CATEGORY 1

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FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana M 05000315
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RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 97-014-02:on 970829,potential for operation in unanalyzed condition,was determined.Caused by postulated elevated control room temperatures.Placed restrictions on plant operation.W/971231 ltr.

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Indiana Michigan
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AEP
INDIANA
MICHIGAN
POWER

December 31, 1997

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Operating Licenses DPR-58
Docket No. 50-315

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

97-014-02

Sincerely,

A. Alan Blind

A. A. Blind
Site Vice President

/mbd

Attachment

IE22

c: A. B. Beach, Region III
E. E. Fitzpatrick
P. A. Barrett
S. J. Brewer
J. R. Padgett
D. Hahn
Records Center, INPO
NRC Resident Inspector

NRC FORM 366 (5-92)	S. NUCLEAR REGULATORY COMMISSION	ROVED BY OMB NO. 3150-0104 EXPIRES 5/31/95
	LICENSEE EVENT REPORT (LER)	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)	DOCKET NUMBER (2)	
Donald C. Cook Nuclear Plant - Unit 1	50-315	Page 1 of 5

TITLE (4)
Potential for Operation in Unanalyzed Condition Due to Postulated Elevated Control Room Temperatures

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
									Cook, Unit 2	50-316
08	29	97	97	– 014 –	02	12	31	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)							
			20.2201(b)		20.2203(a)(3)(I)		50.73(a)(2)(iii)		73.71(b)
POWER LEVEL (10)	100		20.2203(a)(1)		20.2203(a)(3)(ii)		50.73(a)(2)(iv)		73.71§
			20.2203(a)(2)(I)		20.2203(a)(4)		50.73(a)(2)(v)		OTHER
			20.2203(a)(2)(ii)		50.36(c)(1)		50.73(a)(2)(vii)		(Specify in Abstract below and in Text, NRC Form 366A)
			20.2203(a)(2)(iii)		50.36(c)(2)		50.73(a)(2)(viii)(A)		
			20.2203(a)(2)(iv)		50.73(a)(2)(I)		50.73(a)(2)(viii)(B)		
			20.2203(a)(2)(v)	X	50.73(a)(2)(ii)		50.73(a)(2)(x)		

LICENSEE CONTACT FOR THIS LER (12)	
NAME	TELEPHONE NUMBER (Include Area Code
Mr. Jeb Kingseed, Nuclear Safety and Analysis Manager	616/697-5106

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	X	NO				

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

On August 29, 1997, with Units 1 and 2 at 100 percent Rated Thermal Power, as a result of questions posed by the NRC AE Design Inspection team, it was determined that during August, 1987, both units operated in an unanalyzed condition for Control Room equipment operability due to postulated high room temperatures. An ENS notification was made on August 29, 1997 at 1412 hours EDT under the provisions of 10CFR50.72(b)(1)(ii)(A), for any condition during operation that results in the plant being in an unanalyzed condition. This LER is therefore submitted in accordance with 10CFR50.73(a)(2)(ii)(A). This LER is directly related to, and can be considered a sub-issue to, the condition reported in LER 315/97-010-02.

The root cause of this condition was the failure to realize the interrelationship between a UFSAR value and other design aspects. Process changes have been implemented which require that changes to design basis information be handled via the design change process, A corporate directive and policy were written to provide direction on design basis, and additional training on design basis has been provided to those employees involved in handling such information. Restrictions have been placed on plant operation such that the plant will not be operated with lake water temperatures above 76° Fahrenheit. This restriction will remain in effect until all analyses and 10CFR50.59 safety evaluations are complete.

Analysis of this event has been performed, taking into account the potential effects of elevated temperature on the Control Room equipment. It has been determined that the event did not result in any threat to the health or safety of the public.

LICENSEE EVENT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
Cook Nuclear Plant - Unit 1	50-315	97	-- 014 --	02	2 OF 5

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

Condition Prior to Event
Unit 1 was in Mode 1 at 100 percent Rated Thermal Power
Unit 2 was in Mode 1 at 100 percent Rated Thermal Power

Description of Event
During the AE Design Inspection, conducted August 4 through September 12, 1997 at Cook Nuclear Plant, the inspection team noted that during August of 1988, the temperature of Lake Michigan, the Ultimate Heat Sink (UHS) for the Donald C. Cook plant, exceeded 76° Fahrenheit (F) for 22 days. This constituted an unanalyzed condition in that operation with lake temperatures in excess of 76°F for an extended period of time could have resulted in exceeding the qualified life of certain Control Room instruments. The unanalyzed condition reported in this LER is specific to 1988, but also had the potential to exist during any other summer up until 1992, before the Technical Specification limit for Control Room temperature was reduced to 95°F.

