

PHILADELPHIA ELECTRIC COMPANY

NUCLEAR GROUP HEADQUARTERS

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October 11, 1989

Docket Nos. 50-352
50-353

License Nos. NPF-39
NPF-85

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

SUBJECT: Limerick Generating Station, Units 1 and 2
Technical Specifications Change Request

Dear Sir:

Philadelphia Electric Company hereby submits Technical Specifications Change Request No. 89-09, in accordance with 10 CFR 50.90, requesting an amendment to the Technical Specifications (TS) (Appendix A) of Operating License Nos. NPF-39 and NPF-85. Information supporting this Change Request is contained in Attachment 1 to this letter, and the proposed replacement pages are contained in Attachment 2.

This submittal requests changes to TS Section 3/4 3.6 in Limiting Condition for Operation (LCO) 3.6.4.1 to specify the number of suppression chamber to drywell vacuum breaker pairs which are required to be operable as three. The current TS LCO 3.6.4.1 requires that four pairs of suppression chamber to drywell vacuum breakers be operable.

If you have any questions regarding this matter, please contact us.

Very truly yours,

G. A. Hunger, Jr.

G. A. Hunger, Jr.
Director
Licensing Section
Nuclear Support Division

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Attachments

cc: W. T. Russell, Administrator, Region I, USNRC
T. J. Kenny, USNRC Senior Resident Inspector, LGS
T. M. Gerusky, Director, PA Bureau of Radiological Protection

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COMMONWEALTH OF PENNSYLVANIA :
: SS.
COUNTY OF CHESTER :

D. F. Helwig, being first duly sworn, deposes and says:

That he is Vice President of Philadelphia Electric Company, the Applicant herein; that he has read the foregoing Application for Amendment of Facility Operating Licenses, to change the number of suppression chamber to drywell vacuum breakers required to be operable, and knows the contents thereof; and that the statements and matters set forth therein are true and correct to the best of his knowledge, information and belief.

D.F. Helwig

Vice President

Subscribed and sworn to
before me this 11th day
of October 1989.

Angela G. Oleginski

Notary Public

NOTARIAL SEAL
ANGELA G. OLENGINSKI, Notary Public
Wayne, Chester County
My Commission Expires Sept. 31, 1992

ATTACHMENT 1

LIMERICK GENERATING STATION

**Docket Nos. 50-352
50-353**

**License Nos. NPF-39
NPF-85**

TECHNICAL SPECIFICATIONS CHANGE REQUEST

**"Reduction of the Number of Suppression Chamber to
Drywell Vacuum Breakers Required to be Operable"**

Supporting Information for Changes - 11 pages

Philadelphia Electric Company, Licensee under Facility Operating License Nos. NPF-39 and NPF-85 for Limerick Generating Station (LGS) Unit 1 and Unit 2, respectively, hereby requests that the Technical Specifications (TS) contained in Appendix A of the Operating License be amended as proposed herein to specify the number of suppression chamber to drywell vacuum breakers pairs which are required to be operable as three. The proposed changes are indicated with a vertical bar in the margin of page 3/4 6-44 and Bases page B 3/4 6-4 for both Unit 1 and Unit 2 TS, and are contained in Attachment 2.

Philadelphia Electric Company requests the changes proposed herein to be effective upon issuance of the Amendment.

This Change Request provides a discussion of the proposed TS changes, a safety assessment of the proposed changes, information supporting a finding of No Significant Hazards Consideration, and information supporting an Environmental Assessment.

Discussion of Changes

There are four pairs of vacuum breaker valves provided to equalize the pressure between the suppression chamber and the drywell after reactor blowdown and drywell spray actuation, while preventing bypass of the suppression pool during periods of blowdown. Previous analysis indicated that three of the four pairs were required to provide adequate vacuum relief capability to protect the structural integrity of the containment for all

postulated events. The fourth pair provided redundancy in the event that a single active failure prevented one valve in any of the three required valve pairs from opening. Reanalysis has determined that two pairs, rather than three pairs, of vacuum breaker valves are adequate to protect the structural integrity of the containment. Therefore, we propose to revise TS Limiting Condition for Operation (LCO) 3.6.4.1 to require a minimum of three pairs of operable vacuum breakers.

Safety Assessment

The primary containment has the following design values.

Design differential pressure across the diaphragm slab in the upward direction = 20 psid.

