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Dresden Generating Station
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ComEd

January 17, 1997

JSPLTR 97-0011

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, D. C. 20555-0001

SUBJECT: Dresden Nuclear Power Station Units 2 and 3
Emergency Application for Amendment to Facility Operating Licenses DPR-19 and DPR-25
Additional Information Regarding Amendment to Resolve Issues Related to ECCS Suction Strainer Pressure Drop
Docket Nos. 50-237 and 50-249

Reference: 1) Letter JSPLTR 97-0007 dated January 13, 1997 from J. Stephen Perry, ComEd, to U.S. Nuclear Regulatory Commission, Amendment to Resolve Issues Related to ECCS Suction Strainer Pressure Drop.

2) Letter from J. F. Stang, U.S. Nuclear Regulatory Commission to I. Johnson, ComEd, dated January 15, 1997, Subject: Request for Additional Information (TAC No. M97696).

Pursuant to 10 CFR 50.90, ComEd proposes to amend Facility Operating Licenses DPR-19 and DPR-25 and requests NRC Staff review and approval of an emergency Technical Specification (TS) change and an Unreviewed Safety Question (USQ) resulting from ComEd's efforts to reconcile a recently discovered error in the head loss of its Emergency Core Cooling System (ECCS) suction strainers. Reference 1 provided our initial submittal requesting this change, and is included as Attachment 1 to this letter. In response to our initial submittal, a request for additional information (RAI) was received and the purpose Attachment 2 of this letter is to provide the ComEd response to that request.

In response to the RAI, this letter provides a number of additional attachments which provide technical details of our response.

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Pursuant to 10CFR 50.91(a)(5) ComEd requests emergency approval of this amendment request to support the return to service of Dresden Unit 3. Dresden Unit 3 will be ready to return to service after the current forced outage on or before January 18, 1997 and, considering the guidance provided in Generic Letter 91-18, approval of this emergency amendment is required prior to startup. The basis for this emergency amendment is detailed in Attachment A. The original Technical Specification amendment provided herein has been reviewed by onsite and offsite review in accordance with Company procedures and policies.

ComEd will submit a license amendment request no later than January 31, 1997 which will resolve all the identified concerns with post-LOCA ECCS and containment cooling capability.

To the best of my knowledge and belief, the statements contained above are true and correct. In some respect these statements are not based on my personal knowledge, but obtained information furnished by other Commonwealth Edison employees, contractor employees, and consultants. Such information has been reviewed in accordance with company practice, and I believe it to be reliable.

ComEd is notifying the State of Illinois of this application for amendment by transmitting a copy of this letter and its attachments to the designated state official.

ComEd appreciates the Staff's consideration regarding these efforts. If there are any questions regarding this issue, please contact Frank Spangenberg of my staff at (815) 942-2920, extension 3800.

Sincerely,

J. Stephen Perry
Site Vice President
Dresden Station

Subscribed and Sworn to before me

on this 17th day of

January, 1997.

Notary Public

OFFICIAL SEAL
SHERRY L BUTTERFIELD
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES:05/23/00

Attachments:

1. Previous Submittal Regarding Amendment to Resolve Issues Related to ECCS Suction Strainer Pressure Drop (JSPLTR 97-0007, dated January 13, 1997)

2. Response to Request for Additional Information dated January 15, 1997

3. Dresden LPCI/Core Spray NPSH Analysis Post-DBA LOCA: GE SIL 151 Case Short-Term and Dresden LPCI/Core Spray NPSH Analysis Post-DBA LOCA: GE SIL 151 Case Short-Term. Comparison of inputs and assumptions used in proposed and 1976 NPSH calculations.

4. The Use of Containment Over Pressure in NPSH Calculations for Dresden/Quad Cities Stations and An Evaluation of Dresden 2/3 Containment Performance Under Reduced Initial Suppression Pool and Service Water Temperature Assumptions.

5. Safety Evaluation Justifying the Proposed Change

6. Cavitation Test Report, Bingham Pump Company, 1969. Correspondence between ComEd and Sulzer-Bingham Pump Co. regarding cavitation test report. Discussion of test pump vibrations and comparison to Dresden pumps.

cc: A. Bill Beach, Regional Administrator - RIII
Senior Resident Inspector -Dresden
J. F. Stang, Dresden Project Manager, NRR
Office of Nuclear Facility Safety - IDNS

Attachment 1

Previous Submittal Regarding Amendment to Resolve Issues Related to ECCS Suction Strainer Pressure Drop

50-237 CEC DRESDEN 2

ADDITIONAL INFOR RE PROPOSED CHANGE TO TECH SPECS TO RESOLVE ISSURES RELATED TO ECCS SUCTION STRAINER.

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Attachment 2

Response to Request for Additional Information dated January 15, 1997

The RAI provided six detailed questions, each of which is discussed below.

