

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

December 14, 1993

NRC INFORMATION NOTICE 93-96: IMPROPER RESET CAUSES EMERGENCY DIESEL  
GENERATOR FAILURES

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 an emergency diesel generator (EDG) to fail to start on demand or to trip during operation due to improper execution of the reset operation at the conclusion of the previous run. 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

H.B. Robinson

In August of 1987 at the H.B. Robinson plant, startup trips occurred on the "A" EDG. With the assistance of a vendor representative, several steps were taken in an effort to preclude such trips, including replacement of the governor, replacement of the governor oil, replacement of sticky fuel injection pumps, checking of injection pump timing, and rebalancing fuel rack settings. In February of 1988, startup trips were again experienced. It was concluded, after detailed inspection of the latch mechanism parts, that there was a possibility of wear on the tip of the latch, which may have been a contributing factor to the trips. These parts were replaced with new parts.

On June 3, 1992, during the performance of a test activity, the "A" EDG tripped on mechanical overspeed after the engine had been operating approximately one half hour. After detailed consideration of possible scenarios for the trips and considering prior actions taken, it was determined that the most probable cause was a failure to properly reset the trip mechanism after the previous run. It was concluded that operations personnel apparently were unaware of the importance of moving the reset lever through its full travel. In addition, resetting was difficult for shorter individuals due to the location of the reset lever, which is positioned over the exhaust

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manifold. Operations personnel were subsequently trained on the proper method for actuating the reset lever. Also, a step was provided to permit easier access to the lever.

#### Duane Arnold

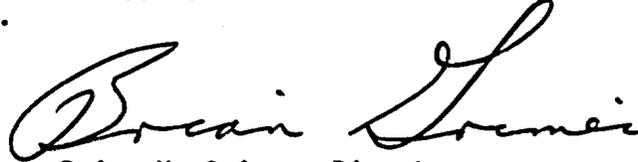
On June 11, 1993, while the Duane Arnold plant was operating at 85 percent of full power, the "A" EDG tripped approximately 3 seconds after the initial start signal during an operability surveillance test. An evaluation was conducted by the licensee of possible EDG trip causes, including occurrence of an actual overspeed condition, failure of the overspeed mechanism, actuation of the emergency stop pushbutton, failure of the emergency stop pushbutton, latch assembly not fully latched, latch assembly failure, mechanical trip mechanism failure, and annunciator circuit or trip lever microswitch failure. It was concluded that the most probable cause of the trip was that the latch assembly was not fully engaged from the previous reset operation and engine startup vibration unlatched the trip mechanism. Less than complete engagement of the latch assembly could be caused by an inadequate reset operation. Corrective actions adopted by the licensee included procedure revisions to ensure a more positive latching operation, improved physical access to the reset lever, and operator training.

The procedure revision directs operators to perform the reset operation a second time following the initial resetting of the trip. The second reset is somewhat easier to perform and should ensure that the latch is fully engaged in the event that the initial latching sequence resulted in a partially latched condition. Verification that the latch is fully seated is accomplished by checking that the reset lever subsequently moves freely.

#### Discussion

In response to experience with previous trips during fast starts, the diesel manufacturer for both plants, (Coltec/Fairbanks Morse Engine Division), had previously issued a service information letter (SIL, Volume A, Issue 25, dated August 1, 1991) addressing a revised overspeed trip adjustment. The SIL recommended that the overspeed trip setting be raised from the range of 112 to 115 percent to the range of 115 to 117 percent. In light of events that occurred at H.B. Robinson and Duane Arnold, the manufacturer has now advised these licensees that proper resetting of the trip mechanism would be enhanced by slowly moving the reset lever fully to the reset position and back, twice. The inadvertent partial reset latching operations described above may also occur on other units having similar mechanical trip mechanisms.

This notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts 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 contacts: Larry Garner, RII  
(404) 331-4663

Chris G. Miller, RIII  
(319) 851-5111

Walter P. Haass, NRR  
(301) 504-3219

Attachment:  
List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
 NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
93-95	Storm-Related Loss of Offsite Power Events due to Salt Buildup on Switchyard Insulators	12/13/93	All holders of OLs or CPs for nuclear power reactors located close to a large body of salt water.
93-94	Unauthorized Forced Entry into the Protected Area at Three Mile Island Unit 1 on February 7, 1993	12/09/93	All holders of OLs or CPs for nuclear power reactors.
93-93	Inadequate Control of Reactor Coolant System Conditions During Shutdown	12/08/93	All holders of OLs or CPs for nuclear power reactors.
93-92	Plant Improvements to Mitigate Common Dependencies in Component Cooling Water Systems	12/07/93	All holders of OLs or CPs for nuclear power reactors.
91-21, Supp. 1	Inadequate Quality Assurance Program of Vendor Supplying Safety-Related Equipment	12/07/93	All holders of OLs or CPs for nuclear power reactors and all recipients of NUREG-0040, "License Contractor and Vendor Inspection Status Report" (White Book).
89-77, Supp. 1	Debris in Containment Emergency Sumps and Incorrect Screen Configurations	12/03/93	All holders of OLs or CPs for nuclear power reactors.
93-91	Misadjustment Between General Electric 4.16-KV Circuit Breakers and Their Associated Cubicles	12/03/93	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License  
 CP = Construction Permit

