

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8709300163 DOC. DATE: 87/09/25 NOTARIZED: NO DOCKET #
 FACIL: 50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
 AUTH. NAME AUTHOR AFFILIATION
 POSTLEWAIT, T. K. Indiana & Michigan Electric Co.
 SMITH, W. G. Indiana & Michigan Electric Co.
 RECIP. NAME RECIPIENT AFFILIATION

SUBJECT: LER 87-010-00: on 870902, insps revealed frost & ice buildup on lattice frames of greater than 3/8 inch in 46 flow passages & 6 of 24 ice condenser bays. Caused by abnormal degradation. Ice condenser defrosted. W/870925 ltr.

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 TITLE: 50.73 Licensee Event Report (LER), Incident Rpt, etc.

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	DEDRO	1 1	NRR/DEST/ADS	1 0
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	NRR/DEST/ICSB	1 1	NRR/DEST/MEB	1 1
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	NRR/PMAS/ILRB	1 1	REG FILE 02	1 1
	RES DEPY GI	1 1	RES TELFORD, J	1 1
	RES/DE/EIB	1 1	RGN3 FILE 01	1 1
EXTERNAL:	EG&G GROH, M	5 5	H ST LOBBY WARD	1 1
	LPDR	1 1	NRC PDR	1 1
	NSIC HARRIS, J	1 1	NSIC MAYS, G	1 1

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) D. C. Cook Nuclear Plant - Unit 2										DOCKET NUMBER (2) 0 5 0 0 0 3 1 6				PAGE (3) 1 OF 1 2										
TITLE (4) Ice Buildup in Ice Condenser Flow Passages Due to Sublimation																								
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 NAMES				DOCKET NUMBER(S)											
0	9	0	2	8	7	8	7	0	1	0	0	0	9	2	5	8	7	0	5	0	0	0		
OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)																						
5		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)										
POWER LEVEL (10)		20.405(a)(1)(i)				50.36(c)(1)				50.73(a)(2)(v)				73.71(c)										
0 0 0		20.405(a)(1)(ii)				50.36(c)(2)				50.73(a)(2)(vii)				<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)										
		20.405(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(viii)(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)(ix)														
LICENSEE CONTACT FOR THIS LER (12)																								
NAME T. K. Postlewait- Technical Engineering Superintendent										TELEPHONE NUMBER AREA CODE 6 1 6 4 6 5 - 5 9 0 1														
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																								
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC														
SUPPLEMENTAL REPORT EXPECTED (14)												EXPECTED SUBMISSION DATE (15)		MONTH	DAY	YEAR								
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)												<input checked="" type="checkbox"/> NO												

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

On September 2, 1987, with Unit 2 in Mode 5 (Cold Shutdown), flow passage inspections of the ice condenser revealed frost and ice buildup on the lattice frames of greater than 3/8 inch in a total of forty-six flow passages in six of the twenty-four ice condenser bays. A subsequent inspection indicated that there was also frost and ice formation between the walls and ice baskets adjacent to the walls.

Technical Specification (T/S) 4.6.5.1.b.3 limits frost or ice buildup in flow passages to a nominal thickness of 3/8 inch. According to this T/S, buildup exceeding this limit in two or more flow passages per bay is evidence of abnormal degradation. 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.

Actions taken to correct the abnormal degradation included a defrost of the ice condenser and an internal investigation of the event. The internal investigation, aided by a previous Westinghouse evaluation, indicated that there were no safety concerns, that is, that the ice condenser remained in a configuration in which it would have performed its intended safety function.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

Conditions Prior to Occurrence

Unit 1 in Mode 5 (Cold Shutdown)

Description of Event

The as-found visual inspection ice condenser (EIIS/COND) flow passages conducted on September 2, 1987, indicated frost and ice accumulation greater than 3/8 inch in two flow passages in Bay 3, two flow passages in Bay 4, two flow passages in Bay 8, four flow passages in Bay 13, two flow passages in Bay 11, and two flow passages in Bay 17. Subsequently, the inspection was expanded to include at least twenty additional flow passages in each of these bays. This inspection revealed an additional six flow passages in Bay 3, zero flow passages in Bay 4, twelve flow passages in Bay 8, six flow passages in Bay 11, six flow passages in Bay 13, and zero flow passages in Bay 17 with more than 3/8 inch frost and ice buildup for a total of 46 flow passages. There are a total of 3072 flow passages in the Ice Condenser. Attachments 1 through 8 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.