This LER specifically addresses the potential effect of the elevated lake water temperature on the Control Room equipment operability. The general lake water temperature issue, and its effect on the 36 hour cooldown analysis, is discussed in LER 315/97-010-02.

The Control Room is normally cooled by an air conditioning system which utilizes non-safety related chillers. The back-up, safety related portion of the Control Room air conditioning system utilizes water from Lake Michigan as the cooling medium. At the average lake water temperature of 81°F during August, 1988, the temperature inside the Control Room could have reached 110.4°F had the non-safety grade chillers not functioned. This would have been possible since at the time of the event, the Technical Specifications (T/S) allowed continuous operation with Control Room temperatures up to 120°F. During the subject period Control Room temperatures could have risen to a level that would have degraded the service life of certain Control Room equipment. It is estimated that at a temperature of 110.4°F the lifetime of some of the Control Room instrumentation would be reduced.

Cause of Event
The root cause of this condition is the failure to recognize interrelationships between a UFSAR value and other design aspects. Personnel conducting reviews to support operation of the plant at higher lake water temperature did not properly consider the impact on the capability of the Control Room ventilation system.

Contributing causes to this condition include:

- Rising standards for UFSAR compliance and design basis definition were not implemented within the organization.
- Design change procedures in place at the time of these events did not require or compel considering a change to design bases values as a design change.

LICENSEE EVENT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
Cook Nuclear Plant - Unit 1	50-315	97	– 014 –	02	3 OF 5

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

<u>Analysis of Event</u>

On August 29, 1997, with Units 1 and 2 at 100 percent Rated Thermal Power, it was determined that during August, 1988, both units operated in an unanalyzed condition for Control Room equipment operability due to postulated high room temperatures. An ENS notification was made on August 29, 1997 at 1412 hours EDT under the provisions of 10CFR50.72(b)(1)(ii)(A), for any condition during operation that results in the plant being in an unanalyzed condition. This LER is therefore submitted in accordance with 10CFR50.73(a)(2)(ii)(A).

During August, 1988, Lake Michigan water temperature exceeded 76°F for 22 days, with an average temperature during this period of approximately 81°F, and a peak on August 17, 1988, of 83.9°F. The 83.9°F temperature value has been verified to be the highest temperature that Lake Michigan has reached, and as such is a bounding value. At this peak temperature and assuming a coincident failure of both of the Control Room ventilation chiller units, Control Room temperature could have risen to 113.3°F.

Considering the time required to reach cold shutdown conditions, and assuming an accident had occurred during the worst case temperature excursion on August 17, 1988, and assuming a complete loss of both of the redundant 100% capacity Control Room ventilation chiller units, the plant would have been safely shutdown prior to reaching Control Room vital equipment qualification limits.

During normal operations, the Control Room ventilation system maintains the Control Room at temperatures at which Control Room equipment is qualified for the life of the plant. Continued operation at the Technical Specification limit is permitted since the portion of time that the temperature is likely to be elevated is small in comparison to the qualified life of the equipment at the limit. During the subject operating period, the Control Room was licensed with a 120°F upper Control Room temperature limit. On September 10, 1990, a Technical Specification change request was submitted to NRC to lower the maximum acceptable temperature from 120°F to 95°F. This was based on a study completed at that time which suggested that a 95°F upper temperature limit would be more conservative to ensure service life of certain Control Room equipment at higher temperatures. The critical non-Westinghouse equipment is continuous-duty rated for room ambient temperature above 120°F. The Westinghouse equipment, the panel with the highest expected ambient temperature, would have a rated life of approximately 15,000 hours at 95°F. At 80°F, equipment life exceeds the life of the plant. The Control Room ventilation system typically maintains the Control Room at an average temperature of 75°F year round.

