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Washington, D.C. 28555

Subject: Dresden 2
SEP Topic: IX-5, Ventilation Systems

NRC Docket 50-237

Reference: P.W. O'Connor letter to L.O. DelGeorge dated April 12, 1982

Mr. O'Connor:

This letter is in response to the above referenced NRC draft evaluation which states that Dresden Unit 2 does not meet acceptance criteria provided in Regulatory Guide 1.105 used for Dresden's Engineered Safety Feature Ventilation Systems, Reactor and East Turbine Room Ventilation Systems.

The function of the engineered safety feature ventilation system is to provide a suitable and controlled environment for engineered safety feature components following certain anticipated transients and design basis accidents.

A review of the systems and exceptions described in the draft evaluation that have not met acceptance criteria of Regulatory Guide 1.105 have been itemized and states the following:

A. Standby Gas Treatment System

Item 1: The capability of the standby gas treatment system to direct ventilation air from areas of low radioactivity to areas of higher radioactivity levels due to its relatively low system design flow rate (4000 cfm).

Response 1: The Standby Gas Treatment System, shown on Dwg. M-49, is a facility shared by Units 2 and 3, consisting of two 100 percent capacity trains rated at a design flow rate of 4000 CFM each. The system is designed to maintain a negative pressure of at least 0.25 inch of water in the Reactor Building under isolation conditions to prevent ground level release of airborne activity and to treat the effluent from

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the building before discharging it through the 310 ft. main plant chimney to minimize release of radioactive material from the containment to the environment. The Standby Gas Treatment System is automatically initiated and the Reactor Building Ventilation System is isolated upon the following:

Item	Setpoint
Group II Isolation	
High Drywell Pressure	+ 2 psi
Low Reactor Water Level	+ 8 inches
High Radiation, Reactor Building Ventilation	11 mRem/hr.
High Radiation, Refuel Floor	100 mRem/hr.

As a result of TMI, the Sentry High Radiation Sampling system (HRSS) has been implemented as of the Unit 2 1981 refueling outage to analyze radiation levels inside the reactor building without necessitating access. The design criteria for the HRSS can be summarized as follows:

1) Control of background radiation and operator exposure to radiation.

2) Rapid sampling and analysis.

3) Sampling and transfer of undiluted sample.

In addition to meeting the minimum NRC requirements, the HRSS has many additional capabilities which provide a high degree of flexibility in anticipation of the escalation of requirements:

1) Can be used for both routine and post-accident sampling and has the capability to obtain an undiluted reactor coolant sample under accident conditions for transport off-site for independent analysis.

2) Additional sample connections are available for more flexibility in selecting sample points; redundant sample connections allow for further expansion if needed to assure sample acquisition under post-accident conditions.

3) Methods for cooling and depressurizing all high temperatures, high pressure fluids for gas sampling and in-line analysis.

Item 2: A single active failure could result in the loss of system functional performance capability. That is, a failure of Diesel 3 to start coupled with loss of off-site power will result in loss of power to the standby gas treatment system.

Response 2: Induced draft fans 2/3 A and 2/3 B located downstream of process filters to minimize contamination problems during maintenance, operate in parallel from a common fan inlet plenum to provide flow through two separate parallel effluent processing lines, for Units 2 and 3. Fan 2/3 A is powered by essential electric service bus 28 through auxiliary transformer 21, Unit 2, by MCC 28-2, and upon loss of off-site power through standby diesel 2/3. Fan 2/3 B is powered by essential electric service bus 39 through auxiliary transformer 32, Unit 3, by MCC 39-2, and upon loss of off-site power through standby diesel 3.

To assure that emergency diesel power is available, the logic of the normal-bypass switch used in conjunction with the 2/3 diesel in the event of a loss of off-site power during a LOCA was changed to the preferred positions of the switches in the normal-normal position. This concurs with the NRC (R.F. Janecek letter to P. O'Connor, dated January 28, 1981) position. Dresden General Procedure, DGA-1-51 (Master Startup, Checklist) and DOP 6600-4, indicate that in operation of the diesel generator normal-bypass switches, the preferred positions of the switches is normal-normal.

The diesel cannot feed both units at the same time, and the switch is supposed to ensure that a unit experiencing the LOCA will have the diesel generator available to it. With the Unit 2 normal-bypass switch in the normal position, a LOCA signal from Unit 2 will result ina trip signal to the diesel output breaker to Bus 33-1 on Unit 3 and a block in the closing circuit for that breaker. The Unit 3 switch in "Normal" causes the same action on Unit 2 in the event of a LOCA signal on Unit 3. Therefore, a single active failure in the loss of off-site power or a single diesel generator power will not impair the functional capability of the Standby Gas Treatment System from processing effluents.

