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Docket Nos. 50-250
and 50-251

Dr. Robert E. Uhrig, Vice President
Advanced Systems and Technology
Florida Power and Light Company
Post Office Box 529100
Miami, Florida 33152

Dear Dr. Uhrig:

SUBJECT: LONG-TERM REVIEW CONTAINMENT PURGE AND VENT VALVES
TURKEY POINT UNITS 3 AND 4

By letter dated August 31, 1981, we identified the components and status of our long-term review for containment purging and venting during normal power operation of Turkey Point Plant, Units 3 and 4. Subsequently, your letter dated November 17, 1982 provided a commitment to install debris screens on the purge supply and exhuast valves during the next refueling outage for each unit. We found this acceptable as stated in our letter dated February 11, 1983.

Recent information concerning the operability of large-diameter Pratt butterfly valves (of the generic family R1A or NR1A) in the event of a DBA-LOCA has raised concern. Your report dated September 17, 1982, provided calculations for valve and operator stresses at the lower angles of opening. Enclosure 1 provides the background information, our initial assessment of your submittal, and the basis for our concern.

We request that you provide any change in your schedular commitments for installation of the debris screens pending resolution of the operability concerns. We have performed a generic evaluation of the radiological consequences of accidents while purging or venting at power. To assure that the generic evaluation is valid for Turkey Point Plant, Units 3 and 4, we verified the adequacy of Technical Specifications limits on iodine equilibrium and the valve closure times. The Safety Evaluation, Enclosure 2, provides the details of our review.

The valve operability concern identified in Enclosure 1 is the only item remaining unresolved for this rather complex issue we identified in our letter of November 28, 1978. The staff is reconsidering the adequacy of

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Dear Dr. Uhrig:

SUBJECT: LONG-TERM REVIEW CONTAINMENT PURGE AND VENT VALVES
TURKEY POINT UNITS 3 AND 4

By letter dated August 31, 1981, we identified the components and status of our long-term review for containment purging and venting during normal power operation of Turkey Point Plant, Units 3 and 4. Subsequently, your letter dated November 17, 1982 provided a commitment to install debris screens on the purge supply and exhaust valves during the next refueling outage for each unit. We found this acceptable as stated in our letter dated February 1, 1983.

Recent information concerning the operability of large-diameter Pratt butterfly valves (of the generic family R1A or NR1A) in the event of a DBA-LOCA has raised concern. Your report dated September 17, 1982, provided calculations for valve and operator stresses at the lower angles of opening. Enclosure 1 provides the background information, our initial assessment of your submittal, and the basis for our concern.

We request that you provide any change in your schedular commitments for installation of the debris screens pending resolution of the operability concerns. We have performed a generic evaluation of the radiological consequences of accidents while purging or venting at power. To assure that the generic evaluation is valid for Turkey Point Plant, Units 3 and 4, we verified the adequacy of Technical Specification limits on iodine equilibrium and the valve closure times. The Safety Evaluation, Enclosure 2, provides the details of our review.

The valve operability concern identified in Enclosure 1 is the only item remaining unresolved for this rather complex issue we identified in our letter of November 28, 1978. The staff is reconsidering the adequacy of the interim position of October 23, 1979, which allows power operation

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the justification for the interim position of October 23, 1979, which allows power operation with the valves blocked in a partial open position. We will inform you of our decision and any required action on your part.

Sincerely,

Original signed by:
S. A. Varga

Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing

Enclosures:
1. Evaluation and Request for Additional Information
2. Safety Evaluation - Radiological Consequences of Accidents While Purging or Venting at Power

cc w/enclosures:
See next page

*PREVIOUS CONCURRENCE SEE NEXT PAGE

OFFICE	ORB#1:DL	ORB#1:DL*	ORB#1:DL				
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DATE	02/7/83	02/8/83	03/10/83				

with the valves blocked in a partial open position. We will inform you of our decision and any required action on your part.

Sincerely,

Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing

Enclosures:
1. Evaluation and Request for Additional Information
2. Safety Evaluation - Radiological Consequences of Accidents While Purging or Venting at Power

cc w/enclosures:
See next page

OFFICE	ORB#1:DL	ORB#1:DL	ORB#1:DL				
SURNAME	DMcDonald:dm	EReeves	SVarga				
DATE	02/4/83	02/ /83	02/ /83				

the justification for the interim position of October 23, 1979, which allows power operation with the valves blocked in a partial open position. We will inform you of our decision and any required action on your part.

