



LONG ISLAND LIGHTING COMPANY

SHOREHAM NUCLEAR POWER STATION

P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

April 16, 1984

SNRC-1024

Dr. Thomas E. Murley
Regional Administrator
U.S. Nuclear Regulatory Commission - Region I
631 Park Avenue
King of Prussia, PA 19406

I. E. Bulletin No. 83-08:
Electrical Circuit Breakers with an Undervoltage
Trip Feature In Use In Safety-Related Applications
Other Than the Reactor Trip System
Shoreham Nuclear Power Station - Unit 1
Docket No. 50-322

Dear Dr. Murley:

LILCO hereby submits the results of our actions taken to comply with the requirements of I.E. Bulletin 83-08. These actions are prescribed on pages 3 and 4 of the subject bulletin and our response corresponds item by item to these as follows:

1. LILCO's numerous reviews concluded that there are no Westinghouse type DB, Westinghouse type DS, or General Electric type AK-2 circuit breakers with Under Voltage Trip Attachments (UVTA), as discussed in I.E. Bulletins 83-01 and 83-04, utilized in the Shoreham Nuclear Power Station. However, we have identified that six (6) safety-related electrical circuit breakers, utilizing an Under Voltage (UV) trip feature, are used in the Reactor Protection System (RPS).

As described in Section 7.2 of the SNPS FSAR, these six breakers are utilized in the RPS as an integral part of the Electrical Protection Assembly (EPA). The EPA provides

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redundant protection to the Reactor Protection System, and other essential circuits against overvoltage, undervoltage, and underfrequency. The (EPA) circuit breakers have the following mark numbers: C71*BKR-002A & B, C71*BKR-003A & B and C71*BKR-004A & B. Additionally, we identified that two circuit breakers, utilizing an UV trip feature, are used in a nonsafety-related application. These two are the RPS motor generator output breakers. These eight electrical circuit breakers identified are manufactured by the General Electric Company and are molded case circuit breakers.

In addition to the aforementioned RPS EPA electrical circuit breakers, LILCO, in addressing the concerns of I.E. Circular 81-12, reviewed all Category I breakers at Shoreham. This review concluded that although no GE AK-2 circuit breakers are used, breakers utilizing an undervoltage trip feature are used in the normal and reserve supply breakers to the 4.16 KV emergency buses 101, 102 and 103. Additionally, the review concluded that these breakers and the 4.16 KV recirculation pump trip breakers utilize a dual trip coil design. Breaker tripping is accomplished by a shunt trip signal and each coil on these breakers is on a separately fused circuit with the capability for independent testing. Both the Shoreham Preventive Maintenance Program and Protective Relay Trip Operational Tests include steps to independently test both trip coils on dual coil breakers. The actions LILCO took to address the concerns of I.E. Circular 81-12 were determined acceptable; and as described in section 4.1.12 of inspection report 50-322/83-08, the circular was closed.

2. (a) The RRS breakers identified in Item 1 by mark number are molded case type circuit breakers consisting of a thermal-magnetic trip element and operating mechanism with contacts and interrupting means in a molded insulated case. The operating mechanism is quick-make, quick-break, and trip-free so that the contacts cannot be held closed against either a short circuit or an overload. Utilizing input from the system designer and breaker manufacturer we have determined that the design margin available to open the molded case breakers is as follows:
 - (1) 5-10 ounces of force is required to release the latching mechanism. The minimum and maximum force available to release the latching mechanism is 1.5 pounds and 5.0 pounds, respectively.

- (2) 2.5 pounds force is required to trip the breaker. 5 pounds force is available from the undervoltage device to trip the breaker.

Considering the fact that these electrical circuit breakers are of a different design type than those discussed in the "Description of Circumstances" section of the subject bulletin, these design margins are adequate. Furthermore, problems encountered within either the UVTA or the trip bar latch assembly due to improper lubrication, inadequate adjustment, excessive torque or excessive wear of moving parts do not necessarily apply to these breakers because the design of the molded case circuit breakers which are factory calibrated and sealed in a molded insulating case eliminates any tampering possibility and continuous maintenance.

- (b) The EPA electrical circuit breakers (C71* BKR- 002A, 002B, 003A, 003B, 004A, & 004B) surveillance program is designed to comply with the requirements of technical specification 4.8.4.3 and is achieved using Shoreham station procedure SP-44.611.02, entitled "RPS-'EPA' Breaker Cal And Funct. Test". The above specified RPS electric power monitoring assemblies are determined operable by performing a Channel Functional Test, and by demonstrating the operability of overvoltage, undervoltage, and underfrequency protective instrumentation by performance of a channel calibration including simulated automatic actuation of the protective relays, tripping logic and output circuit breakers and verifying the technical specification set points.
- (c) Our review of the operating experience with the circuit breakers identified in Item 1. above, concludes that Shoreham has not experienced any breaker malfunctions such as failure to trip or failure to close on demand. However, the review did identify frequent tripping of the alternate power supply Electrical Protection Assembly (EPA) breakers (1C71*BKR-003A&003B) deenergizing the RPS bus, causing half scrams and valve closures. The cause of this problem was mainly attributed to voltage fluctuations on the alternate power supply bus. However, one breaker was found to be defective.

