Stephen B. Bram
Vice President

Consolidated Edison Company of New York, Inc.
Indian Point Station
Broadway & Bleakley Avenue
Buchanan, NY 10511
Telephone (914) 737-8116

March 6, 1992

Re: Indian Point Unit No. 2
Docket No. 50-247

Document Control Desk
US Nuclear Regulatory Commission
Mail Station P1-137
Washington, DC 20555

SUBJECT: Response to Unresolved Items, Electrical Distribution System Functional Inspection, Report No. 50-247/91-81

As requested in your letter dated December 26, 1991, enclosed as Attachment 1 is the status and schedule of resolution for the six unresolved items identified in the subject inspection report. Attachment 2 provides an equipment identification erratum identified during our review of the report.

Should you have any questions regarding this letter, please contact Mr. Charles W. Jackson, Manager, Nuclear Safety and Licensing.

Very truly yours,

cc: Mr. Thomas T. Martin
Regional Administrator - Region I
US Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. Francis J. Williams, Jr., Project Manager
Project Directorate I-1
Division of Reactor Projects I/II
US Nuclear Regulatory Commission
Mail Stop 14B-2
Washington, DC 20555

Senior Resident Inspector
US Nuclear Regulatory Commission
PO Box 38
Buchanan, NY 10511

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ATTACHMENT 1

Response to Unresolved Items

EDSFI Report No. 50-247/91-81

Topic	Number 50-247/
Continuous Rating of DB75 Breakers	91-81-04
125 Vdc Voltage Drop Calculations	91-81-05
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Short Circuit Rating of DB50 Breakers	91-81-07
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CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
MARCH, 1992

Unresolved Item 50-247/91-81-04

Continuous Rating of DB75 Breakers

From Inspection Report Section 3.1:

The team addressed the loading of the ac electrical distribution system to ensure that it met the demand requirements under emergency conditions. For this purpose the team reviewed Calculation No. EPG-00028-00, dated September 25, 1991, "Review and Update of Electrical Diesel Generator Loading Study", and a printout of the load profile, dated September 11, 1991. The study and load profiles reflect the EDG and distribution system modifications implemented during the last refueling outage.

The team's evaluation of the above documents showed that, under certain conditions, the system's load demand exceeded the rating of the supply breaker. For instance, in the event of a large break LOCA with failure of EDG-21, the load on EDG-23 could be as high as 2271 kW, which is equivalent to 3218 A at 0.85 power factor. The team also determined that the licensee, in order to ensure that the EDG supply breaker did not trip on overload, had set the long time overcurrent trip device at 3600 A. Since Westinghouse, in a letter dated April 1990, did not recommend a setting above the breaker continuous rating, the team asked the licensee to justify the acceptability of the momentary overloading of the bus and breaker.

In response to the team's request, the licensee provided the results of a test conducted by Satin American Corporation, Quality Assurance Report No. QA-1181-R01, which evaluated the capability of the DB-75 breaker to carry 3300 A. The test measured the temperature rise of the breaker components under anticipated overload conditions. Based upon the results of this test, the licensee concluded that the breaker could be overloaded for the required period of time without adverse effects on the breaker components.

The team found the resolution of this issue acceptable. However, since the normal supply breakers were also set at 3600 A and load demands are generally higher when the system is supplied by the offsite power, the team asked the licensee to justify the acceptability of the normal supply breaker's setting.

For the long term demand, the licensee provided page 6 of Emergency Operating Procedure E-0 which cautions the operator not to exceed 200 A, on the 6.9 kV transformers 2, 3, 5, and 6. This current corresponds to 2875 A at the 480 V level. For the maximum post accident demand, during the initial loading of the buses, the licensee estimated the current to be 3477 A. The team agreed that breaker's setting was acceptable for the long term loading of the bus, but expressed concern regarding the initial loading of the buses for two reasons:

(1) The maximum current calculated by the licensee was based upon a December 1989 load study and appeared to be non conservative with respect to the latest load distribution. For instance, the component cooling water pump 23 is a load that is not shed when offsite power is available. If only this load (228 kW) is considered, under degraded voltage conditions and at 0.85 power factor, the demand on bus 6A is 3825 A. This value is well above the current (3300A) to which the breaker was tested by Satin American.