A subsequent partial inspection also revealed ice formation in the area between the containment wall and the Row 1 baskets. It is believed that there is additional ice formation in the area between the crane wall and Row 9 Ice Condenser baskets. This is similar to that identified during the most recent Unit 2 Surveillance (see LER 50-316/87-002). The ice in general is not visible from the upper or lower plenum areas of the ice condenser. However, our NSSS vendor, Westinghouse, has indicated (from the evaluation for the condition identified during the last Unit 2 occurrence) that such ice is not unexpected and is not of significance with respect to public health and safety.

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						0 3	OF 1 2

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

Description of Event (cont'd)

During the surveillance interval prior to the September 2, 1987, test, several of the 60 air handling units (AHU) (EIS/AHU) (used to maintain ice condenser temperature) were intermittently inoperable for maintenance and/or repair. However, it has been concluded that the inoperability of the AHU's did not significantly contribute to the frost and ice formation experienced.

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

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 Containment Pressure exceeding the design limit. Since the frost/ice buildup identified in Bays 3, 4, 8, 11, 13 and 17 constitutes a total flow blockage area which is less than the 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.

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Corrective Actions

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

We are discussing this situation with other utilities who have ice condenser units. The discussions center around common problems with ice condenser units and common solutions to these problems.

Failed Component Identification

No component failures were identified during this event.

Previous Similar Events

LER 50-316/85-013

LER 50-316/86-002

LER 50-315/86-013

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TEXT (If more space is required, use additional NRC Form 368A's) (17)

ATTACHMENT 1

Description of Flow Passage Blockage by Category (affected Flow Passages are indicated by the boxed areas on the following attachments).

Category	Description*
A	Maximum Flow Passage Ice/Frost Blockage greater than 75 percent.
B	Maximum Flow Passage Ice/Frost Blockage between 50 and 75 percent.
C	Maximum Flow Passage Ice/Frost Blockage between 25 and 50 percent.
D	Maximum Flow Passage Ice/Frost Blockage less than 25 percent (but greater than 3/8" build-up).

* NOTE: These are generalized categories which reflect the maximum ice/frost blockage found in a particular flow passage and in general was limited to one or two lattice frameworks in the flow passage. This does not indicate that the flow passage was blocked it's 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 - 8).