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**\*SEE PREVIOUS CONCURRENCE**

OFFICE	VIB/DRIL*	REGION III*	REGION II*	VIB/DRIL*	VIB/DRIL*
NAME	WHaass	CMiller	LGarner	UPotapovs	LNorrholm
DATE	09/09/93	09/09/93	08/30/93	09/10/93	09/15/93
TECH ED*	DRIL/NRR*	EKKB/NRR*	OGCB/DORS*	C:OGCB/DORS*	D:DORS/NRR
DGable	CERossi	CBerlinger	PCWen	GHMarcus	BKGrimes
09/14/93	09/20/93	10/21/93	11/10/93	11/16/93	12/9/93

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DGable	CERossi	CBerlinger	PCWen	GHMarcus	BKGrimes
09/14/93	09/20/93	10/21/93	11/10/93	11/16/93	12/ /93

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NAME	WHaass	CMiller	LGarner	UPotapovs	LNorrholm
DATE	09/09/93	09/09/93	08/30/93	09/10/93	09/15/93
TECH ED*	DRIL/NRR*	EEKB/NRR*	OGCB/DORS*	C:OGCB/DORS	D:DORS/NRR
DGable	CERossi	CBerlinger	PCWen	GHMarcus <i>TJK</i>	BKGrimes <i>W</i>
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09/14/93	09/20/93	10/21/93	11/10/93	11/ /93	11/ /93

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Notes:

- The PMs for H.B Robinson (Brenda Mozafari) and Duane Arnold (Bob Pulsifer) were provided with the draft of IN. They have no comments.
- The vendor's comments have been incorporated.

Peter Wen  
 11-10-93.

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DGable	CERossi	CBerlinger	PCWen	GHMarcus	BKGrimes
09/14/93	09/20/93	10/11/93	10/ /93	10/ /93	10/ /93

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Discussion

The staff is continuing its review of the above events with the manufacturer of the diesel engines, Coltec/Fairbanks Morse Engine Division, to arrive at a more detailed and consistent set of procedures to assure a positive latching operation. In addition, it should be noted that other diesel engine manufacturers may have similar mechanical trip mechanisms, and licensees should be aware that potential inadvertent partial reset latching operations may also occur on those units.

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NAME	WHaass	CMiller	LGarner	UPotapovs	J. Norrholm
DATE	9 / 9/93*	9/9/93*	8/30/93*	9/10/93*	9/15/93
COPY DOC	YES NO	YES NO	YES NO	YES NO	<u>YES</u> NO

OFFICE	TECH EDITOR	DRIL/NRR	OGCB/NRR	EELB/NRR	DORS/NRR
NAME	See Attached	CERossi	GMarcus	CBerlinger	BGrimes
DATE	9/12/93	9/20/93	/ /93	/ /93	/ /93
COPY DOC	YES NO	YES NO	YES NO	YES NO	YES NO

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NAME	WHaass	CMiller	LGarner	UPotapovs	LNorrholm
DATE	9 / 9/93*	9/9/93*	8/30/93*	9/10/93*	/ /93
COPY	YES NO	YES NO	YES NO	YES NO	YES NO
DOC					

OFFICE	TECH EDITOR	DRIL/NRR	OGCB/NRR	EELB/NRR	DORS/NRR
NAME	<i>D Gable</i>	CERossi	GMarcus	CBerlinger	BGrimes
DATE	<i>9/14/93</i>	/ /93	/ /93	/ /93	/ /93
COPY	YES NO	YES NO	YES NO	YES NO	YES NO
DOC					

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*Tech Ed.?*

OFFICE	VIB/DRIL	REGION	REGION	VIB/DRIL	VIB/DRIL
NAME	WHaass <i>WRH</i>	Miller <i>(phone)</i>	Garner <i>(phone)</i>	UPotapovs	LNorrholm
DATE	9/9/93	9/9/93	8/30/93	9/10/93	1/93
COPY DOC	<input checked="" type="checkbox"/> YES    NO	YES    NO			

OFFICE	DRIL/NRR	OGCB/NRR	EELB/NRR	DORS/NRR
NAME	CRossi	GMarcus	CBerlinger	BGrimes
DATE	/ /93	/ /93	/ /93	/ /93
COPY DOC	YES    NO	YES    NO	YES    NO	YES    NO