Based on the various modes of plant operation, the following Control Room instrumentation was evaluated:

- Reactor Protection and Control Instrumentation
- Solid State Protection System (SSPS)
- Nuclear Instrumentation System (NIS)
- Post Accident Instrumentation (RegGuide 1.97 Type A and B variables)

All required Control Room instrumentation is qualified for indefinite service up to, and including 120°F, with the exception of SSPS, NIS and the subcooling monitor indicator.

Based on previous engineering reviews, operation at the lower temperature of 113.3°F versus 120°F extends the service life of SSPS and NIS from 12 hours to approximately 66 hours. Assuming that a design basis accident occurred coincident with a loss of both of the Control Room chillers, shutdown would have been complete prior to reaching the equipment qualification limit. The 66 hour period would cover the time required to reach cold shutdown.

NRC FORM 366A U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT CONTINUATION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
Cook Nuclear Plant - Unit 1	50-315	97	– 014 –	02	4 OF 5

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

Analysis of Event (cont'd)

If the chillers had failed during the period that the temperature was over 76°F, without a postulated shutdown situation, the resultant temperature in the Control Room would have been approximately 110.4°F. This lower temperature, as opposed to 120°F, would have resulted in increasing the service life of SSPS and NIS from 12 hours to approximately 150 hours.

It is also noted that the subcooling monitor indicator is rated for continuous service at 113°F. The difference of 0.3°F between the monitor maximum of 113°F and the calculated maximum Control Room temperature of 113.3°F can be considered negligible due to the large conservative margin which presently exists in the Control Room temperature calculations. These conservatisms are discussed briefly below.

The Control Room heat gain calculation, forms a basis for calculation of Control Room temperature. Due to the important nature of this calculation, it was reviewed to consider the methods used to compile the heat gain value. During this review, several areas of conservatism were revealed which are being addressed by a comprehensive update of the heat gain calculation. These conservatisms apply to a reduction in the calculated Control Room peak temperature. Two of the conservative items, application of a unity power factor instead of a more realistic 0.6 power factor to power calculations, and use of 120 volts versus 118 volts power supply, result in a calculated heat load that is higher than actual by approximately 35%.

Based on the above review, no degradation in Control Room equipment service life was experienced as a result of past operation above 76°F lake water temperature. In addition, the instrumentation remained operable throughout the period, since there was no loss of chiller function during the elevated lake temperatures. Considering the time required by Technical Specifications to reach cold shutdown conditions, it can be concluded that the equipment would have functioned during the shutdown and during any postulated accident conditions.

Analysis of this event has been performed, taking into account the potential effects of elevated temperature on the Control Room equipment. It has been determined that the event did not result in any threat to the health or safety of the public.

Corrective Action

Restrictions have been placed on plant operation such that the plant will not be operated with service water inlet temperatures above 76°F, until proper evaluations are performed. If any unreviewed safety questions result from the review, these will be submitted to the NRC.

A corporate directive and policy were promulgated to provide direction on design basis and single failure criteria. Lower level existing procedures were revised, where necessary, to reference and incorporate the information provided in the directive and policy. Training was conducted on the directive and policy to provide the information on dealing with design bases and licensing bases information to the appropriate personnel, as well as the need for improved documentation and literal compliance with the UFSAR.

A process change has been made which requires changes to design basis information, such as lake water temperature, to be handled via the design change process. This requirement will effect a more thorough and detailed review of the impact of such changes on the design, operation and maintenance of the plant.

NRC FORM 366A

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

LICENSEE EVENT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
Cook Nuclear Plant - Unit 1	50-315	97	– 014 –	02	5 OF 5

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

Corrective Action (con't)

As discussed in the NRC's Confirmatory Action Letter (CAL) to the Cook Nuclear Plant, dated September 19, 1997, we have assessed the problems identified during the AE Design Inspection to determine whether these types of engineering problems exist in other safety related systems and whether they affect system operation. The results of that short-term assessment have provided reasonable assurance that the kinds of engineering problems found during the design inspection do not affect the operability of other safety systems. In the longer term, we will evaluate our programs for improvements to assure these kinds of engineering problems are promptly identified, thoroughly evaluated and resolved. The results of our reviews and assessments, as well as any necessary preventive actions, will be communicated separately to the NRC.

Failed Component Identification

Not Applicable

Previous Similar Events

315/97-010-02