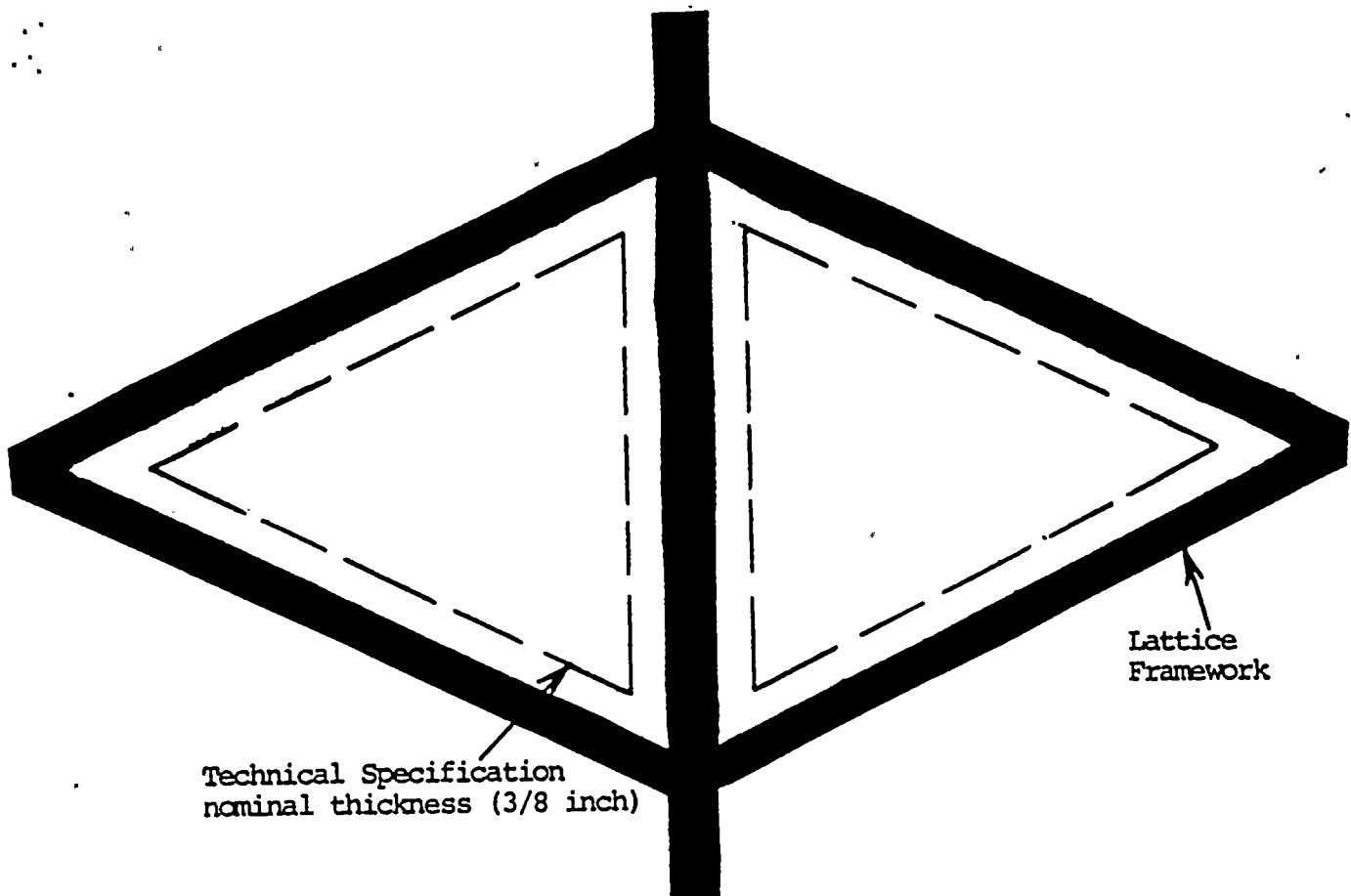
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) D. C. Cook Nuclear Plant - Unit 2	DOCKET NUMBER (2) 0 5 0 0 0 3 1 6 8 7 — 0 1 0 — 0 0 0 6 OF 1 2	LER NUMBER (6)			PAGE (3)		
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ATTACHMENT 2

Representative Diagram of Ice/Frost Build-up in Two Flow Passages



Scale:

1/2 inch equals 1 inch

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

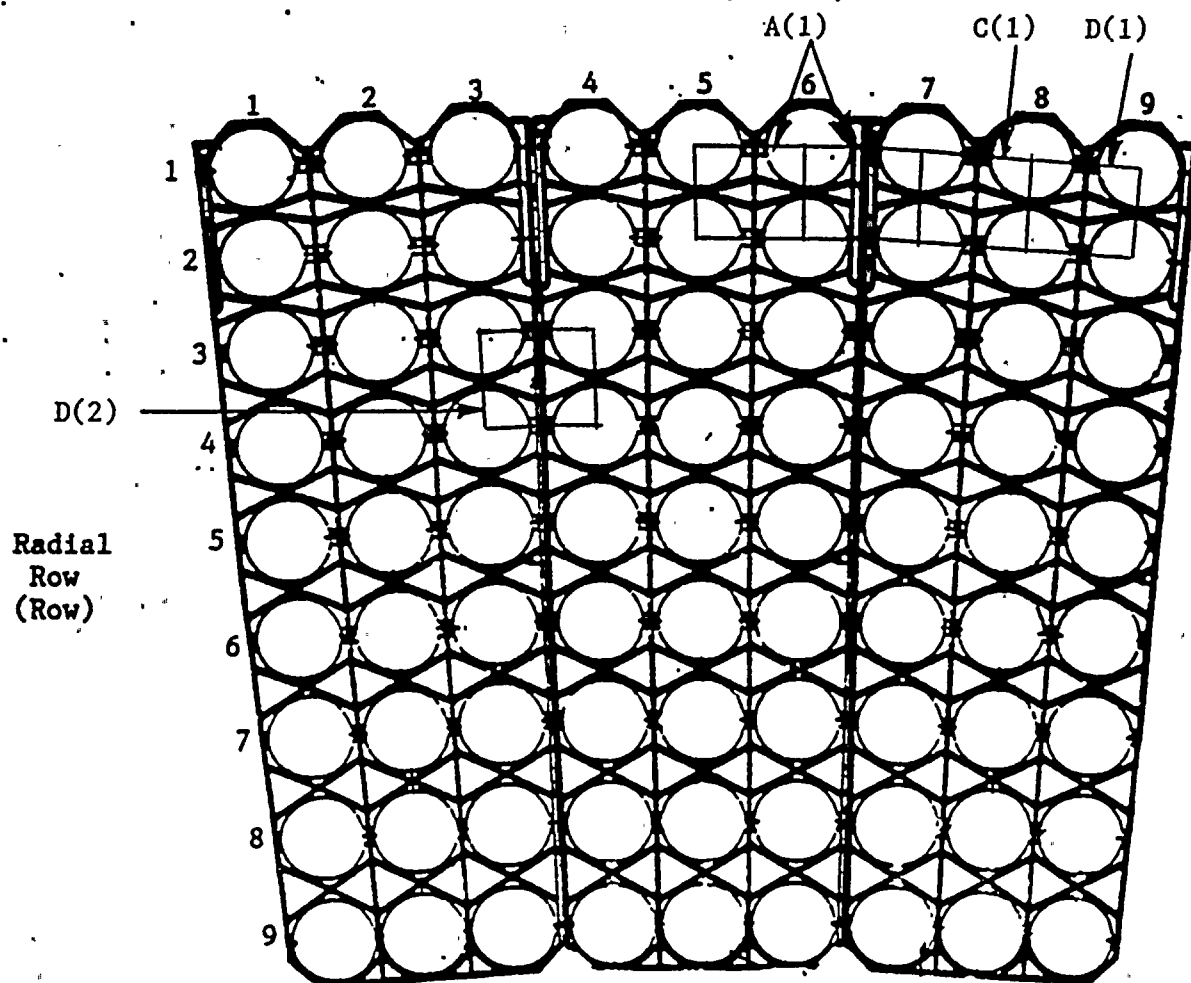
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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

