

**LICENSEE EVENT REPORT (LER)**

FACILITY NAME (1) Duane Arnold Energy Center										DOCKET NUMBER (2) 0 5 0 0 0 3 3 1 1										PAGE (3) 1 OF 0 1 3									
TITLE (4) Unplanned RPS Trip Due to Feeder Breaker Adjustments																													
EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)																			
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES None					DOCKET NUMBER(S) 0 5 0 0 0															
0 7	0 7	8 5	8 5	0 2 4	0 0	0 8	0 6	8 5						0 5 0 0 0															
OPERATING MODE (8) N		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)																											
POWER LEVEL (10) 0 1 0 0		20.402(b)				20.406(a)				X				50.73(a)(2)(iv)				73.71(b)											
		20.406(a)(1)(i)				50.38(a)(1)				50.73(a)(2)(v)				73.71(e)															
		20.406(a)(1)(ii)				50.38(a)(2)				50.73(a)(2)(vi)				OTHER (Specify in Abstract below and in Text, NRC Form 350A)															
		20.406(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(viii)(A)																			
		20.406(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)																			
		20.406(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(x)																			
LICENSEE CONTACT FOR THIS LER (12) NAME James R. Probst, Technical Support Engineer																													
										TELEPHONE NUMBER AREA CODE 3 1 9 8 5 1 - 7 3 0 8																			
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																													
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS																			
B	E	D	B	K	R	G	1	8	4	Yes																			
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)																			
YES (If yes, complete EXPECTED SUBMISSION DATE)										MONTH DAY YEAR																			
X NO																													

On July 7, 1985 two Reactor Protection System (RPS) trips occurred due to an unattached trip coil inside damping spring on an essential bus breaker.

At 1142 hours, with the reactor in cold shutdown mode and refueled with all control rods fully inserted, a full Reactor Protection System trip occurred. The recently modified (during the current refueling outage) feeder breaker for essential bus 1B42 which powers the "B" RPS motor-generator set tripped open while being loaded, and a concurrent "E" Average Power Range Monitor (APRM) momentary upscale signal occurred. Both Standby Filter Units initiated as designed. The Standby Gas Treatment System and Group II through V Isolations had previously been initiated. The 1B42 feeder breaker was found to have a low sustained current trip setting, which was then adjusted. At 2230 hours, the 1B42 feeder breaker again tripped open during loading, and the "A" RPS logic tripped on too few inputs to the "A" APRM, as per design. The feeder breaker was further examined and found to have an unattached trip coil inside damping spring. This was determined to have been the cause of both RPS trips. The spring was reattached and other breakers inspected for similar problems. The "E" APRM circuitry was inspected and minor adjustments completed.

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## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/85

FACILITY NAME (1)  Duane Arnold Energy Center	DOCKET NUMBER (2)  0500033185	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		185	-024	-	0002	OF	03

TEXT: If more space is required, use additional NRC Form 366A's (17)

On July 7, 1985 two Reactor Protection System (RPS) trips occurred due to an unattached trip coil inside damping spring on a breaker feeding 1B42, the essential bus which powers the "B" RPS.

On July 7, 1985 at 1142 hours, with the reactor in cold shutdown mode with the vessel refueled and all control rods fully inserted, a full Reactor Protection System (EIIS Code JC) trip occurred. Maintenance work to install a new type of trip coil, BBC Brown Boveri, Inc. ITE Type OD-4, had been performed on the feeder breaker from 480 volt essential load center 1B4 to 480 volt essential bus 1B42, which provides power for the "B" Reactor Protection System motor-generator set. At 1142 hours while being loaded the 1B42 feeder breaker tripped open, resulting in the loss of the "B" RPS motor-generator, with subsequent tripping of the "B" side of the RPS logic. Concurrent with this, the "E" Average Power Range Monitor (APRM, EIIS Code IG) experienced a momentary spurious upscale signal, resulting in a trip of the "A" RPS logic, and therefore a full RPS trip.\* At 1145 hours, all loads were stripped from 1B42, which was then reenergized. With the full RPS trip remaining in place, 1B42 was then reloaded. The 1B42 breaker tripped open during loading at 1237 hours. The RPS trip was reset at 1315.