(2) Even if it is proven that the breakers and the switchgear buses are not adversely affected by the temporary overload described in (1) above, the possibility exists that the normal supply breakers may trip on overload during the initial response of the system to a large break LOCA. This is due to the fact that the trip devices have a +/-10% tolerance and, therefore, the circuit breakers can trip on overload when the current exceeds 3240 A. In this case, the normal offsite supply would not have the capacity and capability specified by 10 CFR 50, Appendix A, General Design Criterion XVII.

Further discussions with the licensee indicated that the actual power factor may be higher than the 0.85 used in the calculation. In addition, some discrepancies existed between the 1989 calculation and the latest load study. In view of the above, the issue is unresolved pending preparation of refined calculations by the licensee and any appropriate corrective actions. (50-247/91-81-04).

Response

The tolerance on the 480 volt bus DB-75 supply circuit breaker trip setting value based on test results is +/- 2%, not +/-10% as indicated in the NRC inspection report. This has been certified by Westinghouse in a letter to Consolidated Edison dated June 7, 1988. The 10% tolerance noted by the NRC is valid only when using the factory calibrated markings on the circuit breaker dials in setting the circuit breaker based on factory calibration without additional testing; the 2% accuracy tolerance is based on the use of secondary current injection testing which is the calibration method in use at Indian Point Unit 2 during periodic surveillance tests. The expected trip band for the normal supply DB-75 circuit breakers with a 3600 A trip setpoint would be between 3528 and 3672 Amperes.

The most heavily loaded bus during a postulated accident with offsite power available is Bus 6A. An analysis of postulated accident loading on Bus 6A during a worst case extreme voltage contingency (voltage drop to 91.2% system voltage on the 138/345 kV system) was performed. The drop in system voltage of this magnitude is based on the simultaneous failure of several independent components in the transmission system, and is considered possible, but improbable. During this scenario, the lowest bus voltage would appear on Bus 6A (409 V), and the current thru the DB-75 Bus 6A supply breaker by design should not enter the trip band of the subject circuit breaker. Thus, for this worst case analyzed degraded voltage, we would not compromise the integrity or capability of the normal offsite source to supply the postulated accident loading.

In line with the Indian Point Unit 2 defense-in-depth design philosophy, we have also analyzed the case where the 480 Volt bus voltage degrades to 398 V. This point is the lower limit of the degraded voltage setpoint (i.e., 403 V nominal). The analysis indicates that the maximum current on Bus 6A, the most heavily loaded bus under this condition, is 3624 Amps at 398 V.

The NRC report refers to 3825 Amps as the maximum current under the same condition. This value includes 50 kW for the emergency diesel generator bus heat loss and 228 kW for the Component Cooling Pump (CCP). Based on our calculations under this postulated scenario, the CCP draws no more than 212 kW and the diesel generator bus heat loss need not be considered, since the offsite power is available. In addition, our figure is calculated based on the use of actual individual motor power factors, rather than the assumed overall average 0.85 power factor for the total bus load used in the inspection team's calculation.

In this highly unlikely scenario, the automatic tap changer located at the Station Auxiliary Transformer would regulate the voltage back toward nominal. This tap changer responds automatically at the approximate rate of 62 seconds for the first tap and 32 seconds for each succeeding tap.

Each tap is a voltage difference of 1% of the 6.9 kV base voltage. Therefore, for a voltage drop of 9% we could expect a full voltage recovery in approximately 5 minutes. Assuming a voltage just above the degraded voltage setpoint, a movement of 3 taps (approximately 3%) would reduce the current to a point below the trip band of the amptector in approximately 2 minutes.

With a short time overload of 3624 Amperes, the DB-75 amptector trip unit will trip in approximately 10 minutes. Through tap changer operation, the current will back out of the trip range well before an overcurrent trip occurs.

