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Nuclear Operations

November 3, 1994
NRC-94-0108

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

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) NRC letter to Detroit Edison, "Fermi 2 - Control Center Heating, Ventilation and Air Conditioning (CCHVAC) System - Request for Additional Information," dated March 3, 1994

Subject: Results of Special CCHVAC Fan Pressure Test

Attached please find the test report covering a special ANSI/ASME N509-1980 fan pressure test recently conducted at Fermi 2.

This special test was conducted to respond to concerns raised by NRC staff members in discussions associated with the Reference 2 request for additional information.

If you have any questions on this matter please contact Mr. Glen D. Ohlemacher at (313) 586-4270.

Sincerely,

Robert McKeon

Attachment

cc: T. G. Colburn
J. B. Martin
M. P. Phillips
A. Vegel

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ANSI/ASME N509 - 1980 FAN PRESSURE TEST

Four sections of ductwork on the suction side of the Control Center Heating, Ventilating and Air Conditioning (CCHVAC) Emergency Recirculation Fans were subjected to an ANSI/ASME N509 Fan Pressure Test on October 10, 1994.

Description of the Ductwork

Per Detroit Edison Design Calculation DC-5089, there are four sections of ductwork in the CCHVAC System that have a calculated design pressure of between -21.8 and -22 inches of water. These duct sections correspond to nodes 7, 9, and 10 in the figure on page 20 of DC-5089. Node 11 also has a calculated design pressure of -22 inches of water. However, this node is a filter housing and is not considered to be ductwork. This filter housing was designed in accordance with ORNL-NSIC-65 with a design pressure of 33 inches of water (1.5 x 22).

Description of the Test

Paragraph 5.10.8.2 of ANSI/ASME N509-1980 (Fan Pressure Test) requires that the ductwork be subjected to the design pressure for a duration of 5 minutes. Paragraph 4.6.2.2 of the Standard describes the method of determining the design pressure for components subjected to negative pressure. Components located on the inlet side of the fan which can be isolated by closure of an upstream damper shall be designed to withstand a negative internal pressure equal to or more negative than the peak pressure of the fan. The Emergency Recirculation fans have been designed to operate at -22 inches of water with a design fan shutoff pressure of approximately the same (-22 inches of water). Page 16 of DC-5089 has used actual test data to conclude that the actual peak pressure is closer to -20 inches of water.

Detroit Edison decided to perform the test by actually running an Emergency Recirculation Fan with all of the dampers on the suction side of the fan closed. Using an actual fan will most accurately assure that the maximum peak pressure was achieved.

Description of the Test (cont'd)

The system was started and run in the chlorine mode of operation. In this mode the emergency intakes are isolated and there is a flowpath established through the duct that contains dampers F061A and B. After a few minutes, dampers F061A and B were closed. The dampers were left closed for longer than 5 minutes and a pressure of -20.5 inches of water was measured at node 9. The dampers were then opened and the pressure at node 9 increased to -16.3 inches of water. The system was left running in this configuration while all transverse and longitudinal joints were checked for leaks. All damper shafts and gasketed joints at access panels were also checked for leaks. Audible electronic detection equipment was used to identify any leaks.

Test Results

Minor in-leakage was detected at damper shafts and at gasketed access panels in the north and south emergency intakes (node 10). No leakage was detected at nodes 9 and 7.

