CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9808060272 DOC.DATE: 98/07/31 NOTARIZED: NO DOCKET #
FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana M 05000315
AUTH.NAME AUTHOR AFFILIATION
PISARSKY,F. American Electric Power Co., Inc.
SAMPSON,J.R. American Electric Power Co., Inc.
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 98-008-02:on 980112,inadequate contractor control during maint & surveillance activities resulted in ice basket damage.Procedures used to guide maint & surveillance activities have been upgraded & rewritten.W/980731 ltr.

DISTRIBUTION CODE: IE22T COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 7
TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

NOTES:

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	PD3-3 PD	1	1	STANG,J	1	1
INTERNAL:	AEOD/SPD/RAB	2	2	AEOD/SPD/RRAB	1	1
	FILE CENTER	1	1	NRR/DE/ECGB	1	1
	NRR/DE/EELB	1	1	NRR/DE/EMEB	1	1
	NRR/DRCH/HICB	1	1	NRR/DRCH/HOHB	1	1
	NRR/DRCH/HQMB	1	1	NRR/DRPM/PECB	1	1
	NRR/DSSA/SPLB	1	1	RES/DET/EIB	1	1
	RGN3 FILE 01	1	1			
EXTERNAL:	L ST LOBBY WARD	1	1	LITCO BRYCE,J H	1	1
	NOAC POORE,W.	1	1	NOAC QUEENER,DS	1	1
	NRC PDR	1	1	NUDOCS FULL TXT	1	1

CATEGORY 1 DOCUMENT

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE. TO HAVE YOUR NAME OR ORGANIZATION REMOVED FROM DISTRIBUTION LISTS OR REDUCE THE NUMBER OF COPIES RECEIVED BY YOU OR YOUR ORGANIZATION, CONTACT THE DOCUMENT CONTROL DESK (DCD) ON EXTENSION 415-2083

FULL TEXT CONVERSION REQUIRED
TOTAL NUMBER OF COPIES REQUIRED: LTTR 22 ENCL 22

American Electric Power
Cook Nuclear Plant
One Cook Place
Bridgman, MI 49106
616 465 5901

AEP
AMERICAN ELECTRIC POWER

July 31, 1998

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:

98-008-02

Sincerely,

John R. Sampson

J. R. Sampson
Site Vice President

/mbd

Attachment

c: C. J. Paperiello (Acting), Region III
J. R. Sampson
P. A. Barrett
S. J. Brewer
R. Whale
D. Hahn
Records Center, INPO
NRC Resident Inspector

NRC Form 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104

EXPIRES 04/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), 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

LICENSEE EVENT REPORT (LER)

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

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Cook Nuclear Plant Unit 1	50-315	1 of 6

TITLE (4)

Inadequate Contractor Control During Maintenance and Surveillance Activities Results in Ice Basket Damage

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
02	12	98	98	--	008	--	02	07	31	98	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
		20.2201 (b)	20.2203(a)(2)(v)	50.73(a)(2)(i)	50.73(a)(2)(viii)
POWER LEVEL (10)	00	20.2203(a)(1)	20.2203(a)(3)(i)	50.73(a)(2)(ii)	50.73(a)(2)(x)
		20.2203(a)(2)(i)	20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
		20.2203(a)(2)(ii)	20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)	X 50.36(c)(2)	50.73(a)(2)(vii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Mr. Frank Pisarsky, Mechanical component Engineering Supervisor	616/465-5901, x2607

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).	X NO				

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

On January 12, 1998, with Unit 1 in Mode 5, a damaged ice condenser ice basket was removed from the Unit 1 ice condenser and a scoping test was performed to determine its ability to structurally withstand design basis loads. The scoping test results showed that the damaged ice basket failed with plastic deformation under less than design basis loads. This event was reported via ENS on January 12, 1998 at 1545 hours EST under 10CFR50.72(b)(2)(i), as an unanalyzed condition and a condition outside the plant's design basis. Prior to and subsequent to this notification, several forms of ice basket damage were identified including damaged upper rims, missing or torn ligaments, dents and folds. This LER is therefore submitted in accordance with 10CFR50.72(a)(2)(i).

