



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
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ARLINGTON, TEXAS 76012

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August 15, 1980

In Reply Refer To:  
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Docket Nos. 50-458/IE Bulletin No. 80-19, Revision 1  
50-459/IE Bulletin No. 80-19, Revision 1

Gulf States Utilities  
Attn: Dr. E. Linn Draper, Jr.  
Vice President - Technology  
Post Office Box 2951  
Beaumont, Texas 77704

Gentlemen:

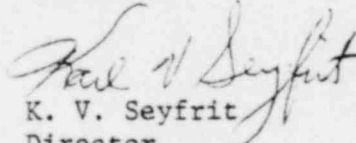
SUBJECT: IE BULLETIN NO. 80-19, REVISION 1 - FAILURES OF MERCURY-WETTED  
MATRIX RELAYS IN REACTOR PROTECTIVE SYSTEMS OF OPERATING NUCLEAR  
POWER PLANTS DESIGNED BY COMBUSTION ENGINEERING

Enclosed is Revision 1 to IE Bulletin No. 80-19. The revision merely clarifies the areas of concern; therefore, the actions including dates of reports required by you with respect to your nuclear power facility are not changed.

In order to assist the NRC in evaluating the value/impact of each Bulletin on licensees, it would be helpful if you would provide an estimate of the manpower expended in conduct of the review and preparation of the report(s) required by the Bulletin. Please estimate separately the manpower associated with corrective actions necessary following identification of problems through the Bulletin.

Should you have any questions regarding the revised Bulletin or actions required by you, please contact this office.

Sincerely,

  
K. V. Seyfrit  
Director

Enclosures:

1. IE Bulletin No. 80-19,  
Revision 1
2. List of Recently Issued  
IE Bulletins

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT  
WASHINGTON, D.C. 20555

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DUPLICATE

IE Bulletin No. 80-19  
Revision 1  
Date: August 15, 1980  
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FAILURES OF MERCURY-WETTED MATRIX RELAYS IN REACTOR PROTECTIVE SYSTEMS OF  
OPERATING NUCLEAR POWER PLANTS DESIGNED BY COMBUSTION ENGINEERING

BACKGROUND:

This bulletin addresses the failures of mercury-wetted relays used in the logic matrix of the reactor protective system (RPS) of nuclear power plants designed by Combustion Engineering (C-E). Except for Arkansas Nuclear One Unit 2 and Palisades, both of which use dry-contact matrix relays, the NRC understands that all other operating C-E plants use C.P. Clare Model HG2X-1011 mercury-wetted matrix relays in the RPS.

Mercury-wetted matrix relays manufactured by the Adams and Westlake Company were initially used in the Palisades plant; however, because of repeated failures of these relays, they were subsequently replaced with relays having dry-contacts. GTE, the manufacturer of these dry-contact relays, however, has since discontinued their production. Thus, although the dry-contact relays used at Palisades have performed without a failure since they were installed, they are not available for the other operating nuclear power plants designed by C-E.

OPERATING EXPERIENCES AND EVALUATION:

To date, operating nuclear power plants designed by C-E have reported thirty-one (31) failures of mercury-wetted relays used in the logic matrix of the RPS.

Most of the reported failures were "failed-closed" type (i.e., the type that could inhibit a reactor trip), and four of the reported events involved multiple failures (i.e., three relay failures were detected during two tests; two other failures were detected during two different tests). Because of the redundancy within the RPS, no reported event would have prevented a reactor trip; however, the build-up of coincident "failed-closed" failures of certain sets of relays could result in trip failures for off-normal events.

The number of single and multiple relay failures reported gives rise to two concerns: (1) the total number of failures yields a much higher random failure rate than that used in other relay failure estimates\*, and (2) the number of

\* Other relay failure estimates include (1) WASH-1400, "Reactor Safety Study", NRC, October 1975; (2) IEEE Std 500-1977, "IEEE Guide to the Collection and Presentation of Electrical, Electronic, and Sensing Component Reliability Data for Nuclear Power Generating Stations", IEEE, New York; and (3) NUREG/CR-0942, "Nuclear Plant Reliability Data System, 1978 Annual Reports of Cumulative System and Component Reliability", NRC.

RECENTLY ISSUED IE BULLETINS

Bulletin No.	Subject	Date Issued	Issued To
80-17	Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR	7/3/80	All BWR power reactor facilities holding Operating Licenses (OLs) or Construction Permit (CP)
Sup. 1 to 80-17	Failure of Control Rods to Insert During a Scram at a BWR	7/18/80	All BWR power reactor facilities holding Operating Licenses (OLs) or Construction Permits (CPs)
Sup. 2 to 80-17	Failures Revealed by Testing Subsequent to Failure of Control Rods to Insert During a Scram at a BWR	7/22/80	All BWR power reactor facilities holding Operating Licenses (OLs) or Construction Permits (CPs)
80-18	Maintenance of Adequate Minimum Flow Thru Centrifugal Charging Pumps Following Secondary Side High Energy Line Rupture	7/24/80	All PWR power reactor facilities holding OLs and to those PWRs nearing licensing
80-19	Failures of Mercury-Wetted Matrix Relays in Reactor Protective Systems of Operating Nuclear Power Plants Designed by Combustion Engineering	7/31/80	All nuclear power facilities having either an Operating License (OL) or a Construction Permit (CP)
80-20	Failures of Westinghouse Type W-2 Spring Return to Neutral Control Switches	7/31/80	To each nuclear power facility in your region having an Operating License (OL) or a Construction Permit (CP)

Enclosure