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ACCESSION NBR: 8810	DI30119 DOC.DATE:	38/09/30 NOTARI	ZED: NO	DOCKET #
<pre>fACIL:50-315 Dona</pre>	ald C. Cook Nuclear Po	ower Plant, Unit	l, Indiana &	05000315
AUTH.NAME	AUTHOR AFFILIATION		•	•
POSTLEWAIT, T.K.	Indiana Michigan Powe	er Co. (formerly	Indiana & Mic	higan Ele
SMITH, W.G.	Indiana Michigan Pow	er Co. (formerly	Indiana & Mic	higan Ele
RECIP.NAME	RECIPIENT AFFILIATI	N		
		•		

SUBJECT: LER 88-007-00:on 880908, ice build-up in ice condenser flow passages due to sublimation. ltr.

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•	AEOD/DSP/NAS	1	ī	AEOD/DSP/ROAB	2	2
	AEOD/DSP/TPAB	ī	ī	ARM/DCTS/DAB	· 1	1
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•	NRR/DEST/MTB 9H	1	1	NRR/DEST/PSB 8D	1	1
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	NRR/DLPQ/HFB 10	1	1	NRR/DLPQ/QAB 10	1	1
	NRR/DOEA/EAB 11	1	1	NRR/DREP/RAB 10	1	1
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NRC Form 386	U.S. NUCLEAR REGULATORY COMMISSION				
	APPROVED OMB NO. 3150-0104				
LICENSEE EVENT REPORT (LER)	EXPINES: \$/31/00				
· · · · ·					
FACILITY NAME (I)	DOCKET NUMBER (2) PAGE (3)				
D. C. Cook Nuclear Plant - Unit 1					
Too Build-Up in Too Condenser Flow Passages Due to Sub	limation				
EVENT DATE (5) (50 NUMBED (6) DEPORT DATE (7) OTHER	FACILITIES INVOLVED (8)				
MONTH DAY YEAR YEAR WEAR SEQUENTIAL WEAR REVISION MONTH DAY YEAR FACILITY NA	MES DOCKET NUMBER(S)				
NUMBER NUMBER	0 15 10 10 10 1 1				
0 9 0 8 8 8 8 8 0 0 7 0 0 9 3 0 8 8	0 5 0 0 0 1				
OPERATING THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 'S: (Check one or more	of the following) (11)				
MODE (9) 4 20.402(b) 20.405(c) 50.73(a)(2)(iv)	73.71(5)				
POWER 20.405(a)(1)(i) 50.38(c)(1) 50.73(a)(2)(v)	73.71(e)				
(10) U U 20.405(a)(1)(ii) 50.38(c)(2) 50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form				
	(A) 366A)				
LICENSEE CONTACT FOR THIS LER (12)					
NAME	TELEPHONE NUMBER				
T. K. Postlewait -	AREA CODE				
Technical Engineering Superintendent	611641651-5901				
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT	RT (13)				
CAUSE SYSTEM COMPONENT MANUFAC- REPORTABLE CAUSE SYSTEM COMPONENT	MANUFAC- REPORTABLE TURER TO NPROS				
SUPPLEMENTAL REPORT EXPECTED (14)	EXPECTED MONTH DAY YEAR				
YES III yes, complete EXPECTED SUBMISSION DATE!	DATE (15)				
ABSTRACT (Limit to 1400 speces, i.e., epproximetely filteen single-spece typewritten lines) (16)					
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• •	•				
On September 8, 1988, with Unit 1 in Mode 4 (Hot Shutdo	own), flow passage				
inspections of the ice condenser revealed frost and ice	e buildup on the				
lattice frames of greater than 3/8 inch in a total of t	chirty-six flow				
passages in nine of the twenty-four ice condenser bays.	•				
Technical Specification (T/S) 4.6.5.1.6.3 limits frost	or ice buildup in				
LIOW passages to a nominal thickness of 3/8 inch. According to this T/S,					
avidance of shnormal degradation. Though our avaluation	ges per day is				
the degradation is not sorious we believe iscurate of	this voluntary IFR				
is appropriate since some degradation has been identifi	ad				
is appropriate since some degradation has been, identify	Leu.				
Actions taken to correct the abnormal degradation inclu	uded manual cleaning				
of the flow passages. In addition an internal investig	ation of the event				
was conducted. The results of T/S Surveillances regard	ling frost and ice				
that forms in the flow passages is being monitored to e	ensure that any ·				
adverse trends in the amount of ice and frost buildup b	oetween surveillances				
will be identified. The impact of frost and ice buildu	ip in the flow				
passages is also being studied in conjunction with the	other utilities with				
ice condenser containments.	· · · ·				
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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104 EXPIRES: 8/31/88