ATTACHMENT 3

Bay 3 (of 24 total)

Azimuthal Row (Basket)



NOTE: The Lattice Frameworks affected are indicated in parenthesis after the category description number (see Attachment 1).

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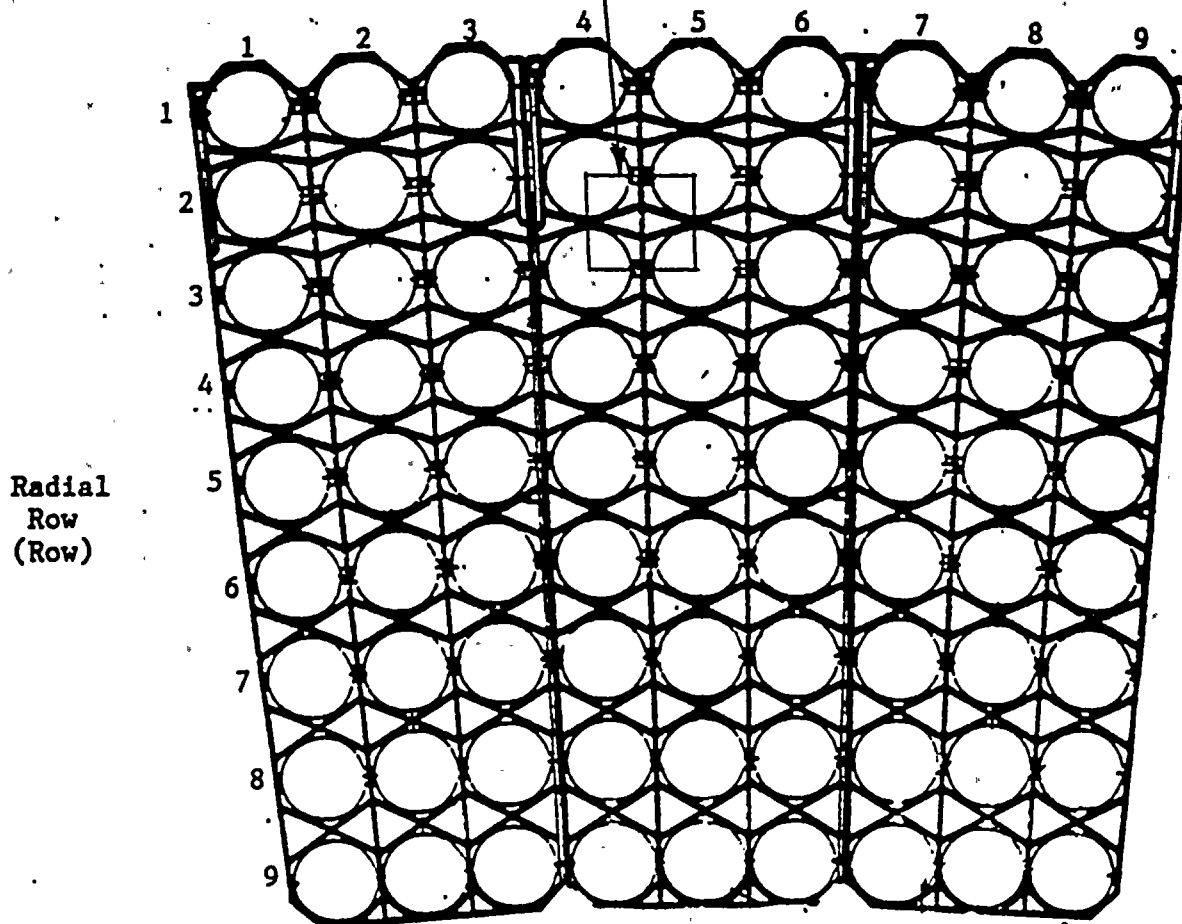
TEXT (If more space is required, use additional NRC Form 366A's) (17)