This reliance upon the use of the station auxiliary transformer automatic load tap changer was established in the original response to the effects of degraded grid voltage on plant operation, in a Consolidated Edison letter to the NRC dated April 28, 1980.

The preceding analysis takes no credit for the operator responding manually to the degraded voltage alarm set at approximately 93% of nominal voltage. The operator response to voltage reduction would take place at two levels. The bulk power System Operator could raise voltage by adjusting the tap changers of the transformers located in the transmission system, and the Indian Point Station Operator, by procedure, can manually increase voltage on the Station Auxiliary Transformer load tap changer.

The above discussion addresses the adequacy of the offsite system to supply the postulated accident loading. The capability of the DB-75 circuit breakers to handle a short-time overload without exceeding their design capabilities has been established through testing and analysis. The DB-75 circuit breakers have been demonstrated to sustain in excess of 3600 Amperes for a minimum of 30 minutes. Consequently, it has been concluded that the 3600 A overload trip setting applied to the station service transformer DB-75 circuit breakers is an appropriate setting.

To further enhance our design margin, an investigation is underway to increase the degraded voltage relay setting above its present value. This change will be supported by a Technical Specification Amendment request to be submitted on or about April 30, 1992.

Unresolved Item 50-247/91-81-05

125 Vdc Voltage Drop Calculations

From Inspection Report Section 3.1:

Voltage drop calculations for the dc system are needed to determined the voltage drop for the most limiting components and to set battery discharge limits to ensure that adequate voltage levels exist at the end devices.

The team inquired about the availability of such documents, but determined that currently the licensee's calculations and studies had addressed only available voltage at the major distribution panels. Therefore, no overall assessment of the capability of the dc system to deliver quality power to the loads was possible. However, the team did review the battery sizing analysis (see Section 3.4) and found no evidence of inadequate voltage at the loads or that the system could not perform its safety function. Further discussions with the licensee indicated that they were aware of this deficiency and that they were in the process of conducting this portion of the study.

Acceptability of available voltage at the 125 Vdc safety related loads is unresolved pending completion of the analysis by the licensee and review by the NRC. (50-247/91-81-05)

Response

A dc voltage drop calculation (No. EGP-00004-00) has been performed to verify that all the dc equipment supplied by Indian Point Unit 2 batteries 21, 22, 23 and 24 are operable during minimum voltage conditions at the battery terminals. The minimum voltage conditions at the batteries occur after two hours of plant operation for a postulated loss of offsite power and loss of cooling accident.

This calculation is available for inspection.

Unresolved Item 50-247/91-81-06

120 Vac Voltage Drop Calculations

From Inspection Report Section 3.6:

Voltage drop calculations for the 120 Vac vital instrument bus are needed to ensure that instruments and components important to safety are adequately powered. For this purpose, the team inquired about the availability of voltage drop calculations. The team determined that the current calculations only address voltage available at the distribution panels. Therefore, the team could not perform an adequate evaluation of the capability of the system to deliver quality power to the end loads. However, the licensee indicated that calculations addressing the voltage drop to the limiting components were in the process of being performed. A review by the team identified no evidence of inadequate voltage at the loads. This item is unresolved pending completion of the above analysis by the licensee and review by the NRC (50-247/91-81-06).

Response

A 118 Vac voltage drop calculations (No. EGP-00031-00) has been performed to demonstrate that all the equipment supplied from 118 Vac Instrumentation Buses 21 and 21A are operable during a postulated minimum voltage at Inverter 21, loss of offsite power, and loss of cooling accident. Inverter 21 was used as a typical case for calculating the postulated minimum voltage expected at the 118 Vac Instrument Buses 21, 21A, 22, 22A, 23, 23A, 24 and 24A.

This calculation is available for inspection.

