

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

November 18, 1993
IPN-93-145

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

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Licensee Event Report # 93-044-00
"Central Control Room Heating, Ventilating
and Air Conditioning System Outside Design
Basis Due to Personnel Error"

Dear Sir:

The attached Licensee Event Report (LER) 93-044-00 is hereby submitted in accordance with the requirements of 10CFR50.73. This event is of the type defined in the requirements pursuant to 10CFR50.73(a)(2)(ii). Also attached are the commitments made by the Authority in this LER.

Very Truly Yours,

A handwritten signature in cursive script that reads 'JH Garrity'.

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

JHG/vjm

cc: See Next Page

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PDR ADOCK 05000286
S PDR

Handwritten initials or a signature, possibly 'JHG', with a vertical line below it.

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 Inspector's Office
Indian Point 3

Attachment 1
List of Commitments

Number	Commitment	Due
IPN-93-145-01	The Authority is currently defining and implementing a modification to maintain the cooling capacity of the CCR HVAC system within design bases.	Prior to Startup
IPN-93-145-02	The Authority is also evaluating the existing CCR HVAC system for modifications to assure compliance with design bases. NUS Inc. has a contract for a conceptual study to evaluate the existing CCR HVAC system, consider alternatives and recommend modifications to upgrade the system. The study will determine whether the modification to add cooling capacity is sufficient for long term operation.	February 1, 1994
IPN-93-145-03	The Authority will make CCR HVAC system modifications to upgrade the system based on the study.	Indeterminate
IPN-93-145-04	Priority I and II design document open items for the CCR HVAC will be evaluated prior to startup to assure they do not affect system operability.	Prior to Startup

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TITLE (4)
Central Control Building Heating, Ventilating and Air Conditioning System Outside Design Basis Due to Personnel Error

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
10	18	93	93	-- 044 --	00	11	18	93	FACILITY NAME	DOCKET NUMBER 05000
									FACILITY NAME	DOCKET NUMBER 05000

OPERATING MODE (9) N	POWER LEVEL (10) 000	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)								
		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 A)	
		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 Gabriel Kazakias, Project Engineer	TELEPHONE NUMBER (Include Area Code) (914) 681-6265
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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)				EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE):	✓	NO						

ABSTRACT

On October 18, 1993, at approximately 1840 hours with the reactor in cold shutdown at atmospheric pressure, Technical Services concluded that the as-built central control room heat loads exceeded the original design heat loads and issued significant occurrence report 93-644 to identify a reportable deficiency. This event resulted in the central control room air conditioners being outside their design basis. This event was caused by personnel error in the original design and in subsequent plant modifications. Scheduled corrective actions include: addressing safety significant design basis document open items; a modification to increase control room cooling; an evaluation to identify recommended control room heating, ventilating and air conditioning changes; and, modifications to address those recommendations. The current Modification Control Manual and design basis documents provide assurance that this type of error will not occur again.

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DESCRIPTION OF EVENT

On October 18, 1993, at approximately 1840 hours with the reactor in cold shutdown (reactor power level at 10 cps, reactor coolant temperature at 109 degrees F, reactor coolant pressure at atmospheric and pressurizer level at 31%), Technical Services issued significant occurrence report (SOR) 93-644 to report that the as-built central control room (CCR) (NA) heat loads exceeded the original design heat loads. A reportable deficiency existed since the design basis of 75 degrees F and 50% relative humidity (RH) cannot be met with the outside air temperature at the design basis of 93 degrees F. Project Engineering evaluated the history of this event.

On August 8, 1985, Technical Services issued a request for engineering services (RES) to evaluate the CCR Heating, Ventilating and Air Conditioning (HVAC) system (VI) and modify it, if required. This request identified the possibility that the air conditioners (ACU) needed to be replaced because of added heat loads (past and planned modifications) as well as poor system performance and condition. Project Engineering addressed the RES in 2 phases.

Phase 1 was initiated with a contract to Nuclear Power Services (NPS) Inc. to evaluate the need for changes and to recommend changes. NPS completed the evaluation and issued a report with recommendations on September 28, 1987. The report identified a heat load approximately twice the heat load used for sizing of the original CCR air conditioning units, and identified actions to improve current system performance and recommended system design changes.

Phase II consisted of preliminary design work initiated by Project Engineering as well as corrective action by Maintenance and Performance to ensure the control room air conditioning was operating at peak efficiency. After the bidding package to implement the NPS recommendations was complete, the approval process was initiated. During the approval process, work was placed on hold pending further evaluation. During their review, Project Engineering concluded that the hold was due to increased performance of the air conditioners following maintenance which resulted in a perception that the proposed design change was not urgent and was overly conservative in its scope.

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No further action was taken in the short term to address the 1987 calculation by NPS indicating that the CCR heat load was larger than original design values. The item was identified during completion of the design basis document for the CCR HVAC and was tracked as a Design Document Open Item (DDOI). To close this item, Project Engineering initiated an evaluation that resulted in a September 1993 calculation by United Engineers and Constructors (UE&C) evaluating the as built CCR cooling requirements. The CCR HVAC system engineer was responsible for closure of the DDOI. Following receipt of the UE&C calculation he compared the calculated heat load to the original design heat load and found it to be approximately 50% greater. The electrical heat load UE&C identified for original equipment was higher than the electrical heat load in the original calculation used for sizing the air conditioners. The 1993 UE&C calculation indicated that the air conditioners, as originally installed, did not meet the design basis requirement that each remove 60% of the original heat load. Additionally, there was no record that heat loads from plant modifications had been used to update the system design requirements. Using the revised heat load, the UE&C calculation identified an increase in CCR temperature to 95 degrees F with both air conditioners working and the design basis outside air temperature at 93 degrees F.

