ATTACHMENT 1

SUMMARY REPORT

EVALUATION OF PRIMARY AUXILIARY BUILDING VENTILATION SYSTEM

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
JULY, 1990

9007300031 900712
PDR ADOCK 05000247
P PDC

1. Background

In Inspection Report No. 50-247/89-18 concerns were expressed with respect to the PAB ventilation system. The issues were revisited during NRC Inspection 90-11 when an on-going evaluation of the design bases of the HVAC system was reviewed with an NRC Region 1 inspector. This evaluation was completed and discussed with Region 1 staff on June 13, 1990, by telephone. During the conference call, Con Edison agreed to provided a letter describing a summary of the evaluation and resulting short term and long term actions. This letter is in response to that commitment.

2. Design Basis

The design basis for the PAB ventilation system was established on Page 7.2-39 of the FSAR, i.e., "The ventilation systems of concern outside the Central Control Room are designed to take a single active failure; thus, an analysis of loss of ventilation was not considered necessary". The design basis within the FSAR also reflects operator action for accident mitigation after the injection phase. For example, manual actuation of the ECCS controls is necessary to place the plant in the recirculation mode.

3. Assumptions

a) The analysis discussed below covers the following events:

   i) Design Basis Events as established in the FSAR

   ii) Safe Shutdown is hot shutdown as defined in Section 14A of the FSAR for the mitigation of high energy line breaks and for normal plant shutdown

   iii) Events beyond the Design Basis. These scenarios reflect NRC guidance concerning the length of time to be assumed for a loss of offsite power in conjunction with a seismic event. This guidance is found in Generic Letter 87-02, "Verification of Seismic adequacy of Mechanical and Electrical Equipment in Operating Reactors,...". The scope includes the use of the RHR system to proceed to cold shutdown for non-LOCA cases.

b) Summer conditions are assumed to prevail. This represents the most adverse conditions for evaluation of the PAB without HVAC. A peak ambient outside air temperature of 95°F is assumed as well as a service water inlet temperature of 95°F.

c) A seismic event was postulated to occur for all scenarios evaluated.

d) PAB areas evaluated and heat sources considered:

   i) RHR Pump Rooms
      - Pump motor
      - Lighting load

ii) SIS Pump Rooms
- Pump motor
- Lighting load
- Convective heat load from RHR pump area

iii) Electrical Penetration Area
- Cable IR losses
- Lighting load

iv) 26AA & BB MCC Area
- Transformer inefficiency
- Lighting load
- Solar load
- MCC losses

v) 26A & B MCC Area
- Transformer inefficiency
- Lighting load
- MCC cabinet losses
- Solar load
- Uninsulated CCW piping

vi) CCW Pump Area
- Pump motors
- Lighting load
- Uninsulated piping heat loss

vii) Containment Spray Pump Area
- Pump motors
- Lighting load

viii) Piping Penetration Area
- Uninsulated piping heat loss

ix) Charging Pump Room
- Charging pump motor loss
- Lighting

4. Analysis

a. Design Basis Events

In the analysis both small and large break LOCAs were considered. The small break LOCA can impose the longest time interval (four hours) before the operator initiates the recirculation switch. A single active failure occurs initially rendering the HVAC system inoperable for the duration. A seismic event is superimposed resulting in a loss of offsite power at event initiation. No operator intervention is assumed during the injection phase.

To maximize heat loads to different PAB areas, maximum equipment operation in conjunction with the longest SI injection phase was assumed although this does not correctly represent all of the small and large break scenarios evaluated. This approach is extremely conservative. For example, three SI pumps were assumed to be in operation (maximum safeguards) in assessing the temperature response in the SI pump room. For the purpose of evaluating the temperature

response of the Containment Spray pump area, it was assumed that two spray pumps operate which only occurs if two SI pumps are in operation. This is possible only in a two hour injection phase rather than the four hour injection phase used to bound the analysis.

The Design Basis event essentially concludes with the initiation of the recirculation phase. At this point credit is taken as permitted by the FSAR for operator action to mitigate the single active failure.

b. Beyond Design Bases Events

In Generic Letter 87-02, the NRC provided guidance which states that offsite power should be considered unavailable for 72 hours. The analysis described for the Design Basis Events was extended to include this time period. Temperature rise in all areas of the PAB was considered assuming no operator intervention for 72 hours with the exception of initiation of the recirculation phase. Recirculation was delayed for four hours to maximize equipment operating time and the resulting heat load to individual areas. A single active failure and an earthquake were superimposed.

In comparison with the injection phase, the number of SI pumps running reduces to two pumps since the one pump is automatically shutdown by actuation of the recirculation switch. The Containment spray pumps cease to perform a safety function during the recirculation phase. The charging pump operates continuously for the 72 hour period. All electrical cabling, MCCs and piping containing recirculation fluid are functional for the entire period.