B. <u>East Turbine Room Ventilation System</u>

B.1 <u>Battery Room Ventilation System</u>

Item 1: The battery room contains the batteries that provide emergency DC power essential for post-accident shutdown of the reactor. Ventilation is considered essential to assure that the hydrogen given off from the batteries during heavy discharging is removed.

Response 1: During the charging period of a lead-acid battery a chemical reaction occurs which causes battery water to decompose to hydrogen and oxygen which is known as gassing and upon discharge lead sulphate is formed.

Therefore, hydrogen is given off only during charging not discharging. Ventilation is provided by the east turbine room ventilation system from which 4000 CFM of filtered, heated air is ducted to the battery room and discharged through the north HVAC equipment room. Redundancy of air handling is provided by three 50 percent capacity supply and discharge fans. All six fans are supplied from one motor control center, MCC 26-4 from bus 26 which a non-essential electric service bus and is not safety related. However, upon loss of offsite power bus 26 can be connected to bus 24-1 which can be powered by standby diesel 2 through bus 24.

C. Diesel Rooms Ventilation Systems

Item 1: However, natural convection through the doors cannot equal the air supplied by a 30 hp fan. If the fan's airflow is deemed necessary by design for ventilation in the event of a prolonged post-accident shutdown, their redundancy is not provided. The system does not satisfy failure criterion.

Response 1: During a prolonged post-accident shutdown, Standby Diesel 2 would provide backup to Standby Diesel 2/3 that powers essential electric service equipment, is ventilated by a single 30 hp fan fed from MCC 28-1 with redundant power from MCC 38-1. Therefore, redundancy is provided and this system satisfies single failure criterion.

D. Low Pressure Coolant Injection Subsystem Ventilation

Item 1: Drawing 12E-2302B list only two cubical coolers 2A on MCC 28-1 and 2B on MCC 29-4. These coolers appear to be in two different rooms (their locations are not explicitly indicated). If so, then despite provision of essential electrical service, the fans of the LPCI cubical coolers do not have the redundancy to assure cooling in the event of a failure within the unit. These coolers are important because they would be the only source of cooling for the LPCI pump motors should the detection of radiation shut down the reactor building ventilation system and cause its effluent to be directed to the standby gas treatment system where the air flow rate is comparatively very small.

Response 1: There are two cubical coolers for the LPCI corner rooms shown on Dwg. M-22 (B6), 2A (east cooler #2-5746A) on MCC 28-1, powered from bus 28, and 2B (west cooler #2-5746B) on MCC 29-4, powered from bus 29. Bus 28 is normally powered from Unit 2 auxiliary transformer 21 and upon loss of offsite power is powered automatically from standby diesel 2/3. Bus 29 is normally powered from reserve auxiliary transformer 22 but upon loss of offsite power is powered automatically from standby diesel 2 (See Dwg. 12E 2302 A & B). Also, Technical Specifications surveillance 4.5.3.

requires testing to assure that full operability shall be provided by three LPCI pumps and deliver at least 14500 gpm against a system head corresponding to a reactor vessel pressure of 20 psig. However, three LPCI pumps are required in response to an accident only until core level is recovered (typically within 10 minutes as shown in FSAR Figure 6.2.30). After level is recovered, two LPCI pumps are adequate for long term cooling. Therefore, the room containing the third pump will not heat up significantly and cause the LPCI system to be inoperable. Only one cubical cooler is required for two LPCI pump motors, and if loss of offsite power occurs emergency diesel power is available.

E. High Pressure Coolant Injection (HPCI) Subsystem Ventilation

Item 1: The HPCI pumps are driven by a steam turbine. The HPCI room is serviced by the reactor building ventilation system supplemented by a room cooler which uses cooling water from the diesel generator cooling water sysem. Drawing 12E-2302B show essential service electrical power being provided by MCC 29-4, again, operator action is required but there is no indication of redundancy of fans or electrical service. As discussed above for the LPCI subsystem, the equipment in the HPCI room is cooled solely by the room cooler if the reactor building ventilation system is shutdown due to detection of radiation in the vent stack. Therefore, the HPCI ventilation and cooling system does not have sufficient redundancy and is vulnerable to a single failure.

Response 1: The HPCI room is serviced by the reactor building ventilation system supplemented by a room cooler #2-5747, see dwg. M-22 (B6), which uses cooling water from the diesel generator cooling water system. The cooler is powered from essential electric service MCC-29-4, powered from bus 29. Bus 29 is normally powered from reserve auxiliary transformer 22 but upon loss of offsite power is powered automatically from standby diesel 2 (Dwg. 12E-2302 A & B).