CAUSE OF THE EVENT

The event was initially caused by personnel error of an indeterminate origin during the original system design. The architect engineer made an error in the original heat load calculations. This event was compounded by personnel error, inattention to detail. When additional components were added to the CCR, inadequate attention was paid to the effect of the additional heat load on the air conditioning system.

The delay in identification of the event was personnel error, misjudgment. The perception that the NPS calculations were conservative resulted in a delay in followup of the event.

CORRECTIVE ACTION

The following corrective actions have been or will be performed to prevent recurrence of this event:

1. The Authority's Modification Control Manual (MCM) increases the scope of the reviews in the design change process. This includes a comprehensive review of work performed by consultants. Consideration of the effects on other systems is required by the MCM process checklists. This provides assurance that this event will not recur.

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2. The Authority's Design Basis Documentation program increases the retrievability of design basis documents and information for review during modifications. This information supports the MCM program and provides additional assurance that this event will not recur.
3. The Authority is currently defining and implementing a modification to maintain the cooling capacity of the CCR HVAC system within design bases. This modification is scheduled for completion prior to start up.
4. The Authority is also evaluating the existing CCR HVAC system for modifications to assure compliance with design bases and licensing commitments. NUS Inc. has a contract for a conceptual study to evaluate the existing CCR HVAC system, consider alternatives and recommend modifications to upgrade the system. The study will determine whether the modification to add cooling capacity is sufficient for long term operation. The conceptual study is scheduled for completion by February 1, 1994.
5. The Authority will make CCR HVAC system modifications to upgrade the system based on the study. The schedule for completion of system modifications will depend on the scope of the modifications.
6. Priority I and II design document open items for the CCR HVAC will be evaluated prior to startup to assure they do not affect system operability.

ANALYSIS OF THE EVENT

This event is reportable under 10 CFR 50.73(a)(2)(ii). The Licensee shall report any event or condition that resulted in the plant being in a condition that was outside the design basis of the plant. The CCR HVAC was not sized to remove the heat loads necessary to meet the design bases of maintaining the control room at 75 degrees F using both air conditioners.

Other events where personnel error in design has resulted in a reportable deficiency are reported in LER 93-39 and LER 93-26. Other events related to the CCR HVAC system are reported in LER 93-36 and LER 93-08.

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SAFETY SIGNIFICANCE

This event did not affect the health and safety of the public.

The above conclusion was reached considering two scenarios. The first is the design basis event of a Loss of Coolant Accident (LOCA) with loss of offsite power (LOOP). The second is assessment of CCR conditions with loss of one air conditioner. The scenario of a LOCA plus earthquake was not considered reasonable since these are both very low probability events. The following were considered in addressing the two scenarios:

- The CCR HVAC system at IP3 consists of two trains using common ductwork and with diesel generator backup power.
- The single failure of one air conditioning unit was not postulated following the design event LOCA with LOOP since the air conditioning system is not designed to allow a single failure and maintain the CCR at design conditions of 75 degrees F and 50% RH.
- The LOCA is postulated with each scenario since it inhibits compensating actions (e.g., opening doors, using fans).
- The postulated scenarios consider other reportable deficiencies in assessing safety significance. The dose effects of the LOCA were assessed using the increased source term identified with the possible failure of fan cooler dampers (LER 93-13). When instrument air is lost, the CCR HVAC dampers fail (an LER is under preparation to identify this). No reportable events associated with an earthquake were considered since the earthquake would not inhibit compensating actions.
- The acceptance criteria for the evaluations were based on the FSAR which states the air conditioning system was designed so that the functional capacity of the Control Room is maintained at all times, including the period during a blackout or design basis accident (DBA). The design condition for maintaining "functional capacity" of the Control Room dictates that the ambient temperature for safety equipment located in this room shall not exceed 120 degrees F for short term operation associated with a loss of one air conditioning unit.

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The results of the evaluations were as follows:

- LOCA with LOOP

When offsite power is lost with a safety injection signal, the Instrument Air (IA) compressor is stripped from the bus and requires operator action to be reloaded. Although the IA system takes about 20 minutes to depressurize, the bounding assumption is that it is lost with LOOP. The loss of IA results in CCR HVAC damper failures which isolate the outside air intake and eliminates both filtration and air conditioning. The LOCA condition therefore becomes the most limiting. The IA can be reestablished by the operator in about 30 minutes using an existing procedure.

The temperature in the control room 30 minutes after the postulated condition occurs will be less than 115 degrees F assuming the design basis outside air temperature. No dose analysis was performed for this condition since the dose assessment of LER 93-36 would be bounding. That analysis assumed an unfiltered air intake of 400 cfm for 20 minutes followed by an unfiltered inleakage of 130 cfm. This event could result in unfiltered inleakage of 130 cfm for 30 minutes.

- Loss of one Air Conditioner

An assessment was done to determine the peak CCR temperature with the outside air temperature at the design basis of 93 degrees F, only one air conditioning train operating and no corrective action. The peak temperature was 116 degrees F. A LOCA was assumed to restrict corrective action but there are no dose consequences because no corrective action is required to reduce temperatures.

The extent of condition will be determined by the current program to close DDOIs. DDOIs have been prioritized in order of their safety significance with priority I being the most significant. All priority I and II DDOIs for the CCR HVAC will be addressed prior to startup to ensure that they do not affect system operability. Priority III and IV DDOIs address the design bases of systems and components but are not considered significant for operability.