

Indian Point 3  
Nuclear Power Plant  
P.O. Box 215  
Buchanan, New York 10511  
914 736.8001



John H. Garrity  
Resident Manager

December 2, 1993  
IPN-93-152

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Mail Stop PI-137  
Washington, D.C. 20555

**SUBJECT:** Indian Point 3 Nuclear Power Plant  
Docket No. 50-286  
Licensee Event Report # 93-048-00  
"Plant Outside Its Design Basis Due to Potential Single Failure  
of Control Building Ventilation for 480VAC Switchgear Causing  
Room Temperatures to Exceed Switchgear Design"

Dear Sir:

The attached Licensee Event Report (LER) 93-048-00 is hereby submitted in accordance with the requirements of 10 CFR 50.73. This event is of the type defined in the requirements pursuant to 10 CFR 50.73(a)(2)(ii)(B), 10 CFR 50.73 (a)(2)(v)(A) and 10 CFR 50.73 (a)(2)(v)(B). Also attached are the commitments made by the Authority in this LER.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'JH Garrity', written over a horizontal line.

John H. Garrity  
Resident Manager  
Indian Point 3 Nuclear Power Plant

0800 13

JHG/DWO/vjm

cc: See Next Page

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PDR ADOCK 05000286  
S PDR

Handwritten initials 'JKD' in the bottom right corner of the page.

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Mr. Thomas T. Martin  
Regional Administrator  
Region 1  
U.S. Nuclear Regulatory Commission  
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King of Prussia, Pennsylvania 19406

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U.S. NRC Resident Inspectors' Office  
Indian Point 3

Attachment 1  
List of Commitments

Number	Commitment	Due
IPN-93-152-01	A temporary modification will be installed to provide a control room alarm on high CB 15 foot elevation ambient temperature. This temporary modification will be installed by December 15, 1993.	December 15, 1993
IPN-93-152-02	A modification will be installed to separate the power supplies for exhaust fans 33 and 34. This modification will be installed prior to plant startup.	Prior to plant startup
IPN-93-152-03	An evaluation will be performed on the existing ventilation system for the CB 15 foot elevation and also other non-safety related HVAC systems including the ventilation system for the CB 33 foot elevation to determine the need for modifications to assure compliance with the design bases and licensing commitments. This evaluation is scheduled for completion prior plant startup.	Prior to plant startup
IPN-93-152-04	Modifications to the CB HVAC system will be made as required based on the results of the above evaluation. The schedule for the completion for such modifications will be dependent upon the scope on the modifications.	Indeterminate
IPN-93-152-05	Priority I and II design document open items for the CB HVAC system will be reviewed prior to plant startup to determine their safety significance.	Prior to plant startup
IPN-93-152-06	Exhaust fans 33 and 34 control components will be upgraded to QA Category I.	Prior to plant startup
IPN-93-152-07	Training on AP-8 will be provided to those corporate personnel involved in the modification or review of the design of IP3. This training will be completed prior to plant startup.	Prior to plant startup

Number	Commitment	Due
IPN-93-152-08	An Alarm Response Procedure (ARP) will be developed to identify a response for increasing CB 15 foot elevation switchgear room ambient temperature in order to maintain the temperature below the design value. This procedure will be developed prior to plant startup.	Prior to plant startup
IPN-93-152-09	The completion of the IPE level 1 analysis for this event is schedule for completion by April 30, 1994.	April 30, 1994

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Indian Point Unit 3	DOCKET NUMBER (2) 05000286	PAGE (3) 1 OF 7
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TITLE (4) Plant Outside Its Design Basis Due to Potential Single Failure of Control Building Ventilation for 480VAC Switchgear Causing Room Temperatures to Exceed Switchgear Design.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	02	93	93	-- 048 --	00	12	02	93	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
POWER LEVEL (10) 000	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)						
	20.405(a)(1)(i)	50.36(c)(1)	✓ 50.73(a)(2)(v)	73.71(c)						
	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER						
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	(Specify in Abstract below and in Text, NRC Form 366A)						
	20.405(a)(1)(iv)	✓ 50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)							
20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)								

LICENSEE CONTACT FOR THIS LER (12)