ATTACHMENT 4

Bay 4 (of 24 total)

Azimuthal Row (Basket)

C(1,2,3,4)



NOTE: The Lattice Frameworks affected are indicated in parenthesis after the category description number (see Attachment 1).

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YEAR

8 | 7

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NUMBER

— 0 | 1 | 0

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NUMBER

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OF

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

ATTACHMENT 5

Bay 8 (of 24 total)

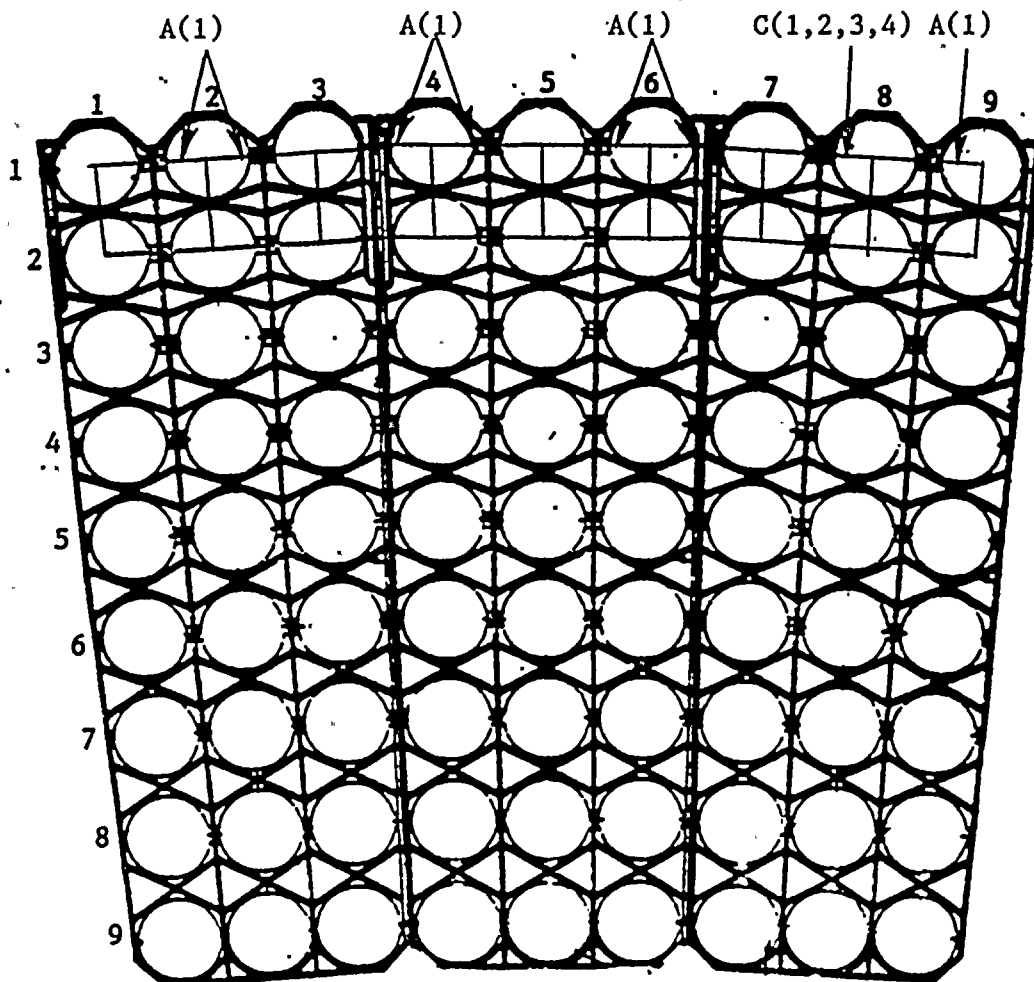
Azimuthal Row (Basket)