Design (negative) pressure of the primary containment with respect to the secondary containment = -5 psig.

To ensure that these design values will not be exceeded, vacuum breakers have been provided between the drywell and the suppression chamber (or wetwell). Four flow paths with two vacuum breaker valves in series on each flow path are provided. The valves are set so that a differential pressure of greater than 1 psid between the suppression chamber and the drywell will result in flow from the wetwell to the drywell to equalize the pressure to within 1 psid.

Events which have the potential to result in these design allowables being exceeded are discussed in the LGS Final Safety Analysis Report (FSAR) "Containment Systems," Sections 6.2.1.1.3, 6.2.1.1.4 and 6.2.1.1.5. The vacuum breaker valves may also serve to relieve a pressure differential between the wetwell and the drywell during containment purge operations and hydrogen recombiner operation. As stated in the FSAR, inadvertant actuation of the drywell spray system following a Loss of Coolant Accident (LOCA) was determined to pose the most severe challenge to the diaphragm slab upward differential pressure and primary containment negative pressure design values.

The initial analysis performed to verify the adequacy of the vacuum breaker sizing was based on highly conservative assumptions. One such assumption was that the upward differential pressure across the diaphragm slab should not exceed 3 psid. Additionally, since valve test data was not available at that time, conservative flow assumptions were used for the vacuum breakers. Based on these assumptions, three flow paths (i.e., three vacuum breaker valve pairs) were determined to be required to maintain the differential pressure below the assumed design value of 3 psid. The fourth flow path provided a redundant flow path in the event that one of the other three flow paths was inoperable as a result of a single active failure which prevented a flow path from performing its intended function.

The initial analysis was followed by a computer analysis incorporating flow test data from the valve vendor for the actual

valves in the as-built configuration, rather than assumed flow data. The purpose of this computer analysis, however, was not to determine the number of flow paths required, but to confirm that three operable flow paths would be adequate to prevent the drywell from exceeding the -5 psig design value in the event of the postulated inadvertant post reactor blowdown drywell spray actuation. Three flow paths were found to be adequate for this purpose. The maximum differential pressure across the diaphragm slab in this case was determined to be 4.26 psid, well below the 20 psid design value.

The 3 psid diaphragm slab differential pressure used in the initial calculation is not a required design basis value, but was arbitrarily chosen as a value to use while performing the determination of the number of required vacuum breaker valve pairs. Since the 20 psid design differential pressure value must not be exceeded, and the 3 psid value was arbitrary, the fact that the actual differential pressure exceeds 3 psid in the more accurate computer calculation is of no consequence.

Recently, the computer analysis was performed again utilizing two flow paths instead of three. The analysis showed two flow paths to be sufficient to avoid exceeding the -5 psig design value. A review of the previous analysis (i.e., using three flow paths) showed that the condensation rate in the drywell is the parameter controlling the resulting peak negative pressure reached. The flow rate through the vacuum breaker valves is not the limiting parameter since the valves are not required to fully open during the event to provide the necessary vacuum relief. Essentially the same

peak negative pressure is reached in the drywell for any number of flow paths greater than two. The flow rate through the vacuum breakers only becomes controlling when less than two flow paths are available. Hence, with the valves full open, two flow paths are sufficient to provide adequate vacuum relief.

FSAR Section 6.2.1.1.4 notes that if both trains of drywell spray were to be actuated concurrently, in violation of existing plant procedure, the drywell design negative pressure of -5 psig could be exceeded, if the suppression pool temperature is below 105⁰F. With only two vacuum breaker flow paths operable instead of three, the suppression pool temperature below which the -5 psig design pressure could be exceeded, if both spray trains were actuated concurrently, will be somewhat higher. Since, as discussed in the FSAR "Response to NRC Questions," question 480.4, drywell spray actuation is under strict administrative controls, and concurrent actuation of both spray trains is in violation of plant procedures, this increase in suppression pool temperature below which concurrent spray train actuation could result in exceeding the -5 psig design pressure is still of no consequence, and does not constitute any actual reduction in a margin of safety.

