

General Information or Other (PAR)

Event # 43190

Rep Org: CARRIER CORPORATION	Notification Date / Time: 02/27/2007 09:48 (EST)
Supplier: CARRIER CORPORATION	Event Date / Time: 02/27/2007 (EST)
	Last Modification: 02/27/2007
Region:	Docket #:
City: SYRACUSE	Agreement State: Yes
County:	License #:
State: NY	
NRC Notified by: ROMAN IWACHIW	Notifications: JOHN ROGGE R1
HQ Ops Officer: PETE SNYDER	EUGENE GUTHRIE R2
Emergency Class: NON EMERGENCY	ROGER LANKSBURY R3
10 CFR Section:	DALE POWERS R4
21.21 UNSPECIFIED PARAGRAPH	TABATABAI (email) NRR

CHILLER COPPER SLEEVE CRACKS LEADING TO SLOW REFRIGERENT DISCHARGE

Manufacturer provided the following information via facsimile:

Carrier Corporation provided the following information of a potentially reportable condition regarding a Compressor and Bearing Discharge Temperature Sensor, Carrier Part #17FA999-1200-381 supplied by Carrier Corporation's Replacement Components Division to PSE&G Nuclear, LLC for use at Hope Creek Nuclear Station.

"Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

"The operative portion of the Sensor is encased in a copper sleeve 1 1/2 inch in length and 1/4 inch in diameter which is soldered to a brass fitting, which fitting couples the Sensor to the chiller to be monitored. PSE&G notified Carrier of four (4) separate instances where a crack occurred in the Sensor's copper sleeve. This crack did not affect the Sensor's ability to function and the Sensors did not cease to function. However, the crack in the Sensor's copper sleeve did result in a leak of refrigerant from the compressor of the chiller to which the Sensor was coupled. Three (3) of these four (4) instances were noted on chillers with safety-related applications, while the fourth was noted on a chiller dedicated to a non-safety application.

"PSE&G noticed the fast refrigerant leak during a routine, visual equipment inspection. As a result of this discovery, the Sensor was replaced, but a similar refrigerant leak was noticed approximately three (3) months thereafter. At approximately the same time, during pressure testing of another safety-related chiller, PSE&G noticed a similar refrigerant leak.

"Safety Hazard which could be created by such a defect: While the refrigerant leak appeared to have been a slow

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General Information or Other (PAR) Event # 43190
process occurring over some period of time, had that refrigerant leak continued uncorrected, the result would have been a loss of enough refrigerant such that the chiller would be automatically shut down by a separate safety feature.

Since mid-2001 Carrier has sold the sensor to the following facilities:

NRC Region 1: Limerick Generating Station, PSE&G (Hope Creek Generating Station, Salem Generating Station)

NRC Region 2: Catawba Nuclear Station, McGuire Nuclear Station

NRC Region 3: Braidwood Station, Perry Nuclear Power Plant

NRC Region 4: San Onofre Nuclear Generating Station, Waterford 3 Steam Electric Station

FAX COVER SHEET

TO: U.S. NRC OPERATIONS CENTER

DATE: 02/27/07

SUBJECT: 10 CFR PART 21 NOTIFICATION

COMPANY: U.S. NUCLEAR REGULATORY COMMISSION

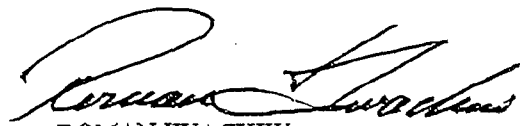
PH. NO.:

FAX NO.: 301-816-5151

FROM: ROMAN IWACHIW
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RCD
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MESSAGE:

SEE FOLLOWING PAGES


ROMAN IWACHIW
Manager, Quality Assurance
Replacement Components Division
Carrier Corporation

PAGE 1 OF 6

EVAC. BOUT.

Carrier Corporation
Carrier Parkway, TR-4
P.O. Box 4800
Syracuse, NY 13221
315.432.6000

**Carrier**

A United Technologies Company

VIA FAX (301) 816-5151 & DHL OVERNIGHT

February 27, 2007

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: 10 CFR Part 21 Notification

“Compressor and Bearing Discharge Temperature Sensor” (Carrier Part #17FA999-1200-381) Supplied by Carrier Corporation’s Replacement Components Division to PSE&G’s Hope Creek Nuclear Station (PSE&G Ref. #70061918)

Dear Sir or Madame:

Per the requirements of 10 CFR Part 21, this letter is intended to inform the U.S. Nuclear Regulatory Commission (the “Commission”) of a potentially reportable condition regarding a Compressor and Bearing Discharge Temperature Sensor, Carrier Part #17FA999-1200-381 (the “Sensor”) supplied by Carrier Corporation’s Replacement Components Division (“Carrier”) to PSE&G Nuclear, LLC (“PSE&G”) for use at PSE&G’s Hope Creek Nuclear Station. While Carrier is not certain that this report is required by the provisions of 10 CFR Part 21, Carrier has opted to provide this report as if it were clearly required.

Carrier convened an internal investigation committee in accordance with Carrier’s reporting requirements procedure under 10 CFR Part 21 and the evaluation and results of that investigation committee’s actions, as well as the committee’s proposed corrective actions are attached.

Please do not hesitate to contact me if there are any questions or concerns. We thank you in advance for your attention to this report.

Very truly yours,

Roman Iwachiw
Manager, Quality Assurance
Replacement Components Division

Enc.

cc: Mr. Alan D. Ho, Director Spent Management, PSE&G Nuclear, LLC

Carrier Corporation10 CFR Part 21 Notification**(4)(i) Name and Address of the individual(s) informing the Commission.**

Roman Iwachiw
Manager, Quality Assurance
Carrier Corporation
Replacement Components Division
Carrier Parkway, TR-2
P.O. Box 4800
Syracuse, New York 13221

(ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.

