

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

July 8, 1988

NRC INFORMATION NOTICE NO. 88-46: LICENSEE REPORT OF DEFECTIVE REFURBISHED  
CIRCUIT BREAKERS

Addressees:

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

Purpose:

This information notice is being provided to alert addressees of licensee reported information that defective refurbished electrical equipment, such as circuit breakers (CBs), may have been supplied to nuclear power plants. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

Pacific Gas and Electric Company (PG&E) has informed NRC that it placed a purchase order for 30 new, non-safety-related, molded-case, KHL 36125-type CBs manufactured by the Square D Company (Square D) with a local electrical distributor. These CBs were intended for use in non-safety-related applications at PG&E's Diablo Canyon Nuclear Power Plant.

According to PG&E, the distributor in turn placed the order with a local supplier who bid the lowest price and promised the quickest delivery. The CBs were delivered directly to the Diablo Canyon plant by the supplier; the distributor did not have an opportunity to inspect the CBs. Square D, aware of the purchase order, questioned its failure to receive an order for the unique vintage KHL 36125-type CBs. With PG&E's permission, Square D inspected the CBs and determined that PG&E had been given refurbished, rather than new, CBs. Square D tested and performed detailed examinations of the CBs, and the results reported by PG&E follow.

A. Physical Examination

The yellow side labels used on the CBs were suspect in that the CB model numbers were typed on the labels whereas authentic labels are preprinted. The CBs departed from normal appearance in other respects as well.

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The individual CB cases and each of the CB components appeared to be Square D products; however, the individual CBs incorporated components of different years of manufacture. Each CB bore evidence of having been opened and reassembled.

B. Electric Testing

Square D subjected the CBs to five electrical tests. None of the CBs complied with Square D or Underwriters' Laboratory (UL) specifications for all of the tests, and several of the CBs were out of tolerance on each of the tests. At least four of the CBs failed to trip under circumstances in which they are designed to trip.

Discussion:

In the past, there have been instances in which licensees purchased commercial-grade components, such as CBs, relays, trip units, and other electrical components, from electrical distributors and have received components that did not meet the original purchase order requirements. NRC has received additional information indicating that the problem of surplus or defective refurbished CBs may also apply to CBs sold under other manufacturers' names (e.g., General Electric, Westinghouse, ITE, Cutler Hammer, and Sylvania).

The electrical suppliers involved in refurbishing and sales of circuit breakers, including the Diablo Canyon, Square D circuit breakers, apparently include five California corporations. These companies are (1) General Circuit Breaker & Electric Supply, Inc., (2) HLC Electric Supply Co., Inc., (3) Pencon International, Inc., doing business as General Magnetics/Electric Wholesale, (4) California Breakers, Inc., and (5) Anti-Theft Systems, Inc., doing business as ATS Circuit Breakers and as AC Circuit Breaker-Electrical Supply.

NRC has an investigation and vendor inspection in progress at the above companies. On the basis of the information developed to date, a preliminary list of customers of the five companies including a list of nuclear utilities (where available) is provided in Attachment 1. Attachment 2 contains a list of original equipment manufacturers whose names may have been used on surplus or refurbished equipment sold as new equipment. The information included in Attachments 1 and 2 is only preliminary and is provided to assist licensees in reviewing the potential of having procured suspect electrical equipment at their facilities.

Licensees are reminded of the requirements to ensure that procured items meet the relevant specifications and codes and are suitable for the intended application. Licensees should consider, as a matter of prudence, the need to inquire of and to verify with their authorized distributors the sources of procured materials, equipment, and components. Licensees may meet these requirements by effectively implementing their quality assurance (QA) programs, particularly in the areas of vendor evaluations, vendor surveillances, receipt inspection, bench tests, and post-installation tests.

NRC is gathering additional information to determine what further actions are necessary. The primary purpose of this information notice is to alert addressees of the situation as soon as possible. The NRC is considering issuing a bulletin to followup on this information notice when the NRC has sufficient information to define requirements.

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact one of the technical contacts listed below or the Regional Administrator of the appropriate regional office.