Question 1. Provide the detailed Net Positive Suction Head (NPSH) calculation which supports the proposed license amendment. Provide, for each Emergency Core Cooling System (ECCS) pump, the NPSH required and at what flowrate it was determined. Specify if this is runout flow for the pump. Specify both of these quantities as function of time. The response should consider changes in suppression pool temperature and containment pressure with time. The response should also include all assumptions and the initial plant conditions used in the NPSH calculation.

ComEd Response:

Attachment 3 provides the detailed NPSH calculations which have been performed to support the proposed license amendment. The calculations were performed for the most limiting LPCI pump and Core Spray pump (highest suction loss) as provided in Dresden Calculation DRE96-0241. The flows utilized in the short-term calculation (DRE97-0002) are provided in Design Input No. 1, and are referred to as the maximum injection flows. These are the runout flows for the ECCS pumps under the limiting conditions in the analysis. The flows evaluated in the long-term calculation (DRE97-0003) are throttled flows. The calculations were performed using bounding cases and assumed worst case values for the duration of their applicability, i.e. less than or equal to 600 seconds for DRE97-0002 and greater than 600 seconds for DRE97-0003. A similar approach was utilized to model containment pressure, i.e. a 2 psig over pressure was assumed constant for the first 600 seconds and no over pressure was assumed thereafter. The suppression pool temperatures were modeled at two points, first at 200 seconds, when peak clad temperatures are predicted, and the more NPSH-limiting condition at 600 seconds when the pool temperature reaches its highest short-term temperature. All assumptions and initial plant conditions are provided in Sections 3 and 4 of the calculations. A comparison of inputs and assumptions between the proposed NPSH calculations and the 1976 NPSH calculations is also provided in Attachment 3.

Question 2. The proposed license amendment estimated that cavitation of the ECCS pumps would reduce flow by 100 gpm per pump. Provide information that supports this amount of degradation. The staff is also concerned with air ingestion in the ECCS pumps. Provide details on the amount of air ingestion in the pumps and the resultant degradation of pump head during cavitation.

ComEd Response:

Attachment 3 includes details regarding the flow methodology used to support the proposed license amendment. A further discussion regarding the cavitation test and its applicability is included in Attachment 6. Dresden Station is not committed to compliance with the Reg. Guide 1.82. However, ComEd believes that if the methodology in Appendix A of the Reg. Guide is applied to the Dresden ECCS system, air ingestion would be zero since the submergence is greater than 6 feet and the Froude number is less than 0.8, including the assumption that one strainer was plugged.

Question 3. Provide justification of the existence of containment over pressure following a design basis accident by one of the following methods.

a. A comparison to a similar designed facility where the use of containment over pressure has been reviewed and approved by the NRC staff.

b. Provide a Dresden specific calculation using a code or methodology which has been reviewed and approved by the NRC staff or with a code the staff has approved for a similar facility and situation which exists at Dresden Station.

Provide all assumptions and initial plant conditions in the response. In addition, provide a comparison of the above calculation to the containment pressure and temperature response results provided in the proposed amendment using the SUPERHEX code.

ComEd Response:

Attachment 4 includes a discussion of the basis for assuming the existence of containment over pressure following a design basis accident. The following discussion provides comparisons with the Quad Cities Station containment response.

In initial plant licensing, the NRC staff reviewed and approved via the Quad Cities original SER, dated August 25, 1971, the use of containment over pressure in NPSH calculations on ECCS pumps for Quad Cities during the design basis accident. Specifically, "a few psi is needed for about 8 hours following a design basis Loss of Coolant Accident..." The Dresden containment systems and associated active components can be demonstrated to be equivalent to those at Quad Cities, and therefore the same over pressure conditions would be appropriate, particularly in the short term (first 10 minutes, prior to initiation of containment cooling) The key containment parameters which could effect containment over pressure during a design basis event are summarized in the following table:

Parameter	Dresden 2/3	Quad Cities 1/2	% Difference
PASSIVE ELEMENTS			
Core Licensed Power	2527 MWT	2511 MWT	0.633
Drywell Free Volume	158236 cuft	158236 cuft	-
Wetwell Free Volume	120097 cuft	119963 cuft	0.111
Wetwell Water Volume	112000 cuft	111500 cuft	0.446
Total Downcomer Area	301.6 ft^2	301.6 ft^2	-
Vent System Path Loss Coeff.	5.17	5.17	-
Vacuum Breaker flow area	18.84 ft^2	18.85 ft^2	-
Vacuum Breaker full open pressure	0.5 psid	0.5 psid	-
ACTIVE COMPONENTS			
LPCI/RHR pump flow rate	4500 gpm rated	4500 gpm rated	-
CS pump flow rate	4500 gpm rated	4500 gpm rated	-
CCSW/RHRWS pump flow	3500 gpm/pump	3500 gpm/pump	-
LPCI/RHR HX original design condition	105 MBTU at 10700 gpm LPCI/7000 gpm CCSW 165 F pool/ 95 F service water side	105 MBTU at 10700 gpm RHR/7000 gpm RHRSW 165 F pool/ 95 F service water side	-
Long term limiting case pump combinations	1 LPCI/2CCSW	1RHR/1RHRSW	n/a