FACILITY NAME (1)

NRC Form 366A (9-83)

> D. C. Cook Nuclear Plant -Unit 1



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

Conditions Prior to Occurrence

Unit 1 in Mode 4 (Hot Shutdown)

Description of Event

The as-found visual inspection of ice condenser (EIIS/COND) flow passages conducted on September 8, 1988, identified frost and ice accumulation greater than 3/8 inch in two flow passages in Bay 1, two flow passages in Bay 2, four flow passages in Bay 3, two flow passages in Bay 4, four flow passages in Bay 6, two flow passages in Bay 8, two flow passages in Bay 12, two flow passages in Bay 14 and two flow passages in Bay 15. Subsequently, the inspection was expanded to include at least twenty additional flow passages in each affected bay. This inspection revealed an additional two flow passages in Bay 2, six flow passages in Bay 3 and six flow passages in Bay 4 with more than 3/8 inch frost and ice buildup. A total of thirty-six flow passages were affected. There are a total of 3072 flow passages in the Ice Condenser. Attachments 1 through 11 graphically describe the geometry of the flow passages and the location of the ice/frost accumulation.

Technical Specification (T/S) 4.6.5.1.b.3 requires that the ice condenser be determined operable at least once per 9 months by verifying, via visual inspection of at least two flow passages per ice condenser bay, that accumulation of frost or ice on flow passages between ice baskets (EIIS/COND-BSKT), past lattice frames (EIIS/COND-FRM), through the intermediate and top deck floor grating, or past the lower inlet plenums support structures (EIIS/COND-SPT) and turning vanes is restricted to a nominal thickness of 3/8 inch. If one flow passage per bay is found to have an accumulation of frost or ice greater than this thickness, a representative sample of twenty additional flow passages from the same bay shall be visually inspected. If these additional flow passages are found acceptable, the surveillance program may proceed considering the single deficiency as unique and acceptable. More than one restricted flow passage per bay is evidence of abnormal degradation of the ice condenser.

The affected flow passages were manually cleaned to remove the accessible 'frost and ice buildup.

NRC Form 366A (9-83)	LICENSEE EVENT REPO	RT (LER) TEXT CONTIN	UATION	U.S. NUCLEAR REG APPROVED (EXPIRES: 8/3	GULATORY CO DMB NO, 3150- 1/88	0104
FACILITY NAME (1)	2	DOCKET NUMBER (2)	LER NUMB	ER (6)	PAGE	(3)
	•		YEAR SEQUEN	TIAL REVISION		
D. C. Unit	Cook Nuclear Plant -	0 5 0 0 0 3 1	5 8 8 - 0 10	17 - 010	10 [3 OF	1 5

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

Additional factors considered as possible contributors to the frost and ice accumulation included: 1) during the surveillance interval prior to the September 8, 1988 test, several of the 60 air handling units (AHU) (EIIS/AHU) (used to maintain ice condenser temperature) were intermittently inoperable for maintenance and/or repair. In addition, as the result of a personnel error, most of the AHU's were inoperable for a period of about four days at the end of July; however, it has been concluded that the inoperability of the AHU's did not significantly contribute to the frost and ice formation experienced; 2) during the Unit shutdown immediately preceding this surveillance, it was discovered that a secondary side steam leak had occurred inside containment, possibly affecting the humidity in the ice condenser; however, it has been concluded that the steam leakage did not significantly contribute to the frost and ice formation experienced, as the formation was very similar to that experienced in the past (the only apparent effect of the steam leak on the ice condenser was minor amounts of frost/ice formation on the intermediate deck doors).

With the exception of the AHU's, there were no inoperable structures, components or systems that contributed to this event.

Cause of Event

It is believed that sublimation of ice or high humidity in the containment air could have contributed to this problem. Further investigation of this event.is ongoing.

Analysis of Event

NRC FORM 368A (9:83) The Westinghouse evaluation indicated that lattice frost/ice formation of up to 20 percent of the total flow passage area could be present without the peak Ice Condenser Compartment Pressure exceeding the design limit. Since the frost/ice buildup identified in Bays 1, 2, 3, 4, 6, 8, 12, 14 and 15 constitute a total flow blockage area which is less than 20 percent limit, this situation is bounded by the Westinghouse evaluation.