NAME Andrew Mihalik, System Engineer	TELEPHONE NUMBER (Include Area Code) (914) 736-8362
---	--

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

X YES (If yes, complete EXPECTED SUBMISSION DATE).	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
			05	15	94

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On October 7, 1993, with the plant in the cold shutdown condition, a concern was identified as a result of preliminary calculations and analyses performed in support of the Indian Point 3 Individual Plant Examination (IP3-IPE), that a single failure of the Control Building 15 foot elevation ventilation system could result in elevated switchgear room temperatures. This condition could cause tripping of multiple circuit breakers as a result of thermal trip of breaker control components. This concern had previously had been identified by an internal memorandum on July 27, 1992. This event was caused by human errors of indeterminate origin during the design process. A lack of aggressive corrective action and inadequate training contributed to an untimely response. A four (4) hour report was made to the NRC pursuant to 10 CFR 50.72(b)(2)(i), (b)(2)(iii)(A) and (b)(2)(iii)(B) at 1547 hours on November 2, 1993 when the preliminary calculations were verified. Corrective actions include a temporary modification to provide control room indication and alarm of high ambient temperature in the switchgear room, a modification to separate the power supplies to the two exhaust fans, and upgrading the fan control components to QA Category I components.

**LICENSEE EVENT REPORT (LER)**  
**TEXT CONTINUATION**

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

**DESCRIPTION OF EVENT**

On July 27, 1992 with the plant in the hot shutdown condition (reactor power level 130 cps, reactor coolant temperature at 547 degrees Fahrenheit, reactor coolant pressure at 2245 psig, and pressurizer level at 26%), a preliminary calculation for the Indian Point 3 Individual Plant Examination (IP3-IPE) identified a concern with loss of Control Building (CB) (NA) 15 foot elevation 480VAC switchgear (SWGR) room exhaust fans (FAN) 33 and 34. The IPE scenario postulated that a loss of ventilation would result in 480VAC switchgear room temperatures in excess of 120 degrees Fahrenheit. Ambient temperatures above 104 degrees Fahrenheit can result in ampacity derating of electrical components located in the room. The elevated temperatures were postulated to result in failure of multiple circuit breakers (52) due to thermal effects on breaker control components. These failures, in turn, could lead to a plant trip. This concern was identified to Nuclear Generation department management via an internal memorandum (JTW-92-35) dated July 27, 1992. The project to reconstitute the design bases of the 480VAC switchgear and the CB heating ventilation and air conditioning (HVAC) (VI) systems used Design Document Open Item (DDOI) numbers 480-OI-004 and CBHVS-OI-001 to track this issue. These DDOIs required verification that the 480VAC switchgear ambient environment would not exceed 104 degrees Fahrenheit. The project recommended performing switchgear room heatup calculations to determine the air temperature in the absence of the ventilation system.

On October 7, 1993 with the plant in the cold shutdown condition (reactor power at 12 cps, reactor coolant temperature at 110 degrees Fahrenheit, reactor coolant pressure at atmospheric, and pressurizer level at 26%), Significant Occurrence Report (SOR) 93-608 was issued by the watch engineer based on input from the Operations department's Senior Technical Advisor who had been recently appointed station technical liaison to the IPE. The SOR identified the CB exhaust fans as being powered from Motor Control Center 39 (MCC-39) and provided a summary of the concerns raised by the IPE analyses. A four (4) hour report was made to the NRC pursuant to 10 CFR 50.72(b)(2)(i), 10 CFR 50.72(b)(2)(iii)(A) and 10 CFR 50.72(b)(2)(iii)(B) at 1547 hours on November 2, 1993 when the preliminary calculations were verified.