A(1)

A(1)

A(1)

C(1,2,3,4) A(1)

Radial
Row
(Row)

NOTE: The Lattice Frameworks affected are indicated in parenthesis after the category description number (see Attachment 1).

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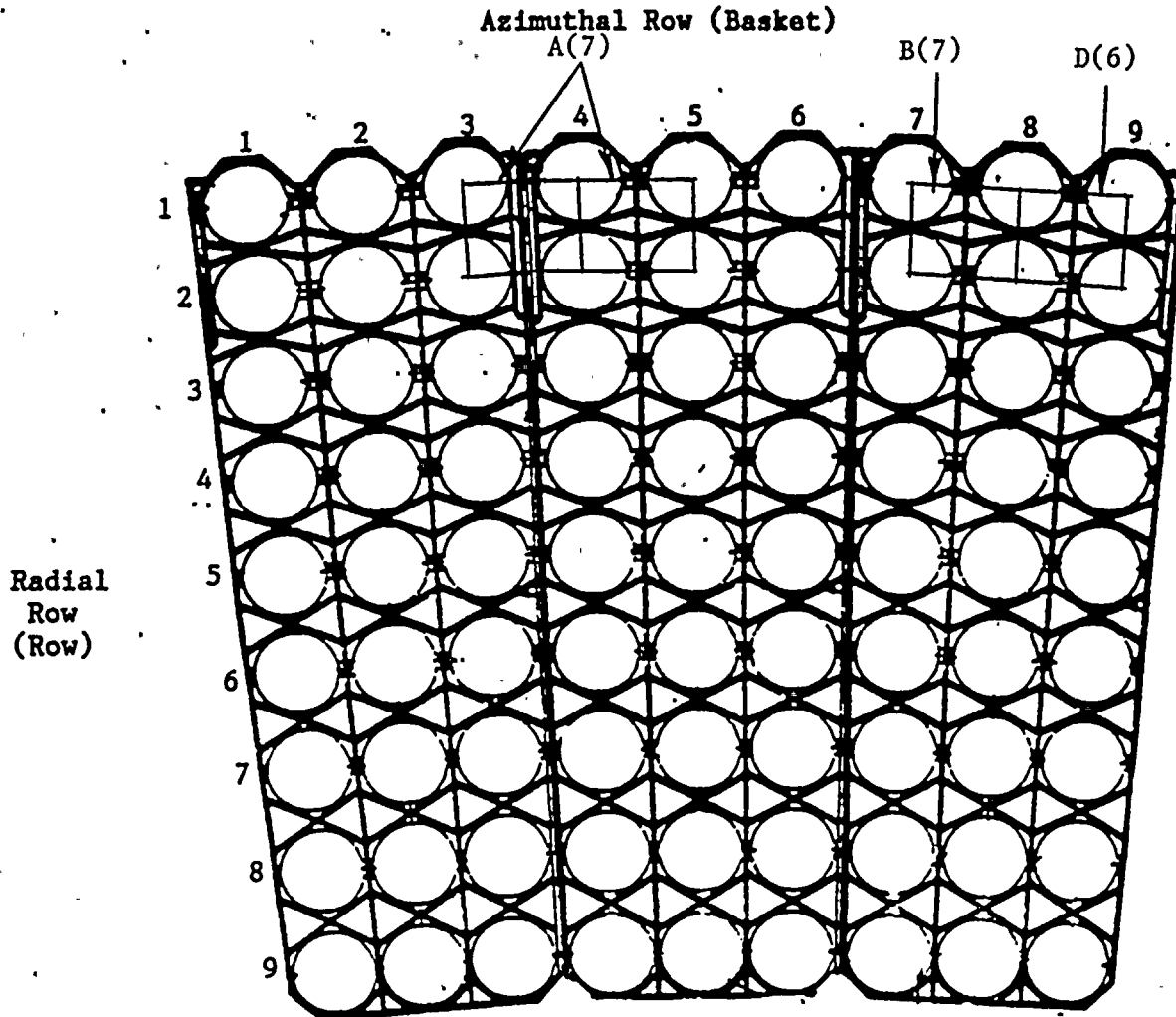
D. C. Cook Nuclear Plant - Unit 2

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

ATTACHMENT 6

Bay 11 (of 24 total)



NOTE: The Lattice Frameworks affected are indicated in parenthesis after the category description number (see Attachment 1).