Unresolved Item 50-247/91-81-07

Short Circuit Rating of DB50 Breakers

From Inspection Report Section 3.7:

The adequacy of the momentary and interrupting fault current rating of the electrical distribution system equipment was reviewed in February 1988, during a Safety System Functional Inspection, Report No. 50-247/88-200. At that time, the team observed that the short circuit calculation had not addressed the effects of the parallel operation of the diesel generators with the system and expressed concern that, during such occurrence, the fault current would exceed both the symmetrical and asymmetrical ratings of the DB50 circuit breakers. The licensee's resolution of the issue was reviewed in May 1989, Report No. 50-247/89-12, and again in April 1990, Report 50-247/90-11. However, the issue was not closed until February 1991, Report No. 50-247/91-04, when the licensee's revised analysis showed that the fault current was within the interrupting rating of the breaker.

During the current inspection, the team addressed the issue again to determine the impact of the EDG modification on the system's fault current. A review of Calculation No. EPG-00006-00, dated September 5, 1991, showed that a revision to the emergency generator impedance had increased the symmetrical short circuit duty of the breakers (54,132 A) beyond their published interrupting rating (50,000 A). In addition, a closer review of the calculation showed that it had not considered the maximum anticipated system voltage and an additional contribution of approximately 1500 A from the 6.9 kV system. The team was concerned about this observation because of the physical arrangement of the 480 Volt safety related buses and the proximity of the two switchgear lineups. With redundant buses housed within the same enclosure and bus duct connecting the EDGs and the switchgear buses, the team's concern was that redundant safety buses could be rendered unavailable as a result of the catastrophic failure of one single breaker.

In response to the team's concern regarding the observation, the licensee pointed out that the calculation included a letter from Westinghouse, which stated that, "based upon engineering judgement and a previous engineering information test" the breakers could "be expected to clear faults" of 52,700 A to 60000 A symmetrical and that, "if damage were to occur, it would be localized to the breaker and the breaker compartment." The letter also stated that the evaluation assumed "the breaker to be new or factory refurbished by Westinghouse NSD." The team was not able to verify the "previous engineering information test" referred to by Westinghouse, or the effect of a fault of the magnitude identified on an aged breaker. In addition, the actual worst case short circuit current, during paralleling of the EDG to the system, was still unclear because of the various assumptions made by the licensee with respect to motor fault contribution and voltage levels at the bus of interest.

The team had no concerns regarding breaker interrupting capacity during normal operation and recognized the low probability of a bolted fault occurring during the diesel generator testing period. However, given the specific arrangement of the IP2 emergency buses, it is considered important that the licensee re-evaluate the results of the short circuit study to determine the significance of the problem. This issue is unresolved pending additional evaluation of the issue by the licensee. (50-247/91-81-07).

Response

We will update our study and calculations in response to the inspection team's concern, to include mitigating factors not discussed in this finding.

We have investigated the effects of the 6.9 kV motor contribution to the worst case short circuit current available to a postulated fault during an emergency diesel generator testing scenario. We have determined that the contribution is minimal due to the small incremental drop (approximately 10%) in the system voltage.

In response to the question of the effects of high system voltage on the DB-50 circuit breakers, calculations have previously been made verifying no adverse short circuit current effects on the DB-50 breakers during the normal case, without emergency diesel generator testing. However, during the testing of the emergency diesel generator in parallel to the bulk power system, the 480 volt system will be regulated by the diesel generator voltage regulator in accordance with manufacturer's specified tolerances, irrespective of system voltage. The 480 volt system voltage has been recorded during each monthly test and essentially 480 Volts have been maintained during the conduct of the test. Thus, in the emergency diesel generator testing case, the 480 volt bus voltage will have only a minimal effect on the short circuit (approximately 0.5% increase).

The possible fault scenarios are:

1. Single phase to ground - this fault results in no fault contribution from the diesel generators since they are ungrounded. This is the most probable fault and would be well below the 50,000 A rms short circuit original rating of the DB-50 circuit breakers.

2. Phase to phase - this fault results in current levels which are approximately 87% of the three-phase values. Such a fault would be below the 50,000 A rms short circuit original rating of the DB-50 circuit breakers.

