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FACIL:50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
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SUBJECT: LER 89-002-01:on 890116,non-svc induced deformation of energy core cooling sys suction line.W/890407 ltr.
W/8 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
D. C. Cook Plant - Unit 2	0 5 0 0 0 3 1 6	1 OF 0 6

TITLE (4) Non-Service Induced Deformation of Energy Core Cooling System Suction Line Seismic Restraint

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 5 0 0 0
0 1	1 6	8 9	8 9	— 0 0 2	— 0 1	0 4	0 7	8 9		0 5 0 0 0

OPERATING MODE (9): 6

POWER LEVEL (10): 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check one or more of the following)* (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 *(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)	X	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	TELEPHONE NUMBER
T. K. Postlewait - Technical Engineering Superintendent	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 NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES *(If yes, complete EXPECTED SUBMISSION DATE)*	NO		1 0	0 1	8 9

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

This revision is being submitted to provide: 1) an update on the ongoing engineering evaluation; and 2) additional details regarding description of event and corrective actions.

On 8/17/88 with Unit 2 in Mode 6 (Refueling) during a walkdown of Inservice Inspection pipe supports, a seismic restraint was identified to have significant deformation. The restraint is located on the 24 inch Emergency Core Cooling System (ECCS) suction line from the Unit 2 Refueling Water Storage Tank (RWST). A 1/16/89 evaluation determined that the suction line stresses would have exceeded the FSAR criteria under design basis seismic conditions. The investigation determined that it was highly unlikely that the damage was service related. Modifications were made in 1976 to allow the pipe to be replaced with a spool piece to facilitate flushing and other startup activities. The deformation most likely occurred during the removal and reinstallation of the piping during or following startup activities. The restraint has been repaired. Subsequent walkdown revealed additional as-built/design inconsistencies on two adjacent supports. An engineering analysis indicated that the subject piping and supporting system would meet Functional Capability Criteria as approved by the NRC as an Interim Acceptance Criteria. However the RWST nozzle is to be evaluated. A supplemental report on the nozzle evaluation will be submitted by 10/1/89.

IE22
1/1

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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D. C. Cook Plant Unit 2	0 5 0 0 0 3 1 6	8 9	— 0 0 2	— 0 1	0 2 OF 0 6

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

This revision is being submitted to provide: 1) an update on the ongoing engineering evaluation; and 2) additional details regarding description of event and corrective actions.

Conditions Prior to Occurrence

Unit 2 in Mode 6 (Refueling - no fuel in the core).

Description of Event

On August 17, 1988, at 0800 hours, during a walkdown of Inservice Inspection (ISI) pipe supports (EIIS/SPT) on Unit 2, it was identified that restraint 2-GSI-L102 was deformed. The restraint is located on the twenty-four inch Emergency Core Cooling System (ECCS) suction line (EIIS/BQ-PSP) just downstream of the Unit 2 Refueling Water Storage Tank (RWST) (EIIS/CB-TK). Subsequent evaluation of the restraint's condition on January 16, 1989, determined that the Unit 2 ECCS suction line stresses would have exceeded the FSAR Criteria under design basis seismic conditions. However, the Functional Capability Criteria as approved by the NRC as an Interim Acceptance Criteria were not exceeded.

The deformation of the restraint was identified as deformation of the I-beam attached to the wall, along with deformation of two stanchions attached to the suction pipe (see ATTACHMENT 1). The deformation caused significant increases in the gap between the I-beam and the stanchions. Examination of the ECCS piping itself revealed no damage. The original seismic design required a one-sixteenth inch gap on each side. The gaps found from the deformation ranged from one-half to one and one-quarter inches. The design of the restraint is for seismic considerations and by definition is exempt from ISI visual examination per ASME Section XI. The purpose is primarily to restrain the suction line axially. It carries nominal loads during normal plant operation.

The ECCS suction line piping was walked down and adjacent hangers and supports were inspected. Two supports, 2GSI-L106 and 2GSI-104, were identified as possibly not being installed in accordance with plant design. The walkdown, however, did not reveal any noticeable deformation, damage, significant pipe movement or other evidence of service induced abnormalities.

On November 1, 1988 and February 10, 1989, respectively, it was determined that the as-built condition of the subject additional hangers were not in accordance with plant design.

Cause of Event

The investigation concluded that it is highly unlikely that the deformation of 2GSI-L102 was service induced as there have been no recorded unusual operating conditions, including a Design Basis Earthquake, which could have resulted in such significant deformation. The location of the restraint, on the suction side of the ECCS pumps, supports the likelihood that this type of deformation did not occur during service.