An evaluation of the proposed changes to determine if an unreviewed safety question exists was completed. The evaluation concluded that the proposed change does constitute an unreviewed safety question. This results from the fact that the reduction of required flow paths does decrease the margin of safety as defined in TS Section 3/4 6.4. TS LCO 3.6.4.1 presently requires the

operability of four vacuum breaker flow paths. If three of the vacuum breaker pairs operate, the primary containment design values will not be exceeded. Calculation has shown that even if only two vacuum breaker pairs operate, the primary containment design values still will not be exceeded. However, there will be a small increase (from -4.821 psig to -4.845 psig) in the magnitude of the drywell peak negative pressure in the event of the postulated drywell depressurization, even though this value will still be within the -5 psig design primary containment pressure limit. There will also be a small increase (from 4.26 psid to 5.77 psid) in the maximum upward differential pressure developed across the diaphragm slab. This value is still within the 20 psid design differential pressure. Although the resulting drywell negative pressure and diaphragm slab differential pressure are acceptable, they still constitute a small reduction in the margin of safety since they are slightly closer to the design values than for the three vacuum breaker flow path case.

Information Supporting a Finding of No Significant Hazards

Consideration

We have concluded that the proposed changes to the LGS TS, which specify that three pairs of suppression chamber to drywell vacuum breakers are required to be operable, do not constitute a Significant Hazards Consideration. In support of this determination, an evaluation of each of the three standards set forth in CFR 50.92 is provided below.

1. The proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

The vacuum breaker valves perform their active safety function after an accident has occurred. Their failure to open prior to an accident cannot cause an accident to occur, nor does the operability of the vacuum breakers have any effect on the operability of other safety related equipment. The operability of the vacuum breakers can affect the consequences of an accident, since damage to the containment could occur if they did not perform their safety function. We have determined that the safety function of protecting containment integrity can be accomplished with only two flow paths operable. A redundant vacuum breaker flow path would be available in the event a single active failure disables one of the three required operable flow paths. Hence, reducing the number of flow paths required to be operable from four to three would not result in any threat to containment integrity following an accident, and therefore would not increase the consequences of an accident.

2. The proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Aside from precluding the possibility of bypass leakage, the only function the vacuum breaker valves perform is to equalize the pressure between the suppression chamber and the drywell. This function serves to protect the integrity of the containment post-LOCA and can be affected by reducing the required number of operable vacuum breaker flow paths from four to three, as is evaluated in the response to the first standard above. However, no other accident or malfunction can be created by this change. There is no change to the TS requirement that all the vacuum breaker valves be in the closed position during reactor operation.

3. The proposed changes do not involve a significant reduction in a margin of safety.

The function of the vacuum breakers is to protect the structural integrity of the containment during a drywell depressurization event. The drywell design negative pressure is -5 psig. So long as the vacuum breakers are able to maintain the drywell pressure above this value, drywell integrity is preserved, and the containment function of preventing release of radioactivity is maintained. A computer analysis using flow test data for the actual vacuum breaker valves in the actual configuration used in the plant indicates that in the event of an inadvertant drywell spray actuation, the peak

negative pressure in the drywell is -4.821 psig with three operable vacuum breaker flowpaths. Repeating the analysis, but reducing the number of operable vacuum breaker flow paths from three to two, results in a calculated peak drywell negative pressure of -4.845 psig. Since the increase in the magnitude of negative containment pressure when going from three operable flow paths to two is small, and is still within the -5 psig design value, the decrease in margin of safety resulting from this change is not considered to be significant. Similarly, relative to the diaphragm slab design differential pressure of 20 psid, the increase in the peak differential pressure from 4.26 psid to 5.77 psid when going from the three flow path case to the two flow path case is not considered to be significant. Therefore, the proposed changes do not involve a significant reduction in the margin of safety.

Information Supporting an Environmental Assessment

An environmental assessment is not required for the changes proposed by this Change Request because the requested changes conform to the criteria for "actions eligible for categorical exclusion" as specified in 10 CFR 51.22(c)(9). The requested changes will have no impact on the environment. This Change Request does not involve a significant hazards consideration as discussed in the preceding section. This Change Request does not

involve a significant change in the types or significant increase in the amounts of any effluents that may be released offsite. In addition, this Change Request does not involve a significant increase in individual or cumulative occupational radiation exposure.

Conclusion

The Plant Operations Review Committee and the Nuclear Review Board have reviewed these proposed changes to the TS and have concluded that they do involve an unreviewed safety question but do not involve a significant hazards consideration, and will not endanger the health and safety of the public.