NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/85

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
PRAIRIE ISLAND UNIT 1	0 5 0 0 0 2 8 2	1 OF 0 3

TITLE (4)

CORE EXIT THERMOCOUPLE CONNECTORS FOUND ASSEMBLED INCORRECTLY

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 6	8 6	8 6	— 0 0 2	— 0 0	0 4	1 6	8 6	PRAIRIE ISLAND UNIT 2	0 5 0 0 0 3 0 6
										0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (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)	X 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)	VOLUNTARY
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
ARNE A. HUNSTAD, STAFF ENGINEER	AREA CODE 6 1 2 — 3 8 8 - 1 1 2 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
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

During installation of new core exit thermocouples on Unit 1, it was discovered that several of the electrical connectors had been misassembled. The misassembly was corrected. This report is being submitted for the information of the NRC Staff.

IE22
1/

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PRAIRIE ISLAND UNIT 1	0 5 0 0 0 2 8 2	8 6	— 0 0 2	— 0 0	0 2 OF 0 3

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

On March 16, 1986, Unit 1 was at cold shutdown and Unit 2 was at 100% power.

During installation of new core exit thermocouples (CET) on Unit 1 it was discovered that several of the twin-pin field installed hermetic sealed connectors (CON) had been misassembled. The field installable twin pin connectors are supplied by Combustion Engineering (CE) through its vendor Electronic Resources Division of Whittaker Corp (ERI). The connector employs reducing Swageloks modified to permit them to slide down over the CET's. At installation, the large Swagelok end is fastened to the new connector body and the smaller end is fastened to the thermocouple sheath. Tightening of the Swagelok nut drives a set of two metal ferrules in such a way as to form a high quality seal. In this application the seal is intended to prevent moisture from entering the back side of the connector during postulated accident events.

The connectors were received directly from ERI and the Swageloks were pre-assembled and sealed in the form of a kit. The installation procedure, which is based on a procedure supplied by CE, did not call for an inspection of the Swagelok ferrules during installation. This inspection was purposely omitted from the procedure by CE since it was felt that to do the inspection would risk the loss of the small ferrule parts.

At approximately 0200 on March 16, 1986, with 15 of the 36 CET connectors already installed, an electrician noticed the improper orientation of the ferrules of the small Swagelok fitting. This was brought to the attention of the QC Inspector who contacted a cognizant engineer. Installation work was suspended and CE was contacted. The remaining un-installed connectors were inspected and 26 of the 33 were found to have improperly oriented (or wrong) ferrule parts. The installation procedure was changed to include an inspection and/or re-orientation of the ferrules during the final installation. With this added step, installation of the remaining connectors was resumed. In the meantime, non-destructive examination techniques were developed to inspect the already installed 15 connectors. Using a combination of measurement and/or radiography it was determined that 10 of the 15 connectors had misoriented ferrules. These ten connectors were cut off and replaced by another connector using the modified installation procedure. At the completion of the work all 36 Unit 1 CET connectors were properly installed.

The root cause of this misassembly problem was inadequate quality control on the part of the fabricator ERI. Part of the inspection procedure at ERI calls for an inspection of the ferrules for proper orientation. This QC breakdown was not discovered at the site until a number of connectors were installed because the installation procedure did not call for an inspection. This lack of reinspection was in accordance with CE's recommended installation.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
PRAIRIE ISLAND UNIT 1	0 5 0 0 0 2 8 2	8 6	— 0 0 2	— 0 0	0 3 OF 0 3

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

The present Unit 2 CET connectors are of identical design to those installed on the new Unit 1 CET's. These connectors were also fabricated by ERI and a similar installation procedure was used. Thus, an evaluation of the probability and consequences of misassembled Unit 2 head connectors was conducted. Two reasons support a conclusion that the misassembly is unique to Unit 1 and does not affect Unit 2. These reasons are: 1) the vendor quality control problem seems to be limited to the time frame surrounding the fabrication of the Unit 1 connectors, and 2) misorientations that would lead to a loss of effective seals would have been detected during installation on Unit 2.

Original and subsequent steam chamber testing by CE show that misoriented ferrules can form an effective post-accident seal and that leaks have a negligible effect on the CET signal. In addition, alternate means are available for subcooled margin and inadequate core cooling monitoring functions.

CE, in their investigation, has concluded that misassembly of the CET connectors does not present a significant safety hazard. In addition, our investigation results in the conclusion that installation of misassembled connectors will not compromise the ability of the CET's to operate in normal and post-accident environments, and that reasonable assurance of environmental qualification exists. Unit 2 connectors will be inspected at the next refueling.

This report is being submitted for the information of the NRC Staff.

Northern States Power Company

414 Nicollet Mall
Minneapolis, Minnesota 55401
Telephone (612) 330-5500

April 16, 1986

U S Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 License Nos. DPR-42
50-306 DPR-60

Core Exit Thermocouple Connectors Found Assembled Incorrectly

The Licensee Event Report for this occurrence is attached.

Eugene Eckholt
for David Musolf
Manager - Nuclear Support Services

DMM/EEE/ere

c: Regional Administrator-III, NRC
NRR Project Manager, NRC
Resident Inspector, NRC
MPCA
Attn: F W Ferman

Attachment

IE22
1/1