The root cause of this condition has been attributed to inadequate control of contractors, and inappropriate maintenance and surveillance practices that resulted in damage to the ice baskets. A decision was made to completely thaw both units ice condensers in order to address a variety of issues identified during the current unit outages, including basket damage. The thaw of both units' ice condenser has now been completed. The procedures used to guide maintenance and surveillance activities for the ice condenser are being upgraded and rewritten for use within the Maintenance department, to whom supervisory oversight responsibility has been transferred.

The types of ice basket damage observed during the recent inspections has been consistent with the types of damage described in the previous revision of this LER. Therefore, the conclusion that the ice baskets would have functioned to prevent containment overpressure remains valid, and the safety significance of the condition minimal.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)					PAGE (3)
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER	
Cook Nuclear Plant Unit 1	50-315	98	–	008	–	02	2 of 6

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

CONDITIONS PRIOR TO OCCURRENCE
Unit 1 was in Mode 5, Cold Shutdown
Unit 2 was in Mode 5, Cold Shutdown

DESCRIPTION OF EVENT
On January 12, 1998, with Unit 1 in Mode 5, a damaged ice condenser ice basket was removed from the Unit 1 ice condenser and a scoping test was performed to determine its ability to structurally withstand design basis loads. The scoping test results showed that the damaged ice basket failed with plastic deformation under less than design basis loads. This event was reported to the NRC on January 12, 1998 as an unanalyzed condition. Prior to and subsequent to this notification, several forms of ice basket damage were identified including damaged upper rims, missing or torn ligaments, dents and folds.

Each ice condenser consists of 24 bays containing 81 ice baskets per bay, covering an arc of 300 degrees in the containment structure. Each ice basket is approximately 12 inches across and 48 feet long, filled with borated ice. To perform their design basis function, the ice baskets and columns are required to withstand design loads to ensure they do not eject upward out of the ice bed and open up bypass flow routes, or impact and damage other ice condenser equipment, or eject out of the ice condenser and become a missile inside containment. The baskets are designed to not collapse causing adjacent or additional ice basket columns to collapse, resulting in excessive flow passageway blockage, bypass flow routes, or undefinable heat transfer geometry.

During the current outages, damage was identified to ice condenser ice baskets during tours of the ice condenser. Damage noted on ice baskets includes damaged top rims, torn/missing ligaments, dents and folds. Folds are considered to be the most significant damage, a result of the basket material undergoing plastic deformation in compression. The thaw of the Unit 1 and Unit 2 ice condensers has been completed. To date over 33 percent of the ice baskets in the Unit 1 ice condenser have been inspected, and repair /replacement activities are ongoing. The type of ice basket damage observed during these inspections has been consistent with the types of damage previously identified. Inspection and repairs for the Unit 2 ice condenser has not yet started, but it is anticipated that the same type of damage will be found.

CAUSE OF EVENT
The observed damage can be attributed to improper handling of baskets during maintenance and surveillance activities. Because damage occurred during basket maintenance and surveillance activities, and contract personnel perform the majority of this work, inadequate control of contractors is considered a primary cause for the noted condition. Contributors to this cause include ineffective training for contract personnel and inadequate supervisory oversight by utility personnel.

Improper surveillance practices was another contributor, since some of the more significant basket damage occurred during attempts to move baskets from beneath during weighing.

Damaged top rims and folds in the baskets most likely occurred during the baskets weighing process. The process of weighing baskets requires lifting the basket from the top rim with a weigh rig. Over time, some baskets have become frozen in place. In order to free frozen baskets for weighing, various techniques have been used. One technique used in the past was "jacking" of baskets from the bottom as the basket was pulled from above. Failure to control the jacking in the event the basket remained frozen sometimes resulted in deformation of the basket and produced a fold in the ligaments near the basket bottom. The practice of jacking baskets from the bottom was discontinued several years ago to preclude further basket damage.