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

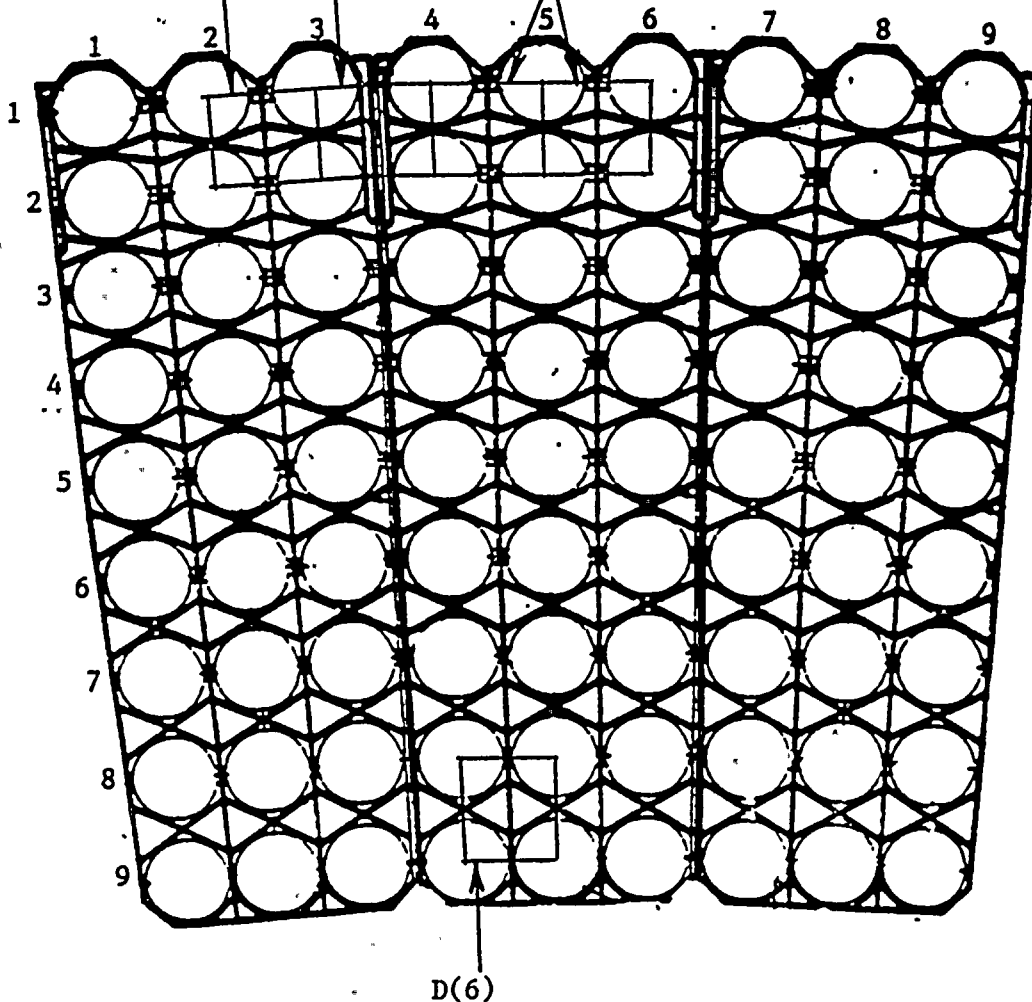
ATTACHMENT 7

Bay 13 (of 24 total)

Azimuthal Row (Basket)

C(1,2,3,4) A(1)

C(1,2,3,4)

Radial
Row
(Row)

NOTE: The Lattice Frameworks affected are indicated in parenthesis after the category description number (see Attachment 1).