*Charles E. Rossi*  
Charles E. Rossi, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

Technical Contacts: K. R. Naidu, NRR  
(301) 492-0980

Jaime Guillen, NRR  
(301) 492-1170

Attachments:

1. Preliminary List of Customers (Intermediate Suppliers) of Suspect Electrical Equipment
2. Preliminary List of Original Equipment Manufacturers Whose Names May Have Been Used on Surplus or Refurbished Equipment Sold as New Equipment
3. List of Recently Issued NRC Information Notices

PRELIMINARY LIST OF CUSTOMERS (INTERMEDIATE SUPPLIERS)  
OF SUSPECT ELECTRICAL EQUIPMENT

<u>Organization</u>	<u>Location</u>	<u>Nuclear Utility (if available)</u>
Westinghouse Electric Supply Co. (WESCO)	St. Louis, MO; Boston, MA; Boise, ID; Atlanta, GA; Charleston, SC; Panama, FL; Santa Clara, CA; Fresno, CA; Sacramento, CA; Shreveport, LA; Green Bay, WI; Elk Creek, IL; Albuquerque, NM; Mobile, AL; Ft. Worth, TX; Baton Rouge, LA; Birmingham, AL; East Hartford, CT; Kokomo, IN; Jackson, MS; Milwaukee, WI; Beaumont, TX; Nashville, TN; Skelton, WV; Albany, NY; Hartford, CT; Portland, ME; St. Paul, MN; Minneapolis, MN; other locations	
Power Conversion	Huntington Beach, CA	
Rockwell International	Los Angeles, CA	
Arkansas Power and Light	Little Rock, AR	ANO
Southern California Edison	San Clemente, CA; other locations	SONGS
Phoenix Electric	Phoenix, AZ	
Rensenhouse Electric	Topeka, KS	
Breaker and Control	Houston, TX	
General Electric Company	Baltimore, MD; Houston, TX; Landover, MD; Chantilly, VA; Emeryville, CA; Elmhurst, IL	
Southern Electric Supply Company	Alexandria, LA	
Cleveland Electric Company		

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<u>Organization</u>	<u>Location</u>	<u>Nuclear Utility (if available)</u>
Stokley Enterprises	Norfolk, VA	
Taylor Electric Company	Portland, OR	
Graybar	Ventura, CA; Atlanta, GA	
Hughes Aircraft	El Segundo, CA	
Houston Electric Distribution Company	Houston, TX	
ITE Electrical Products	Atlanta, GA; Knoxville, TN	
Knudson Corporation	Los Angeles, CA	
Georgia Power Company	Milledgeville, GA	

PRELIMINARY LIST OF ORIGINAL EQUIPMENT  
MANUFACTURERS WHOSE NAMES MAY HAVE BEEN USED  
ON SURPLUS OR REFURBISHED EQUIPMENT SOLD AS NEW EQUIPMENT

<u>Manufacturer</u>	<u>Model Number</u>	<u>Equipment Description</u>
Square D	B19.5; B22	Heater for overload relay
General Electric	12HGA11S52	Auxiliary relay
Exide Company	NX400	
Spectro Inc.	V00014	Mercury lamps
Bussman Company	REN15	15-amp 250-V fuse
Bussman Company	NOS-30	30-amp 600-V fuse
(unknown)	FSN 5925-628-0641	Circuit breaker
Westinghouse	DB-50	Trip unit
Westinghouse	DB-25	400-amp circuit breaker
Westinghouse	HKB3150T	Trip unit
Westinghouse	KB3250F	Frame
Westinghouse	FB3020	Circuit breaker
Westinghouse	FB3070	Circuit breaker
Westinghouse	FB3050	Circuit breaker
Westinghouse	EHB3040	Circuit breaker
Westinghouse	EHB3025	Circuit breaker
Westinghouse	LBB3125	Circuit breaker
Westinghouse	HKA31250	Trip unit
Westinghouse	JA3200	Circuit breaker
Westinghouse	EHB2100	Circuit breaker
Westinghouse	CAH3200	Circuit breaker