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)					PAGE (3)
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER	
Cook Nuclear Plant Unit 1	50-315	98	--	008	--	02	3 of 6

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

CAUSE OF EVENT (cont'd)
Other types of damage can also occur to baskets during the weighing process if not carefully controlled. As previously noted, the weighing process requires lifting the basket by pulling from the top rim. Although limits are set on maximum lift forces, top rim damage can quickly occur if lift forces are not closely monitored, or if loading is applied asymmetrically. Damage can also occur during the weighing process when a frozen basket is exercised in an attempt to free it.

Still other observed damage is considered to be the result of ice basket mishandling or inappropriate maintenance activities. Two examples of this type damage include inward dents in areas of basket ligaments and torn ligaments. Dents probably occurred during basket installation, or perhaps during clearing of flow passages. Tears in ligaments are most likely the result of prolonged contact with a pneumatic vibrator, which is used for emptying of ice baskets.

The vast majority of ice condenser work has been performed in the past by a contract labor force, with the contract being administered by the Engineering department and specifically, the System Engineer. The contract administration responsibility was in addition to the System Engineer's normal role of management of the technical scope of the ice condenser work and analysis of surveillance test results. This broad scope of responsibilities allowed only minimal time for field oversight of the contractor. Steps were not taken to make other utility personnel available for oversight of the contract labor force. Therefore, field supervision for contract workers was largely provided by contract supervisory personnel rather than by utility personnel. During the current outages, steps were taken to transfer responsibility for oversight of the ice condenser labor force to the maintenance department, which retains personnel skilled in the supervision of production labor. These steps are aimed at addressing issues with poor control of contractors.

The System Engineer historically administers a training program to the ice condenser contract personnel. This training includes guidance on basket weighing techniques and on appropriate use of tools to avoid damage to baskets. However, this training has apparently not been effective in preventing basket damage. Steps are being taken to overhaul this training, in part to reinforce appropriate techniques to preclude various types of ice basket damage.

Finally, the lack of a definition of what constitutes "detrimental damage" was also viewed as a contributor, since there was no benchmark for personnel to gage whether observed damage resulted in an unacceptable condition. Simplistically, any basket damage sufficient to challenge the basket's ability to carry design loads is considered detrimental damage

Documentation of damage to Cook Plant ice baskets in previous corrective action documents provides evidence that the organization was able to recognize damaged ice baskets as a condition adverse to quality. In fact, the Technical Specifications (T/S) require periodic inspection of a sample of ice baskets for detrimental damage. However, a definition of detrimental damage does not exist, other than wording in T/S 4.6.5.1.d, which refer to detrimental damage as "structural wear, cracks, corrosion or other damage." This lack of an objective definition may have contributed to confusion about the significance of the damaged ice baskets.

ANALYSIS OF THE EVENT
On January 12, 1998, at 1545 hours EST an ENS notification was made regarding damaged ice baskets in accordance with 10CFR50.72(b)(2)(i), as an unanalyzed condition and a condition outside the plant's design basis, following receipt of a scoping load test result on a damaged ice basket with buckling damage near the basket bottom rim. Baskets with buckling damage are considered to bound other types of ice basket damage identified during the current outages due to these baskets having undergone plastic deformation. This LER is submitted in accordance with 10CFR50.73(a)(2)(i).

This test examined the damaged basket's ability to structurally withstand static test loads equivalent to the Operational Basis Earthquake (OBE) and ice basket dead weight loads. The scoping test results showed that the damaged ice basket

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)					PAGE (3)
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER	
Cook Nuclear Plant Unit 1	50-315	98	--	008	--	02	4 of 6

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

ANALYSIS OF THE EVENT (cont'd)
failed with plastic deformation under a distributed lateral load of approximately 400 lbs in conjunction with a compressive load of approximately 2000 lbs. By comparison, WCAP-8304, Stress and Structural Analysis and Testing of Ice Baskets, specifies that the ice basket should be able to withstand a lateral load equivalent to approximately 2400 lbs distributed over the bottom 6 feet of the basket in conjunction with a compressive vertical load of 4933 lbs. The failure of this basket under less than design loads was considered to be an unanalyzed condition and thus was reported to the NRC per 10CFR50.72. Approximately 25 baskets in Unit 1 and 45 baskets in Unit 2 are currently know to exhibit similar damage.