3. Three phase - a bolted fault during testing is extremely unlikely compared to the above two fault possibilities. The 480 volt bus has a 3.5 inches metal-to-metal clearance and in the unlikely event of 3-phase fault at the breaker terminals, the fault would include some arc impedance which would decrease the fault significantly from the 54,000 A fault calculated in our original calculations. Thus, a fault current in the low 50,000 A range would be cleared by the DB-50 circuit breakers, in view of the Westinghouse memorandum regarding the ability of the circuit breaker to withstand and interrupt a 60,000 A rms short circuit (with some possible minor breaker damage), with the proviso that they are kept in a well maintained condition. Since these are safety-related breakers, the manufacturer's recommended maintenance and refurbishment procedures are closely followed, so as to keep them in "well maintained" operating condition.

In addition, in support of the technical merits of the Westinghouse memorandum, we wish to highlight that the DB-50 circuit breaker has two published interrupting ratings; i.e., 50,000 A symmetrical and 60,000 A asymmetrical. This means that the DB-50 circuit breaker is able to interrupt 50,000 A ac symmetrical plus a superimposed dc offset of 10,000 A. It is a well-known fact that the interruption of dc current imposes a more severe interrupting duty than the equivalent rms ac current. The increase in ac current ampere for ampere over 50,000 A would result in less of an interruption problem than the equivalent dc current increase. Our calculation indicates that the total current (ac plus dc) is well under 60,000 A rms. On the basis of this rationale, in support of the Westinghouse memorandum, a three phase fault at the terminals of the DB-50 circuit breaker will be within the DB circuit breaker's design capabilities.

In conclusion, the effects predicated by the NRC would have minimal effect on the short circuit and, therefore, would not result in exceeding the breaker's short circuit capacity. In addition, the likelihood of a fault over 50,000 A rms symmetrical is extremely remote and even if such a fault should occur, it would not result in failure of the breaker to perform its clearing function, and at worst may require some inspection and maintenance of the breaker while the fault is repaired. This evaluation concludes that the circuit breaker will interrupt the worst case fault at the breaker's terminal, as designed, and that there would be no catastrophic switchgear failure.

A revised calculation to address the case of emergency diesel generator testing is planned to be completed by April 30, 1992.

Unresolved Item 50-247/91-81-08

Automatic Transfer Switches

From Inspection Report Section 3.13:

Review of the EDG control sources determined that the EDG units, their associated output circuit breakers and 480 V safety-related bus circuit breakers were provided with 125 Vdc control power which was derived, through two "ganged" automatic transfer switches, from either a "Normal" or an "Emergency" battery source. This dc control power was used for EDG field flash, governor control, relaying and interlock controls, starting air solenoid valves and for the operation of the associated circuit breakers. Approximately 2 seconds were required to initiate and achieve an automatic transfer from the Normal to the Emergency supply.

The team observed that, although the momentary loss of control power would not cause the EDG engine to shutdown, it could cause the EDG generator field flashing relay to drop-out which, in turn, could cause the generator excitation current to be immediately reduced. When the EDG is not paralleled to the grid, this reduction in excitation current could result in a corresponding reduction in generator output voltage to the emergency loads and a consequent slow down of the emergency pump motors. The voltage decay could also cause the circuit breakers to drop-out.

Although it is recognized that the dc control power would be re-established after the transfer, the team questioned the overall impact of the transfer and its acceptability. The team was particularly concerned about:

- The closure status of the safety related circuit breakers. Since dc power is required to operate the circuit breakers, it was not clear whether they would remain closed until power was regained or whether they would drop-out on undervoltage.

- The ability of the system to re-establish generator output voltage without field flash. Field flashing is automatically discontinued as the engine begins to rotate and increase system coolant pressure.

- The effects of the re-established control voltage on the motors and the EDG unit itself. Restoration of EDG field current, with the engine at approximately rated speed, could result in an instantaneous restoration of the EDG voltage, at 60 Hertz, while the speed of pumps and motors was slowing down considerably. The end result would be: (a) the potential overloading of the EDG, while trying to accelerate all loads at the same time, and (b) large out-of-phase circulating currents between the generator and the pump motors.