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The 15 foot elevation of the CB houses the vital safety related 480VAC switchgear (buses 2A, 3A, 5A and 6A). This room is ventilated by means of two exhaust fans, 33 and 34. The capacity of each exhaust fan is 50% of the required design. Exhaust fan 34 is directly controlled by a thermostat (TH) which will start the fan at 95 degrees Fahrenheit. Exhaust fan 33 is controlled by a limit switch (33) on its associated louver 319 which is thermostatically controlled to open at 100 degrees Fahrenheit. Louver 319 is powered from Lighting Panel (LP) 319. Both exhaust fans are powered from MCC-39. A review of the Final Safety Analysis Report (FSAR) and the Design Basis Document (DBD) indicated that the CB exhaust fans were designed and purchased as seismic class I and non-safety related as part of the original plant design. These components are identified as Quality Assurance (QA) Category I in the Plant Equipment Database (PEDB). They have been maintained as such in accordance with maintenance procedure FAN-002-VSS, revision 2, "Inspection of Category I and Category M Plant Ventilation Fans." No evidence exists to conclude that the components which control fan operation were purchased or maintained as other than non-safety related and non-seismic. Their failure could prevent fan operation.

The CB 15 foot elevation switchgear room exhaust fans 33 and 34 are both powered from 480VAC MCC-39. Therefore, failure of a single MCC would result in a total loss of forced ventilation to the essential 480VAC switchgear. Currently, this MCC is stripped upon receipt of a safety injection (SI) signal with a concurrent loss of offsite power (LOOP). The MCC is subsequently re-energized when the MCCs are reset in accordance with System Operating Procedure SOP-EL-15 "Operation of Non-Safeguards Equipment During Use of the Emergency Operating Procedures," approximately 25 to 30 minutes after the SI/LOOP signal. In response to 480VAC switchgear loading concerns, modifications have recently been approved to: (1) revise the breaker controls such that MCC-39 will be stripped on a SI signal, and (2) remove one CB 15 foot exhaust fan from MCC-39 and supply it from MCC-36C. Since MCC-36C is supplied by an emergency diesel generator, 50% of the ventilation supply to the CB 15 foot elevation will be maintained when MCC-39 is stripped on a SI signal. Under this modification, MCC-39 will not be restored immediately.

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During the verification and approval of the preliminary calculations which indicated that loss of exhaust fans was a concern, it was determined by electrical engineering that the actual heat loads are slightly higher than the calculations' assumed heat input. The calculations utilized the heat release data from IP3's Architect/Engineer, United Engineers and Constructors (UE&C), calculation "Heat Dissipation - Control Building - Elev. 15'" dated July 24, 1969. Electrical engineering also confirmed that the switchgear loading calculations for the 480VAC switchgear were based on a maximum room ambient temperature of 104 degrees Fahrenheit.

**CAUSE OF THE EVENT**

This event was caused by human errors of indeterminate origin during the design process. The cause for the lack of timeliness in the issuance of the SOR was due to lack of aggressive action by corporate support and plant personnel. A contributory cause was corporate personnel being not being trained on site administrative procedures (AP), specifically AP-8, "Reportability Manual."

**CORRECTIVE ACTIONS**

The following corrective actions have been or will be performed in order to address the deficiencies identified during the investigation of this event and to prevent recurrence:

- Operations department Night Order 93-311 was issued on October 7, 1993. This order was subsequently replaced with Night Order 318 to alert the operators of the postulated effects of high ambient temperatures in the CB 15 foot elevation switchgear room. The night order provides for mitigating responses as well as the resetting of safety related circuit breakers.
- A temporary modification will be installed to provide a control room alarm on high CB 15 foot elevation ambient temperature. This temporary modification will be installed by December 15, 1993.
- A modification will be installed to separate the power supplies for exhaust fans 33 and 34. This modification will be installed prior to plant startup.



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- An evaluation will be performed on the existing ventilation system for the CB 15 foot elevation and also other non-safety related HVAC systems including the ventilation system for the CB 33 foot elevation to determine the need for modifications to assure compliance with the design bases and licensing commitments. This evaluation is scheduled for completion prior plant startup.
- Modifications to the CB HVAC system will be made as required based on the results of the above evaluation. The schedule for the completion for such modifications will be dependent upon the scope on the modifications.
- Priority I and II design document open items for the CB HVAC system will be reviewed prior to plant startup to determine their safety significance.
- Exhaust fans 33 and 34 control components will be upgraded to QA Category I.
- Training on AP-8 will be provided to those corporate personnel involved in the modification or review of the design of IP3. This training will be completed prior to plant startup.
- An Alarm Response Procedure (ARP) will be developed to identify a response for increasing CB 15 foot elevation switchgear room ambient temperature in order to maintain the temperature below the design value. This procedure will be developed prior to plant startup.
- The completion of the IPE level 1 analysis for this event is scheduled for completion by April 30, 1994.