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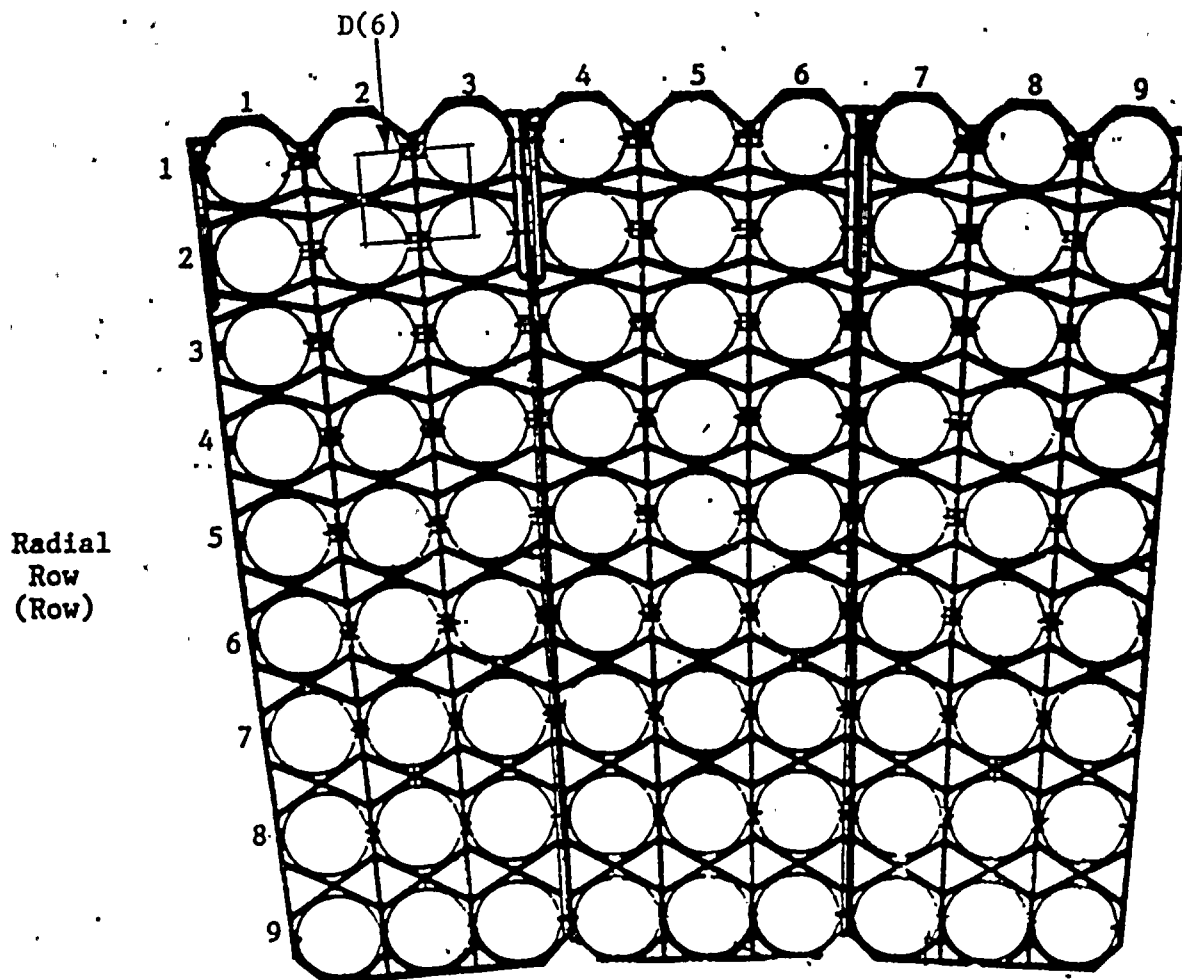
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TEXT (If more space is required, use additional NRC Form 368A's) (17)

ATTACHMENT 8

Bay 17 (of 24 total)

Azimuthal Row (Basket)



NOTE: The Lattice Frameworks affected are indicated in parenthesis after the category description number (see Attachment 1).

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



September 25, 1987

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


Operating License DPR-74
Docket No. 50-316

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:

87-010-00

Sincerely,


W. G. Smith, Jr.
Plant Manager

WGS/afh

Attachment

cc: J. E. Dolan
A. B. Davis, Region III
M. P. Alexich
R. F. Kroeger
H. B. Brugger
R. W. Jurgensen
NRC Resident Inspector
R. C. Callen, MPSC
G. Charnoff, Esq.
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PNSRC
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