The damaged ice baskets were evaluated as to compliance with the design basis, operability and functionality. Several types of ice basket damage were considered, including top rim damage, torn/missing ligaments, dents and folds.

With regard to design basis, the baskets and columns of baskets are designed to withstand certain design loads to provide assurance of ice bed geometry for proper thermal/hydraulic performance of the ice condenser during a LOCA and/or seismic transient events. To perform their design basis function, the baskets and basket columns are designed to not eject upward out of the ice bed and possibly open up bypass flow routes, or impact and damage other ice condenser equipment, or eject out of the ice condenser becoming a missile inside containment. Baskets must also not collapse causing adjacent baskets/columns to collapse, resulting in flow passageway blockage, bypass flow routes, or unanalyzed heat transfer geometries.

Top rim damage has been reviewed and determined to not be a condition that would challenge the design basis or make the ice condenser inoperable. Damage at the top end of the basket column will not promote the ejection of an ice basket or column from the ice bed or promote detrimental damage at any adjacent ice basket columns, interfacing structures or equipment. From the aspect of design basis loads, top rim damage may result in some localized deformation, but it will not cause or promote collapse of that column, or damage adjacent baskets, basket columns, interfacing structures, or equipment. Baskets with damaged top rims will meet design basis load conditions and do not represent a challenge to operability or functionality of the ice condenser.

Missing or torn ice basket ligaments are not represented or taken into consideration on any design drawings or documentation. However, missing ligaments will not promote the ejection of an ice basket or basket column from the ice bed or promote detrimental damage at any adjacent ice baskets, basket columns, interfacing structures, or equipment. The ice basket includes substantial margin in its ability to resist tensile loads from potential LOCA blowdown forces. Ice baskets with missing ligaments will have reduced structural capacity to carry lateral and compressive loads imposed under design seismic load cases. The most common locations for missing ligaments are in the mid to upper elevations of the ice basket column due to ice bed maintenance operations with vibrators.

At these higher elevations, the vertical compressive loads are not structurally significant and if the basket material were overstressed in combination with lateral loads, it is probable that the basket failure would be a small localized lateral displacement or shift in the basket mesh ligaments around the area of the missing ligaments. This localized displacement of the ice basket section would not cause the damaged basket to impact on adjacent ice basket columns. Ice baskets with missing/damaged ligaments are considered to be outside the plant design basis, and equate to inoperability in the sense that the basket damage is detrimental, however, the damage does not result in the ice condenser being incapable of performing its design function to prevent containment overpressure following a high energy line break inside containment.

Dents and folds are considered to be the bounding (worst case) condition when evaluating safety significance. Ice baskets with dents and folds will have reduced structural capacity relative to their ability to carry lateral and compressive loads which would be imposed under design basis seismic load cases. The ice condenser design basis, as described in the FSAR, states that the ice condenser internal structures, including ice baskets, are designed to be capable of withstanding

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)					PAGE (3)
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER	
Cook Nuclear Plant Unit 1	50-315	98	--	008	--	02	5 of 6

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

ANALYSIS OF THE EVENT (cont'd)
various load combinations including deadweight (D) plus operating basis earthquake (OBE) loads, D + design basis earthquake (DBE) loads, D + design basis accident (DBA) loads, and D + DBE + DBA loads. As noted previously, a scoping test of a sample damaged basket with test loads less than D + OBE resulted in a failure of the basket with plastic deformation. Therefore, the existence of damaged baskets that were unable to withstand design loads represented a condition outside the design basis. As noted previously, it is estimated that approximately 25 baskets in the Unit 1 ice condenser and 45 baskets in the Unit 2 ice condenser exhibit similar damage. Baskets with dents are estimated to be a similar quantity of baskets, with a final quantification to be made following inspections during the current outages.