A review of modifications made to the system identified one potential cause for the deformation of 2GSI-L102. In order to facilitate flushing and other startup activities prior to initial unit startup a modification was made to the system, (changing this section of piping to a spool piece) to allow this portion of piping to be removed and replaced with a "jumper" spool piece. The modification, performed in 1976, was completed with one minor change to the original design; i.e., the subject restraint was moved to prevent interference with newly installed flanges. No other problems were noted. A Quality Control inspection report from August 1977 noted no problems with the restraint. The startup activities removed the modified pipe section and replaced it with a spool piece connecting the ECCS pump suction to the Condensate Storage Tank (CST) (see ATTACHMENT 1). Upon completion of the startup activities, the piping was restored. It is believed that the deformation of the restraint occurred during this evolution; however, no documentation of such deformation could be located. The corresponding restraint for Unit 1 was examined. There was no similar modification performed on Unit 1 and no deformation of the restraint was seen.

The investigation of 2GSI-L104 and 2GSI-L106 concluded that the inconsistencies with plant design were not service induced, but rather, the as-installed configuration.

Analysis of Event

This event is being reported per 10CFR50.73(a)(2)(ii) as an event that resulted in the plant being in a condition that was outside the design basis of the plant. (Suction line stresses would have exceeded FSAR criteria under design basis seismic conditions).

The Donald C. Cook Nuclear Plant is located in a low seismicity area, and historically earthquakes have been of low intensity. To date, a seismic event of Design Basis Earthquake magnitude has not occurred at the Cook Nuclear Plant. Thus, the subject piping system has not been subjected to the Design Basis Earthquake loading. Review of the normal operating system loading indicated that the system was capable of supporting normal operating loads.

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

Analysis Of Event (continued)

The section of the suction line from Refueling Water Storage Tank (RWST) to an appropriate overlap boundary has been evaluated excluding supports 2-GSI-L102 and 2-GSI-L106, which were found to have large weld stresses. The piping system failed to meet the Design Basis Earthquake stress limits; however, the limits of the Interim Acceptance Criteria were not exceeded. Pipe support 2-GSI-L104 was within the acceptance criteria limits. The nozzle load values of the RWST will be evaluated to determine if they would have exceeded the original allowable loads. This evaluation is anticipated to be completed by October 1, 1989.

If these loads are found to be acceptable, it can be concluded that the piping system, including the RWST nozzle, would have remained functional during a Design Basis Earthquake condition since the limits of the Interim Acceptance Criteria would not have been exceeded.

It was judged that the deformation on pipe support No. 2-GSI-L102 was not service induced for the following reasons.

1) The 24" RWST discharge is a low pressure suction line for various safety related systems with slow closing valves on large branches. The possibility of water hammer load therefore has been judged to be infeasible since these valves are also not automatically actuated.

2) The piping system does not have any visible distress. Except for the damaged support 2-GSI-L102, no other pipe support has been identified to have any damage.

3) There has not been any Design Basis Earthquake occurrence during the plant life and no other significant load condition can be associated with the damage to the support.

A supplemental report will be submitted by October 1, 1989 when the RWST nozzle analysis reviews have been completed.

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

Corrective Actions

Due to the extent of the deformation of 2GSI-L102, it was not possible to return the restraint to its original design configuration. A revised design was developed to reinforce the restraint and reestablish the gap clearances specified by the original seismic design. A modification was initiated along with an ASME Section XI repair plan to repair the restraint. Repairs have been completed and the restraint visually inspected for final acceptance.

Restraints 2-GSI-L104 and 2-GSI-L106 were redesigned and subsequent modifications were completed on February 20, 1989.

