

LICENSEE EVENT REPORT (LER)																	
Facility Name (1) Dresden Nuclear Power Station, Unit 2												Docket Number (2) 0 5 0 0 0 2 3 7				Page (3) 1 of 0 6	
Title (4) Core Spray System "A" Analytical Piping Stresses Exceed Final Safety Analysis Report (FSAR) Design Requirements Due to Design and Construction Errors																	
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 3	1 7	8 7	8 7	0 1 0	0 1	1 1	1 2	8 7	Dresden Unit 3				0 5 0 0 0 2 4 9				
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)														
POWER LEVEL (10) 0 0 0			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				
			20.405(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)				in Abstract				
			20.405(a)(1)(iv)			X 50.73(a)(2)(ii)			50.73(a)(2)(viii)(B)				below and in				
20.405(a)(1)(v)			50.73(a)(2)(iii)			50.73(a)(2)(x)				Text)							
LICENSEE CONTACT FOR THIS LER (12)																	
Name E.J. Kotrich, Technical Staff Engineer (Ext. 665)												TELEPHONE NUMBER AREA CODE 8 1 5 9 4 2 - 2 9 2 0					
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																	
CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS								
B	B M	S P T	X X X X	N													
SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)							
X Yes (If yes, complete EXPECTED SUBMISSION DATE)										NO 0 1 2 9 8 8							
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																	

While performing piping system inspections with Dresden Unit 2 in cold shutdown for a refueling outage, the embedment plate for a support located on the Unit 2 system "A" Core Spray piping was found degraded. A review of the Core Spray piping was initiated and the following additional discrepancies were found; 1) the degraded embedment plate had not been fabricated properly, 2) a test return line tee had a welded connection where the design analysis indicated a forged connection, 3) a support which had previously been specified for removal was still in place and a support intended to replace it had been installed incorrectly, 4) a non-existent snubber was indicated in the design analysis, 5) certain piping sections were a different schedule type than the design analysis indicated, and 6) analysis revealed two additional embedment plates needing reinforcement. On March 17, 1987 the Corporate Engineering Department indicated that the as-found condition was in excess of Final Safety Analysis Report (FSAR) limits but met operability criteria for all design basis events and thus was of minimal safety significance. Repairs were completed prior to unit startup to ensure FSAR compliance. Subsequent inspections and analyses have revealed other incidences of overstressed piping supports and connections, which are listed in the text of this report. In all cases, operability requirements have been verified through analysis. One such event was reported in LER #87-17 on Docket #050237. A previous similar event was reported by LER #87-003 on Docket #050237.

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PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2527 Mwt rated core thermal power. Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

EVENT IDENTIFICATION:

Core Spray System "A" Analytical Piping Stresses Exceed Final Safety Analysis Report (FSAR) Requirements Due to Design and Construction Errors.

A. PLANT CONDITIONS PRIOR TO EVENT:

Unit: 2 Event Date: 3/17/87 Event Time: 1425 hours
Mode: N Mode Name: Shutdown Power Level: 0%
Reactor Coolant System (RCS) Temperature/Pressure: 135°F/0 psig

B. DESCRIPTION OF EVENT:

On February 2, 1987, while performing piping system hanger and support inspections in accordance with the In-Service Inspection (ISI) program with Unit 2 in cold shutdown for a refueling outage, it was discovered that the embedment plate for support M1150D-62 was pulled away from the ceiling approximately 1/8 to 1/4 inch along one surface. This support was located on the Unit 2 system "A" Core Spray [BM] piping. The inspection team notified the Quality Control Department, and Work Request #061683 was initiated for repair of the embedment plate. A review was initiated on the rest of this Core Spray [BM] piping system by the Corporate Engineering Department (SNED).

While this Core Spray [BM] design verification inspection was being performed, it was discovered that the "A" Core Spray [BM] test return line, where lines 2-1406-8"-DX and 2-1403-12"-DX meet, differed from the analytical model configuration. The design analysis showed this tee to be a forged connection, and as such not requiring a direct support. However, it was found that the tee was a welded connection, which has a higher stress intensification factor than was used in the analysis. This discrepancy was then included in the operability analysis in progress.

Investigation into the degraded embedment plate revealed a discrepancy between the shop drawing used for its fabrication and the design specifications. Although the design specified 9 inch hold down strap spacings, the shop drawing indicated 18 inch hold down strap spacings. The 18 inch spacings were confirmed on the degraded embedment plate by performing ultrasonic (UT) tests. Further UT tests performed on other embedment plates also revealed the existence of some 24 inch hold down strap spacings.

