UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

June 7, 1994

NRC INFORMATION NOTICE 94-41: PROBLEMS WITH GENERAL ELECTRIC TYPE CR124 OVERLOAD RELAY AMBIENT COMPENSATION

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to alert addressees to the potential for out-of-tolerance ambient compensation in certain configurations of General Electric (GE) Type CR124 overload relays. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

After some field test failures, in which several Type CR124 overload relays exhibited out-of-tolerance trip times, the relays were returned to the manufacturer, GE Electrical Distribution and Control (ED&C). GE ED&C discovered that on relay models CR124K028, K128, L028, and L128, manufactured before October 1990, many of the ambient temperature-compensating bimetal elements (sometimes called ambient compensating springs) had been installed upside down because of a problem with the marking of the elements. In this condition, the incorrectly installed element can adversely affect the trip timing of the relay. These overload relays are typically used in conjunction with starters or motor controllers, many of which may serve safety-related loads. In April 1991, GE Nuclear Energy (GE NE) issued a "Germane to Safety" letter to all boiling water reactor customers and certain other customers concerning the relays. However, the NRC has learned that other licensees may also be affected.

Discussion

The ambient temperature compensating bimetal element or spring is intended to adjust the trip forces inside the relay so that the trip time as a function of overload current is consistent with the design characteristic curves over a wide range of ambient temperatures. According to GE, the improperly installed ambient compensating bimetals will permit the overload relays to work correctly within a temperature range of 15-20°C [59-68°F]. However, at lower temperatures, i.e., 0-15°C [32-59°F], the ambient compensation would cause

trip times above published specifications (time-current curves). At higher temperatures, i.e., 20-40°C [68-104°F], which is more typical of nuclear plant installations, the ambient compensations would cause trip times below published specifications. GE ED&C did not have data on the magnitude of deviations from the published time-current curves.

GE NE indicated that the above identified models made before October 1990 may be affected by this problem. To identify when the relays were built, they are marked with date codes consisting of two letters. The first letter, "N" through "Z" (skipping "Q"), indicates month of manufacture. The second letter indicates the year with "D" meaning 1989, "E" meaning 1990, etc. Hence relays of the affected models built before October 1990, i.e., in September 1990 and earlier (date codes "WE" and earlier), are affected. ED&C has issued no service advice letters (SALs), nor has GE NE issued any service information letters (SILs), on this issue. Since late 1991, ED&C has used 5-character, alphanumeric, in lieu of 2-letter date codes for the relays and similar components.

Because the affected relays are reported to work properly within the temperature range of 15-20°C [59-68°F], ED&C recommended evaluating individual applications in terms of actual service conditions and performance requirements to determine the potential impact on operability of the overload relays with defective ambient compensation. In addition, because some of the potentially affected relays may not be defective, GE ED&C provided a test procedure that may be used as an alternative to wholesale replacement to identify those relays that actually have the improperly installed ambient compensation bimetal. The procedure is to test the relays at a nominal overload current (e.g., 300 percent) at room temperature (e.g., 25°C [77°F]) and then repeating the test after thermal soaking at 40°C [104°F] and verifying that the cool and warm trip times at the same overload level are within 10 percent of each other. If these relays fail this test and the condition cannot be tolerated because of requirements of the application, ED&C stated that these relays would need to be replaced because they cannot be repaired. ED&C also recommended the test procedure described above for general use on ambient compensated thermal overload relays, installed or in storage, which ED&C recommended testing at least every five years.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact the technical contact listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

Brian K. Grimes, Director
Division of Operating Reactor Support
Office of Nuclear Reactor Regulation

Technical contact: Stephen D. Alexander, NRR
(301) 504-2995

Attachment:
List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
94-40	Failure of a Rod Control Cluster Assembly to Fully Insert Following a Reactor Trip at Braidwood Unit 2	05/26/94	All holders of OLs or CPs for pressurized-water reactors (PWRs).
94-39	Identified Problems in Gamma Stereotactic Radiosurgery	05/31/94	All U.S. Nuclear Regulatory Commission Teletherapy Medical Licensees.
94-38	Results of a Special NRC Inspection at Dresden Nuclear Power Station Unit 1 Following a Rupture of Service Water Inside Containment	05/27/94	All holders of OLs or CPs for NPRs and all fuel cycle and materials licensees authorized to possess spent fuel.
94-37	Misadministration Caused by a Bent Interstitial Needle during Brachy-therapy Procedure	05/27/94	All U.S. Nuclear Regulatory Commission Medical Licensees authorized to use brachy-therapy sources in high-, medium-, and pulsed-dose-rate remote afterloaders.
94-36	Undetected Accumulation of Gas in Reactor Coolant System	05/24/94	All holders of OLs or CPs for nuclear power reactors.
91-81, Supp. 1	Switchyard Problems that Contribute to Loss of Offsite Power	05/19/94	All holders of OLs or CPs for nuclear power reactors.
94-35	NIOSH Respirator User Notices, "Inadvertent Separation of the Mask-Mounted Regulator (MMR) from the Facepiece on the Mine Safety Appliances (MSA) Company MMR Self-Contained Breathing Apparatus (SCBA) and Status Update"	05/16/94	All holders of OLs or CPs for nuclear power reactors, and all licensed fuel facilities.

