required to be installed.

a. As stated in APCo's June 25, 1981 (Unit 2) and July 15, 1981 (Unit 1) letters to the NRC, all piping and equipment used in the reactor head vent system from the connection to the existing vent pipe to the orifices are designed and fabricated in accordance with ASME Section III, Class 1 subsection NB (seismic) requirements. From the orifices up to and including the second isolation valves, all equipment is designed and fabricated in accordance with ASME, Section III, Class 2 subsection NC (seismic). A break in the Class 2 section of the reactor head vent does not constitute a LOCA as shown in APCo Response to NRC Question 2 of this letter.

b. This is not applicable to FNP.

c. The reactor coolant leakage detection system is described in APCo's June 20, 1980 letter for Unit 2 to the NRC and provides sufficient sensitivity to detect increases in leakage rates while the total leakage rate is below a value consistent with safe operation of the plant. To detect PORV and Safety Valve leakage, the following indication is provided on the Main Control Board: (1) temperature detectors on the PORV and Safety Valve discharge lines; and, (2) temperature, pressure and level indication for the Pressurizer Relief Tank (Note: PORV and Safety Valve piping is routed to the Pressurizer Relief Tank). The above is applicable for Unit 1.

d. The materials used in construction of the new portions of the reactor head vent system were fabricated and tested in accordance with SRP Section 5.2.3, "Reactor Coolant Pressure Boundary Materials."

e. The only missle which has a potential for impacting the reactor vessel vent system is a CRDM missile. The combined size of a CRDM rupture (hot leg break) and a vent severance (due to CRDM missile) is enveloped by the break study provided in WCAP 9600.

5. NRC Question:

Verify that the following reactor vessel head and pressurizer vent failures have been analyzed and found not to prevent the essential operation of safety-related systems for safe reactor shutdown or mitigation of the consequences of a design basis accident:

a. Seismic failure of any reactor vessel head vent or pressurizer vent components that are not designed to withstand the safe shutdown earthquake.

b. Postulated missiles generated by failure of reactor vessel head and pressurizer vent components.

c. Dynamic effects associated with the postulated rupture of new pressurizer vent piping greater than one-inch nominal size.

d. Fluid sprays from reactor vessel head and pressurizer vent component failures. Sprays from normally unpressurized portions of the vents that are Seismic Category 1 and Safety Class 1, 2 or 3 and have instrumentation for detection of leakage from upstream isolation valves need not be considered.

APCo Response:

As the existing power operated relief valve (PORV) system is designated as the required RCS vent for the pressurizer, the requested analyses for the pressurizer are not required.

a. Alabama Power Company's letter of June 25, 1981 (Unit 2) and July 15, 1982 (Unit 1) referenced WCAP 9600 which described the required analysis for the seismic failure of the reactor head vent components not designed to withstand a safe shutdown earthquake.

b. The RCS vent system is designed and analyzed to prevent any mechanical breaks in the system. In accordance with the Farley FSAR, Section 3.6.2.5, circumferential or longitudinal breaks need not be considered for piping diameters of 1 inch or less. Since there is no piping greater than one inch diameter, postulated missiles generated by failure of reactor vessel head vent components are not required to be analyzed.

c. This question is not applicable to Farley.

d. Postulated breaks in the Reactor Vessel Head Vent System (RVHVS) piping up to the second isolation valves are not to be analyzed since this piping is of diameter 1" or less in accordance with the Farley FSAR Section 3.6.2.5. In addition, the piping downstream of the second isolation valve is not a concern since it is Non-nuclear Safety piping.

6. NRC Question:

Your previous submittals stated that the reactor vessel head vent discharges into a well ventilated area of the containment. Provide a specific description of the vent paths. Also, demonstrate that both the reactor vessel head and pressurizer vent paths to the containment atmosphere discharge into areas:

a. That provide good mixing with containment air to prevent the accumulation or pocketing of high concentrations of hydrogen, and

b. In which any nearby structures, systems, and components essential to safe shutdown of the reactor or mitigation of a design basis accident are capable of withstanding the effects of the anticipated mixtures of steam, liquid, and noncondensible gas discharging from the RCS vents (reference NUREG-0737 Item II.B.1 Clarification A.(9)).

APCo Response:

A specific description of the reactor vessel head vent discharge path was provided to the NRC for Unit 2 by Alabama Power Company on September 22, 1980. This description is also applicable for Unit 1.

a. APCo's letters of December 31, 1979 for Unit 1 and September 22, 1980 for Unit 2 demonstrated that, for the discharge from the head vent, good mixing with containment air is provided to prevent the accumulation or pocketing of high concentrations of hydrogen. The existing power operated relief valve (PORV) system is designated as the required RCS vent for the pressurizer and discharges into the Pressurizer Relief Tank.

b. The inadvertent opening of both isolation valves in one of the RVHVS flow paths will discharge steam and liquid into the reactor cavity. For the expected short term operation of the vent system, no damage to equipment required for safe shutdown is conceivable.

7. NRC Question:

Verify that operability testing of the reactor vessel head and pressurizer vent valves will be performed in accordance with Subsection IWV of Section XI of the ASME Code for Category B valves (reference NUREG-0737 Item II.B.1 Clarification A.(11)).

APCo Response:

The existing power operated relief valve (PORV) system is designated as the required RCS vent for the pressurizer. The operability testing of the PORV is accomplished in accordance with Technical Specification paragraph 3/4.4.5. As stated in Alabama Power Company's December 22, 1981 letter to the NRC, upon approval of the reactor vessel head vent system by the NRC, Alabama Power Company will submit Technical Specification changes to address operability testing.

8. NRC Question:

Since your submittal states that power lockout of the vent valves is not considered necessary, describe the design features (e.g., individual valve switches, distinctive valve switch labeling, or distinguishing alarms) or administrative procedures that will be employed to ensure that human error or a single active failure will not result in inadvertent actuation of the RCS vents (reference NUREG-0737 Item II.B.1 Clarification A.(7)).

APCo Response:

APCo's letter to the NRC dated June 25, 1981 for Unit 2 and July 15, 1981 for Unit 1, stated that power lockout is not required because there are two independently controlled, normally de-energized isolation valves in each of the two flow paths for venting. A single active failure or human error will only open one valve and thus will not result in inadvertent actuation of the RCS vents.