Compressor and Bearing Discharge Temperature Sensor, Carrier Part #17FA999-1200-381

(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.

Carrier Corporation
Replacement Components Division
Carrier Parkway, TR-2
P.O. Box 4800
Syracuse, New York 13221

(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

Nature of Defect: The operative portion of the Sensor is encased in a copper sleeve 1½" in length and ¼" in diameter which is soldered to a brass fitting, which fitting couples the Sensor to the chiller to be monitored.

PSE&G notified Carrier of four (4) separate instances where a crack occurred in the Sensor's copper sleeve. This crack did not affect the Sensor's ability to function and the Sensors did not cease to function. However, the crack in the Sensor's copper sleeve did result in a leak of refrigerant from the compressor of the chiller to which the Sensor was coupled. Three (3) of these four (4) instances were noted on chillers with safety-related applications, while the fourth was noted on a chiller dedicated to a non-safety application.

PSE&G noticed the first refrigerant leak during a routine, visual equipment inspection. As a result of this discovery, the Sensor was replaced, but a similar refrigerant leak was noticed approximately three (3) months thereafter. At approximately the same time, during pressure testing of another safety-related chiller, PSE&G noticed a similar refrigerant leak.

Safety Hazard which could be created by such defect: While the refrigerant leak appeared to have been a slow process occurring over some period of time, had that refrigerant leak continued uncorrected, the result would have been a loss of enough refrigerant such that the chiller would be automatically shut down by a separate safety feature.

(v) **The date on which the information of such defect or failure to comply was obtained.**

On December 27, 2006, Carrier received a letter dated December 14, 2006, sent via U.S. mail, from Alan D. Ho, Director Spent Management, PSE&G Nuclear, LLC, P.O. Box 236, Haycocks Bridge, New Jersey 08038-0236.

(vi) **In the case of a basic component which contains a defect or fails to comply, the number and location of all such components in use at, supplied for, or being supplied for one or more facilities or activities subject to regulations in this part.**

Since mid-2001, Carrier has sold the Sensor to the following facilities regulated by this Part:

<u>Purchaser</u>	<u>Quantity Sold to Purchaser</u>
First Energy Corp. Perry Main Warehouse Perry Nuclear Power Plant 10 Center Road, Perry, OH 44081	7
Exelon Generation Company LLC Braidwood Warehouse East of IL Rt. 53 1-1/2 Miles South of Rt. 113 Braidwood, IL 60408	1
Duke Energy Corporation Mcguire Site Receiving Dept. 13225 Hagers Ferry Rd, Hwy. 73 Huntersville, NC 28078	5
Duke Energy Corp. C/O Catawba Site 4800 Concord Road Phone 803 831-3460 York, SC 29745	4
Entergy Operations, Inc. Waterford 3 Nuclear Shipping and Receiving 17265 River Road, Hwy. 18 Hahnville, LA 70057	1
Limerick Gen. Station	2

3146 Sanatoga Road
Pottstown, PA 19464

Public Service Electric & Gas Co. 24
Nuclear Dept, Material Center
Material Control Manager
Alloway Creek Neck Road
Hancocks Bridge, NJ 08038

Southern California Edison 26
Edison Material Supply
Songs Warehouse
14300 Mesa Road
San Clemente, CA 92672

(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

In response to the notice of a potential defect or failure to comply received from PSE&G, along with a report of various analysis conducted by PSE&G, Carrier convened its "Nuclear Defect Review Board" (NDRB") to review and respond to PSE&G's notice and report.

As part of its review, Carrier's NDRB requested various additional information from PSE&G regarding the Sensor's alleged defect or failure to comply experienced by PSE&G, as well as its use and operation of the Sensor and the chillers utilizing the Sensor. The chiller use and operation data provided by PSE&G showed that the chiller was run under such an extremely light cooling capacity that Carrier has no reference test data or experience available. As a result, Carrier cannot accurately predict the effects of this low cooling capacity on the operation of the Sensor.

Carrier's NDRB also reviewed Carrier's current process of brazing the Sensor's copper sleeve, as compared to the brazing process utilized when the Sensor was first offered for sale approximately 30 years ago. Carrier's NDRB commissioned testing by a third party firm to determine if changes in the brazing process had any impact on the hardness or grain size of the Sensor's copper sleeve. This testing determined that there was no significant difference in the hardness of the Sensor's copper sleeve between a sample using the original brazing method, another sample using the current brazing method and a third sample using an alternate brazing method not previously or currently in use in connection with the Sensor. In addition, the firm indicated that it is typical that a lack of significant difference in hardness will also be an indicator of a lack of significant difference in grain size.

Carrier's third party test results showing no change in hardness or grain size, PSE&G's operation of the associated chiller at an extremely light cooling capacity and the fact that the PSE&G failures were very isolated occurrences have convinced Carrier's NDRB that the cause of the potential defect or failure to comply was other than a defect inherent in the Sensor. Rather, Carrier's NDRB believes that the potential defect or failure to comply resulted from a cause or causes external to the Sensor.

Carrier plans to work with PSE&G over the next sixty (60) days to explore these possible external causes and to take corrective actions, as may be necessary, to limit the effects of these external causes on the Sensor and/or to modify the Sensor to better operate in the presence of these external causes.

(viii) Any advice related to the defect or failure to comply about the facility activity, or basic component that has been, is being or will be given to purchasers or licensees.

No advice related to the defect or basic component has been given to purchaser or licensees at the present time, however, the need for, and form and content of such advice, if any, will be determined by the results of the additional investigation conducted by Carrier and PSE&G.