Sincerely,

Steven A. Varga, Chief
Operating Reactors Branch #1
Division of Licensing

Enclosures:
1. Evaluation and Request for Additional Information
2. Safety Evaluation - Radiological Consequences of Accidents While Purging or Venting at Power

cc w/enclosures:
See next page

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ENCLOSURE 1

OPERABILITY ASSESSMENT
PRATT BUTTERFLY VALVES
R1A OR NR1A

Background

On August 3, 1982, the evaluation was completed for the 48 inch Pratt butterfly purge valves at Three Mile Island 1 (TMI-1). The qualification on these valves was found to be insufficient to demonstrate the ability of these valves to close in the event of a LOCA accident. The major reason for this finding was the determination that the shaft stress would exceed allowable stress when experiencing worst case LOCA torque loads.

A number of operating plants have Pratt butterfly valves of the same generic family (R1A or NR1A) and approximate size as the 48 inch R1A butterfly valves at Three Mile Island 1. Some of these plants have agreed to maintain these valves sealed closed in operating modes above cold shutdown. A larger number of plants, however, do operate these valves for some period of time during operating modes, opening the valve to a limited maximum opening. The limitation on maximum valve opening has been determined by the licensees in consultation with the valve vendors in accordance with the Staff Interim Position of October 23, 1979. The basis for this position was that for most butterfly valves the highest torque loads under flow would occur at the higher angles of opening. Subsequent testing has revealed that for some valve installations downstream of an elbow the higher torques may be experienced at smaller angles of opening but for the large majority of valve installations the higher torque at higher angles is valid.

For most of the butterfly valves used for purging and venting operations a maximum opening limitation of 50 degrees has produced sufficient confidence in the valve's ability to close in the event of a LOCA to allow continued use of these valves while qualification was progressing. In June 1981, however, Henry Pratt Valves began to inform utilities operating with 48 inch and larger R1A and NR1A model valves that additional restrictions might be required for these valves in order to assure the ability of these valves to close under LOCA loads. According to Pratt analyses, the valve restrictions would be a maximum opening of 30 degrees to 55 degrees, depending on the individual valve or operator. Since that time, a number of qualification reports for these valves have been submitted for NRC staff review. The majority of these reports have been performed for valves closing from the full open (90 degrees) position. These analyses have shown the valves to be overstressed for this angle of opening. Pratt has recommended smaller maximum angles of opening for these valves but no analysis has been done to show the acceptability of operating the valves at the lower angles of opening. Two of the licensees have submitted reports calculating valve and operator stresses at the lower angles of opening. These reports were the Turkey Point 3 and 4 report submitted September 17, 1982 by Florida Power and Light (FP&L) and the

Three Mile Island (TMI-1) report submitted by General Public Utilities (GPU). As previously stated, the TMI-1 report was evaluated on August 3, 1982 and found insufficient to qualify the valves to close against LOCA loads.

Evaluation

The Turkey Point 3 and 4 report was for 48 inch and 54 inch Pratt R1A butterfly valves. These valves were to be blocked to 35 degrees and 30 degrees respectively. The peak containment pressure was not used in qualifying these valves but rather a percentage of that pressure by taking credit for the fact that these valves would begin to close before the containment would reach its peak pressure. Enveloping static seismic loads of gx = 3, gy = 3 and gz = 4 were used in analyzing the 48 inch valve but actual required seismic loads of gx = 1.5, gy = 1.5 and gz = 1.15 were used in analyzing the 54 inch valve.