Our evaluation indicates that the amount of flow blockage due to frost and ice buildup noted in the Ice Condenser can be tolerated without adversely affecting the Ice Condenser function during a Loss of Coolant Accident.

Based on the above information and the Westinghouse evaluation, it is concluded that the abnormal degradation event does not constitute an unreviewed safety question as defined in 10CFR50.59(a)(2), nor does it adversely impact health and safety.

Though our evaluation has concluded that the degradation is not serious, we believe issuance of this voluntary LER is appropriate since some degradation has been identified.

(NRC Form 366A (9-83) LICENSEE EVENT REPO	LICENSEE EVENT REPORT (LER) TEXT CONTINUATION			
FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)	PAGE (3)	
		YEAR SEQUENTIAL REVISION		
D. C. Cook Nuclear Plant - Unit l	0 5 0 0 0 3 1 5	8 8 - 0 0 7 0 0	0_4 OF 1 5	

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

Unit_1

Corrective Actions

The corrective action was to manually clean the flow passages to remove the accessible frost and ice buildup.

The results of Technical Specification Surveillances regarding frost and ice that forms in the flow passages is being monitored to ensure that any adverse trends in the amount of ice and frost buildup between surveillances will be identified. The impact of frost and ice buildup in the flow passages is also being studied in conjunction with the other utilities with ice condenser containments.

Failed Component Identification

No component failures were identified during this event.

Previous Similar Events

LER 50-316/85-013 LER 50-316/87-002 LER 50-315/87-013 LER 50-316/87-010 LER 50-315/88-002 LER^{50-316/88-005}

ACILITY NAME (1)	DOCKET NUMBER (2) LER NUMBER (6) PAGE (3)
۰ .	YEAR SEQUENTIAL MENISION
D. C. Cook Nuclear	r Plant -
Unit 1	0 5 0 0 3 1 5 8 8 - 0 0 7 - 0 0 0 5 OF 1
XT (If more spece is required, use additional NRC Form 366	(45) (17)
•	
	ATTACHMENT I
Description of Flor	w Passage Blockage by Category (affected Flow Passages are
indicated by the b	oxed areas on the following attachments).
-	
Category	Description*
· .	Maximum Flow Passage Tae/Front Blockage greater
A -	than 75 percent.
В	Maximum Flow Passage Ice/Frost Blockage between 50
	and 75 percent.
C	Marimum Flow Passage Tee/Frent Bleekage between 25
6	and 50 percept.
D	Maximum Flow Passage Ice/Frost Blockage less than 25
	percent (but greater than $3/8"$ buildup).
	,
* NOTE: These are	e generalized categories which reflect the maximum.
ice/frost	t blockage found in a particular flow passage and in
general v	was limited to one or two lattice frameworks in the flow
passage.	This does not indicate that the flow passage was blocked ,
· its entit	re length. Lattice framework is located at the positions

its entire length. Lattice Framework is located at the positions of cruciforms in the ice basket. Cruciforms are installed every six feet within the 48 foot ice basket (for convention the "top" lattice framework is referred to as number 1, etc.). The specific lattice frameworks affected are indicated on the individual Bay drawings (Attachments 3-11).

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(see Attachment 1).



Note: The lattice frameworks affected are indicated in parenthesis after the category description number (see Attachment 1).

*U.S.GPO:1986-0-624-538/455

NRC FORM 366A (9-83)



Note: The lattice frameworks affected are indicated in parenthesis after the category description number (see Attachment 1).

NRC FORM 366A (9-83)



Note: The lattice frameworks affected are indicated in parenthsis after the category description number (see Attachment 1).

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U.S.GPO:1986-0-624-538/455



(see Attachment 1).



(see Attachment 1).





Indiana Michigar Power Company Cook Nuclear Plant P.O. Box 458 Bridgman, MI 49106 616 465 5901



September 30, 1988

United States Nuclear Regulatory Commission Document Control Desk Washington, D.C. 20555

> Operating License DPR-58 Docket No. 50-315

Document Control Manager:

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

88-007-00

Sincerely,

W. G. Smith, Jr.

Plant Manager

WGS:clw

Attachment

D. H. Williams, Jr. cc: A. B. Davis, Region III M. P. Alexich P. A. Barrett J. E. Borggren R. F. Kroeger NRC Resident Inspector J. F. Stang, NRC. R. C. Callen G. Charnoff, Esq. · Dottie Sherman, ANI Library D. Hahn INPO PNSRC A. A. Blind S. J. Brewer/B. P. Lauzau