The licensee was unable to determine the effects of the loss of dc control power during the transfer interval. Therefore, a decision was made to block the transfer until a complete analysis could be made. This temporary change was approved for implementation via a "Night Letter", during a management meeting in which the problem was discussed and interim procedures and safety analysis were presented.

In conjunction with this finding, the team observed that the licensee used automatic transfer switches in several other applications, but no detailed analysis was ever performed to ascertain the acceptability of the design. For example, during the diesel generator upgrade, the licensee determined that a minimum of three fans were required to provide adequate cooling for the diesel generator building (see Section 4.3.1). To support this need, they provided five fans for which two were powered by one diesel generator, two from a second diesel generator, and the fifth fan from either of these two generators through an automatic transfer switch.

The team reviewed the design and determined that adequate physical separation had been used for the two redundant sources and that adequate coordination was used between the main and branch fuses. Nonetheless, the design did not consider the possibility of a single failure, e.g., a main fuse blowing prematurely or an undetected blown fuse. In this case, a fault at the switch or downstream of the switch could result in the loss of more than two fans.

The use of transfer switches in the applications described above as well as other potential applications not identified by the team is unresolved pending complete evaluation and appropriate resolution of the issues by the licensee (50-247/91-81-08).

Response

Review of the plant electrical design indicates the use of automatic transfer switches in two dc applications and two ac applications, addressed below.

DC Applications

1. Automatic Transfer Switches for EDG 125 Vdc Control Circuit Power

   For loss of power to the normal source of the EDG 125 Vdc transfer switch, it will take approximately two seconds for the transfer from the normal to the emergency supply. During this duration, the K1 contactor, associated with the voltage shutdown (field flashing) circuit, will drop out which will short the field and initiate a trip to the diesel generator output circuit breaker.

   As indicated in the Inspection Report, interim measures have been taken to preclude the operation of these automatic transfer switches. These measures will remain in place until after completion of the control circuit modification described below.

   To eliminate any potential for the loss of an EDG upon loss of normal dc power, a modification has been planned for the 1993 outage on the EDG control circuit. It consists of adding a redundant EDG field shorting circuit for each of EDGs 21, 22 and 23. The new redundant circuit will be supplied via a separate, fused feeder from the emergency 125 Vdc source associated with each diesel generator. The new K1′ contactor will have normally closed contacts connected in series with the existing K1 contactor for the field shorting, the Basler field shutdown alarm, and the EDG output circuit breaker trip circuits. For loss of a power source or transfer switch action, K1 and K1′ contactors will not both drop out. Therefore, the above scenario will have no effect on the EDG field shorting, the Basler field shutdown alarm, and the EDG output breaker trip circuits.

Besides the K1′ contactor addition, we plan to enhance the EDG control circuits as follows:

a. Modify EDG 22 and 23 control/field flashing 125 volts dc supply transfer switch internal wiring so that the normal and the emergency supplies are reversed. This modification will insure each EDG's automatic transfer switch normal power supply will be fed from different sources.

Existing	Existing (Proposed) Normal Supply	Existing (Proposed) Emergency Supply
EDG 21	Dist. Pnl. 21	Dist. Pnl. 23
EDG 22	Dist. Pnl. 22 (Pnl. 23)	Dist. Pnl. 23 (Pnl. 22)
EDG 23	Dist. Pnl. 22 (Pnl. 24)	Dist. Pnl. 24 (Pnl. 22)

b. The outputs of the EDG 125 Vdc control power automatic transfer switches are fused. To insure the fuses are functional, it is currently planned to install during the 1993 outage a voltage monitoring relay and a local light to indicate power available. During loss of dc power to the EDG control circuit, the voltage monitoring relay will activate the respective EDG category alarm to the CCR "SH" alarm panel and the local indicating light will be deenergized. This modification will improve the monitoring of the EDG field flash circuit.