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**ANALYSIS OF THE EVENT**

This event is reportable under 10 CFR 50.73(a)(2)(ii)(B), 10 CFR 50.73(a)(2)(v)(A) and 10 CFR 50.73(a)(2)(v)(B). The design of the CB 15 foot elevation switchgear ventilation system placed the plant outside the design basis during the period from initial criticality through October 7, 1993 when compensatory measures were initiated to deal with potential high room temperatures. The system was initially designed as seismic class I, non-safety related. Exhaust fans 33 and 34 are not full capacity and are powered from the same MCC. During this period, there was the possibility that a failure of the CB switchgear room ventilation system could have resulted in tripping of multiple, redundant safety related 480VAC circuit breakers. A four (4) hour report was made to the NRC pursuant to 10 CFR 50.72 (b)(2)(i), 10 CFR 50.72 (b)(2)(iii)(A) and 10 CFR 50.72 (b)(2)(iii)(B) at 1547 hours on November 2, 1993 when the preliminary calculations were verified. This condition was found while shutdown. Had it been found while operating, it would have placed the plant in an unanalyzed condition that would have significantly compromised plant safety. Additionally, this condition could have prevented the fulfillment of the safety function of plant systems to shutdown the reactor and maintain it in a safe shutdown condition and remove residual heat.

LERs 93-002, 93-007, 93-026, 93-030, 93-035, 93-036, 93-044, and 93-045 have reported similar events in that the original engineering design was inadequate.

**SAFETY SIGNIFICANCE**

The effect on the health and safety of the public has not yet been fully assessed for this event.

The plant was designed to safely shut down the plant following a loss of offsite power (LOOP) or a safe shutdown earthquake (SSE) and to mitigate the consequences of a loss of coolant accident (LOCA) considering a LOOP. A single failure is considered in evaluating the ability to meet design.

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The reported event identifies the loss of CB 15 foot elevation ventilation due to a failure of fan control components or power to MCC-39 being stripped following a LOOP, with or without a coincident safety injection (SI) signal. Additionally, a seismic event could result in a loss of exhaust fans 33 and 34 control components. The failure of the CB 15 foot elevation ventilation would result in complete or partial loss of safety related 480VAC switchgear due to high temperature.

The safety significance was evaluated by looking at the actual and potential safety significance of the event. There was no actual safety significance because there was no loss of ventilation. The potential safety significance was assessed for design basis conditions.

Procedures and equipment exist to safely shutdown the plant following the random failure of MCC-39, a LOOP, or a seismic event. Each of these events can result in fan failure but the 10 CFR 50, Appendix R diesel generator is available for safe shutdown. The 10 CFR 50, Appendix R diesel generator was designed to allow for safe shutdown outside the central control room following a fire whose damage could include the 480VAC safety switchgear and would be available for the operators to shutdown the plant. The 10 CFR 50, Appendix R diesel is expected to be available following the SSE even though it is not seismically qualified based on the earthquake experience data developed by the Seismic Qualification Utility Group in addressing Unresolved Safety Issue A-46.

A LOCA with a LOOP or a failure of MCC-39 could result in a loss of the 480VAC switchgear. Immediate operator action (e.g., opening doors, using fire protection portable exhaust fans) to mitigate the temperature rise in the area would be required to maintain the functional capability of the 480VAC switchgear. A central control room alarm indicating a loss of MCC-39 would provide indication to the operators of the need for immediate corrective action. The conservatively calculated rate of temperature rise is sufficiently rapid and the demands on operators are such that immediate operator action cannot be depended upon to prevent failure of the safety related 480VAC switchgear. This condition has not been confirmed by testing. A probabilistic risk based analysis is currently underway to quantify the probability associated with the loss of ability to mitigate the consequences of the LOCA so that the effect on public health and safety can be determined. The results of this analysis will be reported in a supplementary LER.