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<u>Manufacturer</u>	<u>Model Number</u>	<u>Equipment Description</u>
Westinghouse	225N	Navy trip units
ITE	EF-3B100	100-amp circuit breaker
General Electric	AK-2-75-3	Circuit breaker
General Electric	AK-2	Circuit breaker
General Electric	AK-1-50	Circuit breaker
General Electric	AK-1-75	Circuit breaker
General Electric	B; TDQ; TFJ	Circuit breakers
General Electric	TCVVF5	Circuit breaker
ITE	ET; KA	Circuit breakers
Cutler Hammer	--	Circuit breakers
Zinsco/Sylvania	--	Circuit breakers
Bryant	--	Circuit breakers
Murry	--	Circuit breakers
Federal Pacific Electric Company	--	Circuit breakers

LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-45	Problems In Protective Relay and Circuit Breaker Coordination	7/7/88	All holders of OLs or CPs for nuclear power reactors.
88-44	Mechanical Binding of Spring Release Device in Westinghouse Type DS-416 Circuit Breakers	6/24/88	All holders of OLs or CPs for nuclear power reactors.
88-43	Solenoid Valve Problems	6/23/88	All holders of OLs or CPs for nuclear power reactors.
88-42	Circuit Breaker Failures Due to Loose Charging Spring Motor Mounting Bolts	6/23/88	All holders of OLs or CPs for nuclear power reactors.
88-41	Physical Protection Weaknesses Identified Through Regulatory Effectiveness Reviews (RERs)	6/22/88	All holders of OLs or CPs for nuclear power reactors.
88-40	Examiners' Handbook for Developing Operator Licensing Examinations	6/22/88	All holders of OLs or CPs for nuclear power reactors.
88-39	LaSalle Unit 2 Loss of Recirculation Pumps With Power Oscillation Event	6/15/88	All holders of OLs or CPs for BWRs.
88-38	Failure of Undervoltage Trip Attachment on General Electric Circuit Breakers	6/15/88	All holders of OLs or CPs for nuclear power reactors.
88-37	Flow Blockage of Cooling Water to Safety System Components	6/14/88	All holders of OLs or CPs for nuclear power reactors.
88-36	Possible Sudden Loss of RCS Inventory During Low Coolant Level Operation	6/8/88	All holders of OLs or CPs for PWRs.

OL = Operating License  
 CP = Construction Permit



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2. Preliminary List of Original Equipment Manufacturers Whose Names May Have Been Used on Surplus or Refurbished Equipment Sold as New Equipment
3. List of Recently Issued NRC Information Notices

\*SEE PREVIOUS CONCURRENCES

<del>D/DOEA: NRR</del> CERoss 07/07/88	*C/OGCB:DOEA: NRR CHBerlinger 07/07/88	*RPB:ARM TechEd 07/07/88	*OI 07/07/88	*OGC WHBriggs 07/07/88
*OGCB:DOEA: NRR JGuillen 07/07/88	*VIB:DRIS: NRR KRNaidu 07/07/88	*SC/VIB:DRIS: NRR EBaker 07/07/88	*C/VIB:DRIS: NRR EWBrach 07/07/88	*A/D/DRIS: NRR BKGrimes 07/07/88

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2. Preliminary List of Original Equipment Manufacturers Potentially Affected
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D/DOEA:NRR

CERossi

07/ /88

OGCB:DOEA:NRR

JGuillen

07/7/88

C/OGCB:DOEA:NRR

CHBerlinger

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EWBrach

07/07/88

\*OGC

WHBriggs

07/07/88

BKGrimes

07/07/88

*Handwritten initials and signatures:*  
CWB (large)  
JG (signature)  
for (handwritten)

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*WNB*

*Call*  
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SC/VIB:DRIS:NRR  
EBaker  
07/ /88

*Nothing contained  
in this information  
notice will impact  
negatively on pending  
OI investigations.*

OI  
By Phone - R. Forluna  
07/ 7/88 - 3:25 PM  
C/VIB:DRIS:NRR  
EWBrazen  
07/ 7/88

OGC  
WHBriggs  
07/ /88  
A/D/DRIS:NRR  
B/S/Primes  
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