As can be seen in the above, it is clear that the physical parameters defining the containment mass, volume, and initial non-condensable volumes are virtually identical between Dresden Units 2/3 and Quad Cities Units 1/2. Where there are differences, the magnitude is less than one percent, and no significant differences in containment pressure response are anticipated. The recirculation piping systems that define the limiting break (suction piping) are the same size between the units as well. The most significant difference between the plants is with respect to the long term active components, with Quad Cities capable of operating a single RHRSW pump in the long term cooling period with the assumed single failure of a diesel generator plus LOOP, whereas Dresden can support two CCSW pumps under the same assumed conditions. This is due to the difference in horsepower rating of the RHRSW (700 HP) versus the CCSW (500 HP) pump motors. This difference in active components is only significant during the long term post-LOCA period (>10 minutes) when pool cooling is assumed to be manually initiated. It should also be noted that the reconstituted LPCI heat exchanger calculations result in a maximum heat transfer rate of 98.6 MBTU/hr versus the original 105 MBTU/hr rating, and the new values are employed in all current calculations.

Based on the above comparisons and discussion, ComEd has proposed the use of limited over pressure within the first 10 minutes of the design basis event, prior to initiation of suppression pool cooling. A minimal value of 2 psig has been determined to be sufficient in combination with limitation of suppression pool initial temperature to 75 F to result in adequate ECCS pump performance. Due to the differences in long term heat removal capability between Dresden and Quad Cities, no credit for over pressure is proposed for the long term post-LOCA cooling period at this time. Maximum allowable service water temperature reductions have been calculated in conjunction with the reduced initial pool temperature to ensure that the long term peak temperature is limited to the extent necessary to ensure adequate ECCS pump NPSH.

The use of over pressure credit, particularly in the short term post-LOCA period is technically justified from the standpoint that over pressure conditions can be expected to exist until significant steam condensation and corresponding return of non-condensables from the wetwell airspace occur. The amount of steam condensation is limited until vessel refill and subcooled fluid release from the break occurs (at approximately halfway through the short term period).

Question 4. In the resubmitted license amendment be specific in any pressure given as to whether it is absolute of gauge.

ComEd Response:

The license amendment request is based on assuming a two pounds per square inch gauge over pressure in the containment following a design basis accident for the first 600 seconds.

Question 5. The proposed license amendment stated that a new 10 CFR 50.46 report was being prepared to be submitted to the NRC. Provide the details of the peak clad temperature (PCT) changes and how the PCT changes affect the proposed license amendment. In addition, provide affirmation and the details on how the requirements of 10 CFR 50.46 are met in relation to the proposed license amendment.

ComEd Response:

ComEd has performed an analysis which evaluates the effects of this change. The previously applicable LOCA analysis applicable to Dresden Units 2 and 3 resulted in peak cladding temperature of 2030 degrees F. The calculation performed consistent with the conditions described in the amendment request resulted in a peak clad temperature increase of 133 degrees F to 2163 degrees F. This analysis was done with the same approved methodology as described in our last 50.46 letter dated November 6, 1996. ComEd will submit a report in accordance with 10 CFR 50.46 which further details the effects of this change.

Question 6. Provide a detailed safety evaluation (SE) which justifies the proposed changes to the TS and the justification for the change in the design basis as it related to the Unreviewed Safety Question. The SE should explain, in detail, the change in the facility which required a 10 CFR 50.59 evaluation and how a USQ was determined to exist. The SE should also show how the proposed changes to the TS restore NPSH margin for the ECCS pumps and the justification for the design basis change to the Dresden facility.

ComEd Response:

Attachment 5 provides a safety evaluation justifying the proposed change. The change in the facility which required a 10 CFR 50.59 evaluation was the acceptability of continued operation with the ECCS suction strainer design which causes a head loss of greater than one foot. That is, the evaluation was performed to implement the already installed design, and 'use-as-is' the ECCS pump suction strainers. A 10 CFR 50.59 evaluation was required because the suction strainer design, although installed and utilized in the past, was discovered to not be in accordance with the plant design basis. The acceptability of the strainer design required demonstration before it could be permanently incorporated into the design basis. Additional details are provided in Attachment 5.

These changes will assure that the facility continues to operate in compliance with the requirements of 10 CFR 50.46. ComEd has concluded that this change does not involve a significant hazards consideration.

Attachment 3

Dresden LPCI/Core Spray NPSH Analysis Post-DBA LOCA: GE SIL 151 Case Short-Term

Dresden LPCI/Core Spray NPSH Analysis Post-DBA LOCA: GE SIL 151 Case Short-Term

Comparison of inputs and assumptions used in proposed and 1976 NPSH calculations.