As the review continued, it was reported by an inspector from the Region III staff that U-bolt support No. 1403-M-206, which the current design indicated as having been removed and replaced with support NO. M3208-08, was still in place on the Core Spray [BM] line. Further investigation by SNED and Nutech (an engineering firm involved with the previous modification) inspection personnel revealed that this replacement support had been installed approximately 19 inches from the specified

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location, which was 13 inches out of tolerance. Additionally, it was found that the analytical model indicated that a snubber existed near this location. This snubber was not shown on the drawings, and the inspection team verified that it was not installed. The inspection team also discovered that certain sections of the piping were Schedule 80, although the analysis model listed them as Schedule 30. All of the Core Spray [BM] piping discrepancies were compiled and factored into the operability analysis of the as-found condition. Further analysis incorporating the proposed repairs indicated that support M3208-09 and M3209-11, located on the Unit 2 system "A" and "B" Low Pressure Coolant Injection (LPCI) [BO] test return lines where they interface with the Core Spray piping, needed reinforcement.

C. CAUSE OF EVENT:

Contributing causes of the degraded embedment plates were the improper hold down clamp spacings which occurred during original fabrication due to misinterpretation of the design specifications. Personnel error on the part of survey teams utilized by consulting firms involved with modifications associated with I.E. Bulletin 79-14 and Mark I Torus attached piping upgrades resulted in the test return line tee being incorrectly identified as a forged connection. Investigation shows that personnel error on the part of contractor construction and Quality Control personnel resulted in the U-bolt support not being removed and its replacement being installed incorrectly. Personnel errors and miscommunications between various consulting engineering firms doing work on the system under coordination of SNED resulted in the incorrect snubber and piping schedules being included in the analytical model. This report is submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B), which requires the reporting of any event that resulted in the condition of the nuclear power plant being outside the design basis.

D. SAFETY ANALYSIS:

An analysis completed on March 17, 1987 of the as-found condition, including all discrepancies, indicates that the system "A" Core Spray [BM] piping would exceed the conservative FSAR design requirements. However, since it indicates the piping would remain operable under all design basis events, the safety significance of this event is considered minimal. Various redundant emergency core cooling systems are also available in the event of an inoperable Core Spray [BM] system.

E. CORRECTIVE ACTIONS:

Upon identification of these discrepancies, the system analysis model was revised to address the as-found condition. The following repairs were necessary to ensure compliance with the conservative FSAR design requirements; 1) the degraded embedment plate was repaired under Work Request #061683, 2) the welded tee connection was reinforced under Work Request #063196, 3) the U-bolt support which had been inadvertently left in place was removed under Work Request #063402, 4) the embedment plate associated with supports No. M3208-09 and M34209-11 were reinforced prior to Unit 2 startup under Work Request Nos. 64002 and 64192, and 5) various Core Spray [BM] and LPCI [BO] operating surveillances are being revised to clarify venting requirements.

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As a result of the embedment plate discrepancy, a review of similar embedment plate installations on all Dresden Unit 2 and Unit 3 safety-related piping systems was initiated. An analysis was performed to determine what loads the 18 inch and 24 inch hold down strap spacing configuration could withstand. Then, a list of all embedment plates whose design analyses require loads in excess of this amount was generated. Inspections and UT examinations are in progress as appropriate for this list of embedment plates. On May 12, 1987, during the course of this inspection and evaluation program, the embedment plate for support #M-3210-03 was found to exceed FSAR design limits, although analysis indicated it was operable for all design basis events. This embedment plate supports line 2-1601-20"-LX which is part of the torus vacuum relief [BT] system. This event was submitted under reportable occurrence #87-017 on Docket #050237. Corrective action consisted of reinforcing the support in accordance with the conservative FSAR limits. Inspections of the Dresden Unit 2 and 3 Core Spray [BM] piping were also performed to ensure that the general locations, orientations, types of supports as well as the tee configurations match those used in the analysis, and no further discrepancies were noted.

Since a contributing cause to the analysis model errors was attributed to miscommunication between different engineering firms doing work on the same piping system, a review was performed of current isometric and support drawings against the analysis models where significant interface had occurred between Nutech and Impell. The results of this activity confirmed the accuracy of the analytical models in areas of significant interface between these two firms.