After an accident HPCI will inject either contaminated condensate storage tank (CST) water or suppression pool water into the reactor vessel under emergency conditions at the rate of at least 5000 gpm over an 1150-150 psi reactor pressure range. HPCI typically operates for a short period of time (e.g. 500 seconds for a 0.1 $ft.^2$ break to depressurize to 150 psig, FSAR figure 6.2.15) for small breaks. Therefore, the room will not heat up significantly to cause HPCI to be inoperable. Also, if the reactor building ventilation system is isolated upon high radiation, HPCI will vent to standby gas treatment.

In addition through Dresden General Procedure (DGA-1, loss of coolant accident) upon loss if high pressure cooling system (HPCI) fails to initiate or cannot maintain reactor water level, the operator will verify the initiation of the

Auto-Depressurization System (ADS), and also will verify that LPCI and core spray injection occurs when the reactor pressure decreases to 350 psig as indicated by more than one indication. Therefore, redundant systems are available should HPCI fail to operate.

F. Containment Cooling Service Water System Ventilation

Item 1: Drawing M-5 shows pumps 2B and 2C in the flood-protected cubicals and pumps 2A and 2D in other separate cubicals. Thus, only two of the four containment cooling water pumps are cooling by four cubical coolers. Operator action is required to initiate area cooling.

Response 1: Drawing M-274 which shows the arrangement of the room coolers for the CCSW system is in error. Presently, there are four cubical coolers, each containing two fans, cool the equipment located in the flood-protected cubicle for pumps 2B and 2C with 2A and 2D located outside the flood-protected cubicle. CCSW pump 2B with coolers 30C and 30D, each have two fans powered from MCC 29-2 (essential electric service) through bus 29. Bus 29 is normally powered from auxiliary transformer 22 and upon loss of off-site power is automatically powered from standby diesel 2. CCSW pump 2C with coolers 30A and 30B, each have two fans is powered from MCC 28-2 (essential electric service), powered from bus 28. Bus 28 is normally powered from auxiliary transformer 21 and upon loss of offsite power is automatically powered from standby diesel 2/3.

Operator action is not required to initiate cooling because as long as the pumps are operating they provide cooling to the coolers (Dwg. M-29, sheet 2) and the fans are operating off of a essential electric service with emergency diesel power backup. Also, by design only 2 CCSW pumps are required for cooling (FSAR Table 6.2.4, LPCI/containment coolant equipment specifications).

G. Auxiliary Electrical Equipment from Ventilation

Item 1: Electrical power to the HVAC compressors and fan is from motor control center MCC 25-2, which is not an essential power center supplied by the emergency diesel generators. However, MCC 25-2 can be connected by operator action through buses 25 and 23 to bus 23-1 which is powered by diesel 2/3. Also the auxiliary electrical equipment room is shared with Unit 3, there appears to be no conterpart HVAC system powered by Unit 3. Redundancy depends instead on the east turbine ventilation system deriving its electrical power from motor control center MCC 26-4. Electrical bus 26 is not essential electrical service but may be connected through buses 24 and 24-1 to power from diesel 2. The adequacy of the electrical power redundancy depends upon the adequacy of the complex power interconnections between Units 2 and 3 and among the three diesel generators.

Response 1: An annunciator will alarm upon loss of 120/240V instrument bus which will indicate possible loss of MCC 25-2, which means an operator would manually connect through buses 25 and 23 to bus 23-1 which is powered by diesel 2/3 to guarantee adequacy of power to HVAC equipment. Also, east turbine room ventilation system can be used through MCC 26-4 with loss of offsite power connected to diesel 2. However, all non-essential electric service loads can be connected to diesel generator power by operator action to provide the redundancy of power needed upon loss of offsite power.

Conclusion

In conclusion, it is the opinion of the station that Dresden Unit 2 does meet the intent of the criteria given in Regulatory Guide 1.105 to assure function of engineered safety feature ventilation systems following certain anticipated transients and design basis accidents. Also, all essential electric service loads serving engineered safety feature ventilation systems from bus 28 and 29 are automatically initiated by standby diesel 2, 3 or 2/3 upon loss of offsite power.

Please address any questions you may have concerning this matter to this office.

One (1) signed original and forty (40) copies of this transmittal have been provided for your use.

Very truly yours,

T. G. Lentine

for Thomas J. Rausch
Nuclear Licensing Administrator
Boiling Water Reactors

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