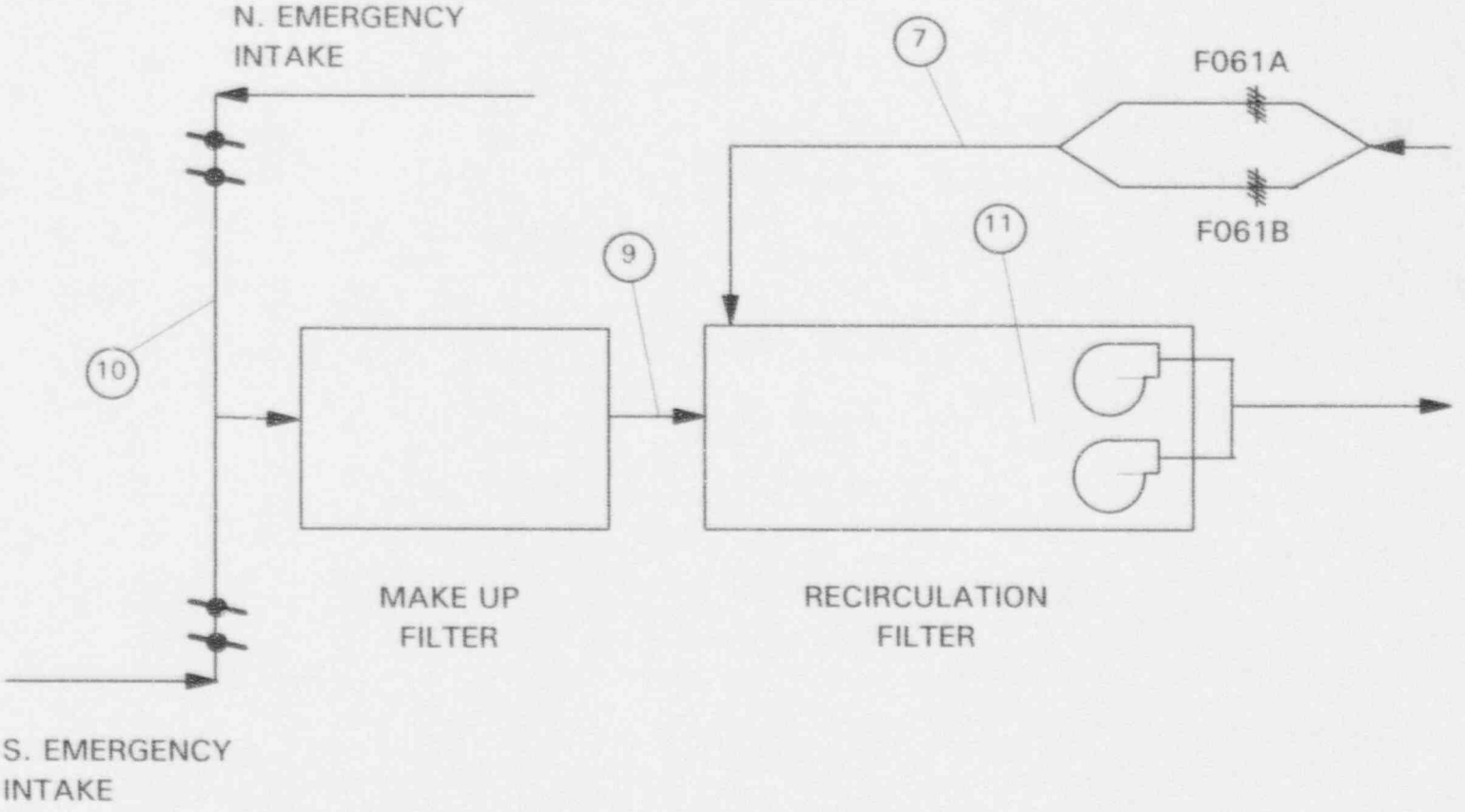
This minor inleakage in the emergency intakes is acceptable. Appendix B of ANSI/ASME N509 classifies these intake ducts as leakage Class II where leakage up to 1% of the duct flowrate is acceptable. Any in-leakage in the emergency intakes would be subjected to the same degree of filtration as the potentially contaminated air from the outside that is flowing through the intakes. This outdoor air is being used to create a slight positive pressure in the control room to eliminate potential sources of unfiltered inleakage.

This minor amount of leakage in the emergency intakes will not impact any flowrate, filtration efficiency, or bypass leakage path that is used to determine the Iodine Protection Factor (IPF) for the main control room. The IPF is used to calculate the post accident control room operator dose. Thus, Fermi-2's calculated operator doses are not impacted by this minor duct leakage.

After the leak check was completed, the system was lined up to the post accident emergency recirculation mode (the mode used for postulated radiation release accidents) and the flowrates were measured in the ducts at node 9 and 7. All flows were within Technical Specification tolerances.

Conclusion

Detroit Edison considers this to be an acceptable ANSI/ASME N509 -1980 Fan Pressure Test. The test met the ANSI/ASME acceptance criteria. There was no permanent distortion or breach of integrity.



SIMPLIFIED CCHVAC EMERGENCY FILTRATION SYSTEM DIAGRAM

(THE NODES CORRESPOND TO THE SAME NODES IN DC-5089, PAGE 20)