5. Results

The results of the evaluation are illustrated in the following table which identifies the equipment considered in each area, the temperature at 4-hours and the peak temperature reached during the 72 hour period.

	Room/Area	4-hour Temperature	Peak Temperature in 72 hour period	Equipment Evaluated
1.	RHR Pump Rooms	137°F	202°F	Motors Motor Lubricants Cable
2.	Safety Injection Pump Room	144°F	176°F	Solenoid Operated Valves, Motor, Motor Lubricant, Cables - Power, Transmitter, Pump Lubricant, Coupling Lubricant Cables - Instrumentation

	Room/Area	4-hour Temperature	Peak Temperature in 72 hour period	Equipment Evaluated
3.	Electrical Penetration Area	101°F	108°F	Cables
4.	MCC 26 A & B	118°F	124°F	MCCs, Cables
5.	MCC 26 AA & BB	112°F	122°F	MCCs, Cables
6.	Component Cooling Pumps	113°F	119°F	Motor, Motor Lubricant, Coupling Lubricant, Cables
7.	Containment Spray Pump	113°F	119°F	Motor, Motor Lubricant, Pump, Pump Lubricant, Coupling Lubricant, Cables
8.	Piping Penetration	116°F	133°F	Cables, Solenoid Operated Valves, Transmitters, Motor Operated Valves, Temperature Switches.
9.	Charging Pump	122°F	155°F	Cables, Motor, Motor Lubricant, Pump, Pump Lubricant, Fluid Drive Lubricant, Solenoid Operated Valve 112 B, Pressure Switches 6033, 6034 & 6035 Limit switches

Equipment listings and evaluations were based on walkdowns and/or "As-Built" data.

6. Evaluation

a. Design Basis

The above table illustrates that under the assumed accident conditions, none of the equipment areas in the PAB exceed 150°F in the initial four hours. Consistent with the FSAR, credit is taken at the end of four hours for operator intervention to mitigate the hypothetical accident and any assumed single active failures. The postulated single active failures considered are as follows, together with the required actions:

1. Failure of Diesel Generator 23.

   Diesel Generator #23 feeds the bus described in the FSAR which supplies power to the PAB exhaust fans. Its failure would terminate the emergency power supply. At the end of the four hours, emergency power could be restored to the PAB exhaust fans with load management and via tie breakers from busses supplied emergency power from the remaining diesels.

   The main power supply breaker feeding the motor control center (MCC 27) for the PAB exhaust fans opens upon an SI signal. Plant emergency procedures require resetting MCCs after an event.

2. Failure of a PAB exhaust fan/motor.

   No operator action required. Redundant fan/motors have always existed.

3. Failure of the power supply breaker.

   The power supply breaker is located within the 480 volt switchgear room, an area that is readily accessible after an accident. Replacement with a spare breaker is an operation capable of being accomplished within a brief time period.

For High Energy Line Breaks (HELBs) outside of containment and normal plant shutdown, equipment similar to that required for LOCA mitigation is required. However the listing is not as extensive nor are as many components required to be operable to achieve hot shutdown. Therefore, the single active failure analyses is equally applicable. Since operator action could be assumed after 30 minutes to 1 hour, peak PAB temperatures under these circumstance would be less than stated in the table.

The evaluation described above confirms the validity of the original design basis.

b. Beyond the Design Basis

In order to assess the capability of equipment to comply with more recent guidance such as Generic Letter 87-02, the analysis was extended to 72 hours without operator intervention. The single active failures postulated previously and the corrective actions still remain valid.

Thus for these failures HVAC cooling would be restored in the initial hours of any incident. In addition, the evaluation was broadened to enable inclusion of other single failures, such as a failure affecting MCC 27. Previously identified corrective actions would not necessarily be available.

Our assessment establishes that all required equipment should survive the temperature transient and remain operable.

7. Short term actions

Several actions were taken to provide added margin at the peak temperatures associated with 72 hour operation.

1. The lubricants for the SI and RHR pumps were changed to synthetics which are more suitable for high temperature operation.

2. A fusible link controlling opening of one RHR cell fire door was changed.

3. Procedures were revised to provide for portable blowers to be installed in a charging pump cell with power from a qualified emergency power source.

4. A seismically qualified casualty cable was installed but not connected. Should both normal offsite power and diesel generator 23 be lost for any reason, a connection to a power cable from diesel generator 22 could be accomplished in eight hours. This would restore power to at least one fan. Procedures have been revised to reflect this change.

5. Procedures were revised to address loss of an operating charging pump if it is tripped by a potential malfunction of an oil pressure switch.

6. Procedures were revised to provide additional vent areas for upper elevations in the PAB (with appropriate radiation monitoring).

8. Long Term Actions

As part of our diesel generator upgrade program for the 1991 Refueling outage, we plan to provide a separate power feed for each of the PAB exhaust fans from a different MCC/diesel bus train.