With regard to operability, both unit's T/S require periodic inspections of ice baskets for "detrimental damage", to demonstrate operability. While the term "detrimental damage" has not been formally defined, damage, which results in a basket's inability to carry design loads, is considered detrimental. Therefore, the existence of these damaged ice baskets is considered to represent an inoperable condition for each ice condenser.

With regard to functionality, ice baskets with folds will have reduced structural capability relative to their ability to carry lateral and compressive loads, which would be imposed under design basis seismic load cases. The potential for continued ice basket failure under design basis seismic loading conditions at the fold is a function of the size of the damage, and the weight of the ice in the basket sections above the damage area. It may be postulated that the displacement of the damaged basket section under a seismic loading may be enough to cause the basket to displace laterally into an adjacent ice basket column. However, since basket sections with folds have been shown to have substantial strength as demonstrated in aforementioned testing (which bounds dents, where plastic deformation has not occurred), and since significant energy would be dissipated in the deformation of the ice basket sheet metal section and enclosed ice, it is expected that ice basket structural integrity will be maintained, so as to preclude significant collateral ice basket damage and flow passage geometry degradation. Because of this and the fact that each ice basket column is supported laterally every six feet in elevation by a structural lattice frame grid, it is highly improbable that a significant domino type failure would occur where the damaged basket collapses into an adjacent basket and so forth. Therefore, ice baskets with dents and folds are considered to be out of the design basis, and inoperable from the standpoint of compliance with the surveillance requirement related to detrimental damage, however, the damage does not result in the ice condenser being incapable of performing its design function to prevent containment overpressure following a high energy line break inside containment.

Evaluation of the different types of damage identified to date supports the conclusion that the safety significance of the condition was minimal, and that the ice condenser was capable of performing its design function.

CORRECTIVE ACTIONS
Both unit's ice condensers have been completely thawed to allow inspection of the ice baskets for the purpose of identifying and correcting, by repair or replacement, damaged baskets.

A definition of "detrimental damage" has been developed to serve as a gage for judging whether observed ice basket damage needs repair. This definition has been incorporated into the special procedure being used to perform the current inspections. The definition will also be incorporated into design basis documents and procedures for surveillance of the ice condenser. Damage beyond the threshold of detrimental damage will be repaired or replaced. These actions will be completed prior to startup for each unit.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER(2)	LER NUMBER (6)					PAGE (3)
		YEAR	SEQUENTIAL NUMBER			REVISION NUMBER	
Cook Nuclear Plant Unit 1	50-315	98	--	008	--	02	6 of 6

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

CORRECTIVE ACTIONS (cont'd)
After the thaw of each unit's ice condenser, a thorough inspection of ice baskets will be performed. Although these inspection activities will likely result in the identification of additional damaged baskets, the types of basket damage under consideration are not expected to change. This condition is applicable to both units.

Responsibility for oversight of production work - maintenance and surveillance activities - has been transferred from the Engineering department to the Maintenance department. This will allow personnel skilled in supervising production workers to provide oversight for the ice condenser labor force, including contract labor, if used in the future.

The procedures used to guide maintenance and surveillance activities for the ice condenser are being upgraded and rewritten for use within the Maintenance department. The upgraded procedures will contain improved guidance on maintenance and surveillance activities to preclude future damage to ice baskets. Ice condenser maintenance procedures are also being revised to require inspection of baskets emptied for maintenance prior to refilling during future outages. The basket inspection will specifically include provisions for identifying ice basket damage and correcting damage that exceeds the threshold of detrimental damage.

The training program for ice condenser workers is being upgraded. The upgraded training will include improved guidance on proper techniques to avoid basket damage.

These preventive actions will be in place prior to commencing relevant ice condenser activities during the current outages on each unit.

FAILED COMPONENT IDENTIFICATION
Not applicable

PREVIOUS SIMILAR EVENTS
None