Review revealed the newly installed trip coil for the 1B42 feeder breaker had been set to trip at an improperly low sustained current of 200 amperes. The breaker was reset to trip at a sustained current of 400 amperes. It was concluded this was the cause of the trip at 1142 hours. Loading of 1B42 recommenced. At 2230 hours, the 1B42 feeder breaker tripped open. This resulted in loss of the "B" RPS motor-generator set and the subsequent "B" RPS trip. Concurrent with the "B" RPS trip, the "A" RPS tripped on too few inputs to the "A" Average Power Range Monitor. The "A" APRM receives signals from 20 Local Power Range Monitors (LPRM, EIIS Code IG), 10 from the "A" APRM group, which are powered by the "A" RPS bus, and 10 from the "B" APRM group, which are powered from the "B" RPS bus. Upon receipt of 8 or less LPRM signals to the "A" APRM, an "A" RPS trip occurs. Due to the bypassing of two "A" APRM group LPRM's, input from at least one "B" APRM group LPRM was required. Consequently, upon loss of power to the "B" RPS bus, the "A" RPS tripped. The "A" APRM had been bypassed at the time of the RPS trip at 1142 hours. By 2243 hours, RPS had been reset and all other plant systems returned to their pre-trip condition. Since all of the control rods were inserted, neither of the RPS trips resulted in actual control rod movement.

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	0 5 0 0 0 3 3 1	8 5	- 0 2 4	- 0 0	0 3	OF	0 3

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Loading of 1B42 was suspended pending further investigation of the 1B42 breaker trip. The breaker was tested and inspected internally. The current load on the breaker was found not to have exceeded the breaker's initial low setting. It was determined that the cause of both 1B42 breaker trips on July 7, 1985 was an unattached inside damping spring on the tripper arm of the newly installed "B" phase trip coil unit. Under normal operation, when the high sustained current trip setting is reached, the coil trip arm is pulled forward to the coil trip bar by magnetic force. The arm is held back at lower currents and prevented from an instantaneous response by the damping spring and a dashpot. The top of the damping spring forms a hook which fits through a small bracket in the main coil body. This end of the spring had detached during movement and installation of the trip coil unit. Without the spring in place, the coil trip arm was in a resting position much closer to the coil trip bar, and a much smaller current was required to trip the 1B42 breaker's "B" phase. The spring was reattached, and the 1B42 phase "B" trip coil tested and found to be operating properly. The three other newly installed trip coils of this type were inspected internally and two springs found to be potential problems were more firmly attached.

As corrective actions, Duane Arnold Energy Center will notify the breaker manufacturer of the installation difficulties, disseminate our experience via the "NETWORK system", and develop appropriate preventive control measures. The "E" APRM circuitry was examined between July 10 and July 18, 1985. Minor adjustments were made. Following this work, the "A" and "B" RPS motor-generator sets were deenergized and reenergized with no upscale "E" APRM signals resulting.

\*The Uninterruptible AC (EE) and both Instrument AC (EF) distribution panels had been placed on 1B42 in support of breaker maintenance. Initiation of both Standby Filter Units (VI) on loss of the Instrument AC panels occurred as designed. The Standby Gas Treatment System (BH) had been actuated and Groups II, III, IV, and V isolations (JM) had been taken or deenergized previously for planned maintenance activities. On the afternoon of July 7, following the trip at 1B42, the Group III Isolation and Standby Gas Treatment System were reset, the Uninterruptible AC distribution panel was transferred to the Uninterruptible AC motor-generator set, and the two Instrument AC distribution panels were returned to their normal configuration, receiving power off 1B42 and another essential bus.

Iowa Electric Light and Power Company  
August 6, 1985

DAEC-85- 0715

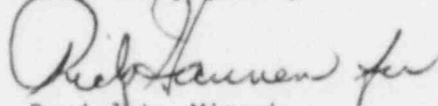
U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D. C. 20555

Subject: Duane Arnold Energy Center  
Docket No. 50-331  
Op. License DPR-49  
Licensee Event Report No. 85-024

Gentlemen:

In accordance with 10 CFR 50.73 please find attached a copy of the  
subject Licensee Event Report.

Very truly yours,



Daniel L. Mineck  
Plant Superintendent - Nuclear  
Duane Arnold Energy Center

DLM/JRP/kp

attachment

cc: Mr. James G. Keppler  
Regional Administrator  
Region III  
U. S. Nuclear Regulatory Commission  
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NRC Resident Inspector - DAEC

File A-118a