2. Automatic Transfer Switches for 480 Vac Buses 2A, 3A, 5A & 6A Equipment.

The 125 Vdc control power for the operation of circuit breakers on Buses 2A, 3A, 5A and 6A are supplied from dc distribution panels via automatic transfer switches. The automatic transfer switches are monitored by the indicating lights in the Central Control Room, which identify the switch connection to the normal or emergency source. In addition, indicating lights for power available and automatic transfer switch connection to normal or emergency source are provided at the automatic transfer switch. Loss of the 125 Vdc power will not automatically change the state of the circuit breaker, but will momentarily interrupt the 480 V circuit breaker indicating lights and control capability during the transfer because the tripping and closing coils require 125 Vdc power. However, the circuit breaker is still protected by the ac Amptector circuit which does not require dc power because it uses a direct mechanical trip, independent of the dc tripping coils.

As part of the 1993 outage, the number of automatic transfer switch operations is planned to be reduced to one during loss of power to a battery/panel source. This enhancement consists of swapping the normal and emergency feeds for Bus 3A and 6A transfer switches as follows:

Switchgear	125 Vdc Transfer Switch Normal Supply Existing (Proposed)	125 Vdc Transfer Switch Emergency Supply Existing (Proposed)
480 V Bus 2A	Pnl. 22	Pnl. 24
Bus 6A	Pnl. 22 (Pnl. 24)	Pnl. 24 (Pnl. 22)
Bus 5A	Pnl. 21	Pnl. 23
Bus 3A	Pnl. 21 (Pnl. 23)	Pnl. 23 (Pnl. 21)

AC Applications

1. Automatic Transfer Switch for EDG Building Ventilation Fan

   The need for the automatic transfer switch will be eliminated with the addition in 1993 of a sixth ventilation fan for the EDG building. With six fans, there is no need to have the fifth fan on a transfer switch. After the fan is added, the transfer switch will be eliminated and the fans will be powered directly from three separate power trains, two fans per train.

2. Automatic Transfer Switch for Instrument Bus Power Supply

   Each one of the four inverters 21, 22, 23, and 24 contains a static switch which transfers the power supply of the instrument bus to the alternate source in case of the loss of the regulated 118 V. This switch is an integral part of the inverter. The bus arrangements have been designed so that failure of a single inverter (or its static switch) will not cause the loss of a basic protective system or prevent the actuation of the minimum safeguards devices when called for.

Unresolved Item 50-247/91-81-09

Switchgear Room Ventilation

From Inspection Report Section 4.3.2:

The team reviewed the design of the ventilation system in the switchgear room and noted that the three fans in the switchgear room were powered by MCC 29 which is shed in the event of a LOCA. In this case, the switchgear room temperature could rise to approximately 135°F. This anomaly had been previously identified by the licensee which reported it to the NRC, on September 27, 1991, in accordance with 10 CFR 50.72 (SOR No. 91-485).

Since this issue directly affects the continuous rating of the DB75 breakers (Section 3.1), its resolution will be followed separately from the 10 CFR 50.72 process (50-247/91-81-09).

Response

As indicated in LER 91-20-00 dated October 28, 1991, immediate corrective actions were taken to address the possibility of failure of all three switchgear room fans. These actions consisted of procedural changes to verify operation of the ventilation system during periodic operator rounds and, in the event of an accident, to open doors to establish natural circulation (stack effect).

As the permanent resolution, a plant modification has been designed to provide a separate power supply to each of the three fans. Two will have back-up power from separate emergency diesel generators. In addition, a high ambient temperature alarm for the switchgear room will be installed in the Central Control Room to alert the operator of a high room temperature condition. A local temperature indicator will also be installed. Finally, key interlock switches will be provided to bypass the fire protection signal interlock in case an interlock malfunction trips all three fans.

Installation of the above changes is underway, and is expected to be completed by April 30, 1992.

Additional confirmatory heat rise analysis is being performed, and a supplementary LER is planned to report results by July 31, 1992.

ATTACHMENT 2

ERRATUM: In Inspection Report No. 50-247/91-81, Section 3.5, the reference to Battery Charger 22 as original plant equipment is incorrect. It should read Battery Charger 21.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
INDIAN POINT UNIT NO. 2
DOCKET NO. 50-247
MARCH, 1992