Failed Component Identification

None

Previous Similar Events

None

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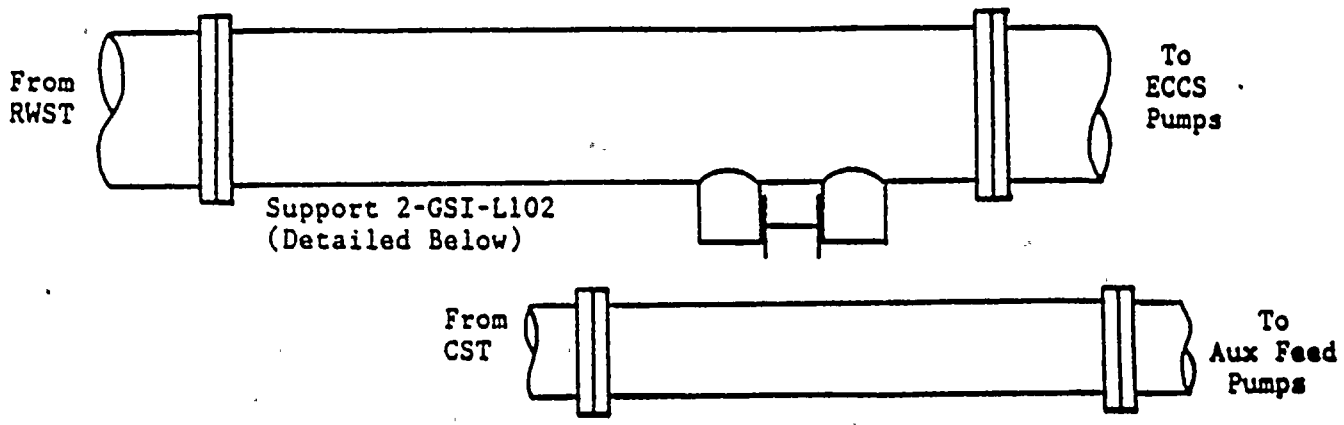
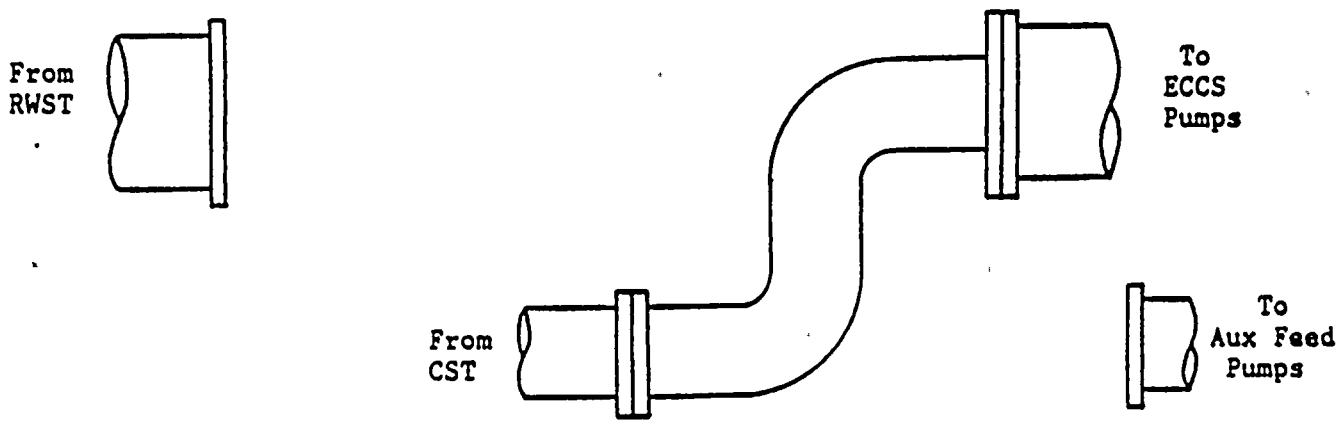
TEXT (If more space is required, use additional NRC Form 366A's) (17)

ATTACHMENT 1

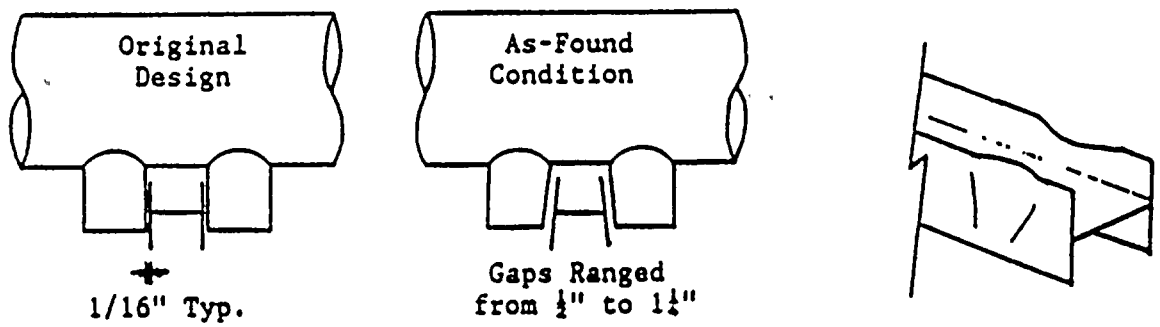
NORMAL PIPING CONFIGURATION



PIPING CONFIGURATION USED FOR FLUSHING AND TESTING



SUPPORT 2-GSI-L102 DETAIL



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INDIANA
MICHIGAN
POWER

April 7, 1989

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Docket No. 50-316

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

89-002-01

Sincerely,

W. G. Smith, Jr.
Plant Manager

WGS:clw

Attachment

cc: D. H. Williams, Jr.
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