The calculated shaft stresses for the Turkey Point 48 inch and 54 inch valves were 27,861 psi and 26,534 psi respectively. The analysis used a shaft stress allowable of 30,000 psi. This value was based on the ASME allowable of 1.5 Sm for pressure retaining code parts. Effectively, 30,000 psi would be a minimum yield strength. At this point a small amount of permanent deformation would be experienced. The calculated values are 93 percent and 88 percent of this yield point leaving small margins. In addition, the values calculated were determined on the basis of straight line approach flow. The actual installations of these valves have elbows and bends upstream which would distort the flow profile to these valves and change the torques experienced by these valves. Tests performed on other model valves have shown the effect of upstream elbows as increasing the torque by as much as 100 percent. As no information has been submitted to date on the effects of upstream elbows on this model valve, it is uncertain what the magnitude of the increase on torque would be on this valve. The small margins remaining for the shaft stress for these valves is inadequate to cover the concern of upstream elbows. Consequently, the qualification submitted for the Turkey Point 3 and 4 valves is insufficient to demonstrate the ability of these valves to close against LOCA loads.

Concern

Although there are some design differences in the R1A series of butterfly valves installed in purge and vent systems of operating nuclear plants, the inadequacy of the analysis submitted to qualify these valves to close, in conjunction with the fact that the analyses submitted for the TMI-1 and Turkey Point 3 and 4 were for the lowest angles of opening, raises concerns as to the adequacy of the justification for Interim Position of October 23, 1979.

GENERIC EVALUATION OF THE RADIOLOGICAL CONSEQUENCES OF ACCIDENTS WHILE PURGING OR VENTING AT POWER

Introduction

The release of radioactivity through vent or purge valves from a potential large LOCA at power has been considered generically to assure that such events do not constitute an undue hazard to the people residing around operating reactor sites. To evaluate the radiological consequences of such accidents, the following assumptions have been made:

a. vent and purge valve isolation signals, circuitry and purge valve actuation are reliable;

b. purge system isolation valve closure times are generally sufficient to prevent the release of activity associated with fuel failures that could follow a large break (a total accident elapsed time of about 15 seconds or less);

c. maximum allowable coolant iodine equilibrium and spiking activity limits do not exceed those contained in Standard Technical Specifications (STS);

d. fission products generated by pipe breaks are reflective of coolant activity and fuel failures estimated using 10 CFR Part 50, Appendix K, analysis techniques; and

e. radiological consequences of accidents while purging or venting would be bounded by those produced by a large break.

Evaluation

A large number of staff evaluations of the radiological consequences of LOCA's have been performed for construction permit, operating license, operating license amendment, and Systematic Evaluation Program reviews. In addition, a generic assessment of the amount of radioactivity that could be released while venting and purging from a spectrum of pipe breaks through the range of purge valve sizes utilized by industry has been made. In virtually all cases, the contribution through vent or purge valves is estimated to be of the order of 2 percent, or less, of the Exclusion Area Boundary (EAB) and outer boundary of the Low Population Zone (LPZ) doses that would occur from a large break LOCA in which a source term indicative of a substantial melt of the core with subsequent release of appreciable quantities of fission products is assumed.* For dose assessments in which only activity in primary coolant systems would be released, or for events in which fuel failures indicative of 10 CFR Part 50, Appendix K, LOCA analyses are indicated, EAB and LPZ dose estimates are substantially less than dose estimates made for a large break LOCA assuming a substantial fuel melt. Since the magnitude of the vent or purge contribution to severe LOCA dose estimates is small compared to other LOCA scenarios within design bases, we conclude that the consequences of such accidents are within applicable dose guidelines.

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*Estimates based upon SRP analysis techniques and 10 CFR Part 100.11.

Plant Specific

The following plant specific information for Turkey Point, Units 3 and 4, was verified to assure that the important assumptions for the generic evaluation are valid as applied to Turkey Point Units 3 and 4:

1. Reactor Coolant Activity

   The maximum limits on iodine equilibrium is required to be 1.0 microcuries/gram during normal operation and 30 microcuries/gram during power transients. These limits are defined in the Technical Specifications, Section 3, for Turkey Point Plant, Units 3 and 4.

2. Valve Closure Time

   The valve closure time is required to be less than about 10 seconds. The licensees submittal, dated January 20, 1982, indicates the maximum closure time is 5 seconds.

Conclusion

A generic assessment of the radiological consequences of large break accidents, including a resulting severe LOCA of the type hypothesized for site suitability purposes, while venting or purging at power indicates that the dose contribution through open valves is small. Therefore, we find total accident radiological consequences of such accidents would be less than the dose guidelines of 10 CFR Part 100.