A field inspection was also performed by Nutech personnel of all locations where hanger and/or support removal had been called for by the Mark I Torus attached piping modifications. Nutech personnel inspected 85 such supports. Impell personnel inspected 75 hanger locations, which, had they been inadvertently left in place during the I.E. Bulletin 79-14 modifications, had the potential of causing increased pipe stresses. Hanger No. 1506-M-207, located on the Unit 2 LPCI [80] system, was identified as having been inadvertently left in place. This hanger was removed under Work Request #063815 prior to startup of Dresden Unit 2. Additionally, a Piping Configuration Verification Program was initiated by Nutech to resolve the apparent discrepancies found between the as-built and as-analyzed condition of certain Mark I Torus attached piping at Dresden Units 2 and 3. As a result of these inspections, several incidences of overstressed piping supports and connections have been identified (see Attachment 1); however, for all cases, system operability has not been affected. Although the project is still in progress, a status report generated by Nutech is forwarded to the Nuclear Regulatory Commission on a bi-weekly basis.

Additionally, an inspection was initiated of all Nutech-analyzed piping systems (involving 74 piping models) to confirm that general locations, orientations, and types of supports as well as tee configurations match those used in the analytical models. The walkdowns for these inspections have been completed, however, the detailed piping analysis will not be completed until early 1988. A supplement to this report will then be issued in order to report any additional information.

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It is believed that the current level of inspection would help prevent a recurrence of this type under the present modification program. Dresden Administrative Procedure (DAP) 5-1, Plant Modification Program, was revised on December 4, 1986 to require the performance of a final field walkdown of the entire modification by the station cognizant engineer, using the installation documents as a reference. Furthermore, the present program requires that all modifications involving safety-related load bearing supports must be dimensionally verified.

F. PREVIOUS OCCURRENCES:

The previous occurrences which involve similar mechanical design deficiencies are documented in the following Reportable Occurrences:

<u>LER/DOCKET Nos.</u>	<u>TITLE</u>
87-003/050237	Primary Containment Structural Steel Connections Outside Final Safety Analysis Report Design Criteria Due to Apparent Original Construction Oversight
86-020/050237	Overstress of Small Bore Torus Attached Piping Supports Due to Architect Engineer Error
86-007/050237	NUREG 0661 Pipe Stress Criteria Exceeded Due to Design Error
81-061/050237	Damage to Horizontal Guide 1510-12 Restraining LPCI/CCSW Pipe 1510-6" Due to Water Hammer
80-027/050237	Seismic Analysis for As-Built Safety-Related CRD Piping System
80-022/050249	Seismic Analysis for As-Built Safety-Related (CRD) Piping System

The corrective action in each occurrence listed above was to implement repairs for each discrepancy.

G. COMPONENT FAILURE DATA:

An NPRDS data search has been performed concerning hanger attachment plate failures and 3 similar events were found. In these cases, grouting was also found pulled away from the hanger attachment.

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ATTACHMENT 1

Non-Reportable Event No.

System

Components Affected

1) 12-02-87-112

LPCI

Embedment Plate Support on
Line 2-1506-16"A

2) 12-02-87-119

Core Spray

- a) Pipe hanger #M3402 on
line 3-1402-16"-LX
- b) Pipe hanger #M3202-35 on
line 2-1401-16"-LX

3) 12-02-87-146

Condensate
Nitrogen Inerting
Primary Containment

- a) Pipe support #NM-R5-09 on
line 3-3317B-12"-L
- b) Pipe support #NA-SN-03 on
line 3-1601A-20"
- c) Tee connection between run
line 3-3316-20"-L and branch
line 3-3316C-14"-L
- d) Tee connection between run
line 3-8506-18"-LX and branch
line 3-8503-8"-LX

4)

LPCI

Embedment plate support on line
3-1509-18"-DX



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November 12, 1987

EDE LTR #87-773

U.S. Nuclear Regulatory Commission
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Licensee Event Report #87-010-1, Docket #050237 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10 CFR 50.73(a)(2)(ii). This revised report is submitted to provide the results of additional inspection and analyses performed as part of a Piping Configuration Verification Program initiated as stated in the original report.

E.D. Eenigenburg
Station Manager
Dresden Nuclear Power Station

EDE/kjl

Enclosure

cc: A. Bert Davis, Regional Administrator, Region III
File/NRC
File/Numerical

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