OL = Operating License
CP = Construction Permit

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Original signed by
Brian K. Grimes

Brian K. Grimes, Director
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Office of Nuclear Reactor Regulation

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*See previous concurrence.

OFFICE	VIB/DRIL	SC/VIB/DRIL	TECH ED	BC/VIB/DRIL	D/DRIL
NAME	SAlexander*	GCwalina*	RSanders*	LNorrholm*	CERossi*
DATE	01/07/94	01/13/94	02/02/94	01/24/94	01/31/94

OFFICE	EELB/DE	OGCB/DORS	ABC/OGCB/DORS	D/DORS/NRR
NAME	CBerlinger*	PWen*	AKugler*	BKGrimes
DATE	02/22/94	03/08/94	03/16/94	06/ / /94

DOCUMENT NAME: 94-41.IN

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OFFICE	EELB/DE		OGCB/DORS	ABC/OGCB/DORS	D/DORS/NRR
NAME	CBerlinger*		PWen*	AKugler	BKGrimes
DATE	02/22/94	03/ /94	03/08/94	03/16/94	03/ /94

DOCUMENT NAME: CR124AC.PCW

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DATE	01/07/94	01/13/94	02/02/94	01/24/94	01/31/94

OFFICE	EELB/DE		OGCB/DORS	ABC/OGCB/DORS	D/DORS/NRR
NAME	CBerlinger*		PWen PCW	AKugler	BKGrimes
DATE	02/22/94	03/ /94	03/8/94	03/ /94	03/ /94

DOCUMENT NAME: CR124AC.PCW

GE NE stated that any of the affected models made before October 1990 should be considered suspect and should be replaced. To identify when the relays were built, they are marked with date codes consisting of two letters. The first letter, "N" through "Z" (skipping "Q"), indicates month of manufacture. The second letter indicates the year with "E" meaning 1990, "F" meaning 1991, etc. Hence relays of the affected models stated above built before October 1990, i.e., in September 1990 and earlier (date codes "WE" and earlier), are affected. ED&C reportedly corrected the problem on these models in September 1990 so that date codes for October 1990 and later, i.e., "XE" (October 1990), "YE" (November 1990), "ZE" (December 1990), "NF" (January 1991), etc., should not be affected. ED&C has issued no service advice letters (SALs), nor has GE NE issued any service information letters (SILs) on this issue.

GE NE also reported that ED&C recommended, in addition to replacing suspect relays, testing thermal overload relays that are installed and in storage at least every 5 years. ED&C's procedure is to test the relays at a nominal overload current (e.g., 300 percent) at room temperature (e.g., 25°C/77°F) and also after thermal soaking at 40°C/104°F and verifying that the cool and warm trip times at the same overload level are within 10 percent of each other. If not, ED&C recommended replacing the relays because they cannot be repaired.

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DATE	01/07/94	01/13/94	02/02/94	01/24/94	01/31/94
COPY	YES	YES	NO	NO	NO

OFFICE	EELB/DE		OGCB/DORS	BC/OGCB/DORS	D/DORS/NRR
NAME	CBerlinger /s/ for EHB		~~RKiessel~~		BKGrimes
DATE	02/22/94	02/ /94	02/ /94	02/ /94	02/ /94
COPY	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: CR124AC.IN

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COPY	YES	YES	NO	NO	NO

OFFICE	EELB/DE		OGCB/DORS	BC/OGCB/DORS	D/DORS/NRR
NAME	CBerlinger		RKiesel		BKGrimes
DATE	01/ /94	01/ /94	01/ /94	01/ /94	01/ /94
COPY	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: CR124AC.TE

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COPY	YES NO	YES NO	NO	YES NO	YES NO

OFFICE	EELB/DE		OGCB/DORS	BC/OGCB/DORS	D/DORS/NRR
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DATE	01/ /94	01/ /94	01/ /94	01/ /94	01/ /94
COPY	YES NO	YES NO	YES NO	YES NO	YES NO

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