The following is a list of the SNPS alternate power supply breaker experience:

<u>DATE</u>	<u>TIME</u>	<u>DESCRIPTION</u>
3-1-83		RPS Alternate supply EPA breakers 1C71*BKR-003A&B Tripped Frequently
4-05-83	1750	Lost RPS Alternate supply EPA breakers supplying RPS Bus A
4-07-83	0745	RPS Alt. supply EPA breaker 'A' Tripped. 1/2 Scram.
6-16-83	1835	RPS Alt. Supply EPA breakers Tripped
	1910	RPS Alt. Supply EPA breakers Tripped - Over-Voltage
	2026	RPS Alt. Supply EPA breakers Tripped - Over-Voltage
6-17-83	1755	RPS Alt. supply EPA breakers tripped due to High Voltage
7-07-83	1036	RPS Alt. supply tripped - Lost feed to RPS Bus "B"
8-05-83	1015	RPS Alt. Supply "B" breaker Tripped - 1/2 Scram
	1125	Same as above
	1139	Same as above
8-16-83	0927	RPS Alt. supply EPA breakers tripped - Low Voltage - 1/2 scram
1-13-84	0945	RPS Alt. supply breaker "A" tripped - 1/2 Scram
	1000	Same as above
	1045	Same as above

- d) The following preventive and corrective measures have been taken at Shoreham:
- A. The two interim measures taken to reduce the frequent tripping of the alternate supply EPA breakers (1C71*BKR-003A&003B) were to increase the time delay of the EPA breakers to the maximum setting, and to slightly increase the high voltage trip setpoint on these EPA breakers. These changes, however, were ineffective in eliminating the RPS breaker trips being experienced. A new measure which calls for the installation of a Voltage Regulator on the alternate supply is being implemented so that the RPS can function as designed.
 - B. The undervoltage trip breaker 1C71*BKR-003A, which was found to be defective, has been removed and replaced with a temporary 175A standard breaker. The replacement breaker will be installed in accordance with maintenance work request MWR-84-0381. A Category I replacement breaker is already on site and we expect this work to be complete within the next two weeks.
 - C. The recommendations contained in the Independent Safety Engineering Group (ISEG) Report dated July 6, 1983, which was conducted as a result of the Salem ATWS Event, have been implemented to minimize the potential for breaker misoperation due to inadequate maintenance.

The subject recommendations were implemented as follows:

- Shoreham Station Procedure SP12.009.03 "Report of Abnormal Conditions" insures that any unusual events are documented.
- Shoreham Station Procedure SP21.003.01 "Operations Report" is used by operations to evaluate ATWS conditions.
- Shoreham Station Procedure SP44.611.02 "RPS EPA Breaker Calibration and Functional Test" was written for the calibration and functional testing of the six (6) EPA units (1C71*BKR-002A, 002B, 003A, 003B, 004A & 004B) utilized in the RPS system.

- D. Since the Salem breaker failure was attributed directly to improper maintenance, an ISEG review of the SNPS Preventive Maintenance (PM) Program was conducted to verify that all the breakers identified in Item 1. were scheduled for preventive maintenance.

The ISEG review concluded that all six (6) safety-related EPA breakers are included in the Station Procedure SP44.611.02. The two (2) nonsafety-related RPS Motor Generator set output breakers were identified during the ISEG review and are included in the Station Preventive Maintenance Program. Station Procedures SP12.015.01 entitled "Preventive Maintenance Program" SP37.006.03 "Molded Case Circuit Breakers Test", and SP 87.001.24 "Low Voltage and DC Power Circuit Breakers", provide detailed instructions for station personnel to perform maintenance checks and tests on these electrical circuit breakers. Also, because of the relative safety significance of these two electrical circuit breakers we are now evaluating the possibility of including them in SP 44.611.02 and thereby putting them under the technical specification surveillance envelop.

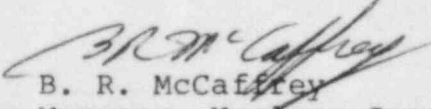
3. The requirements of this item do not apply to Shoreham.
4. The contents of this letter should satisfy the requirements of the written report sought by this item.

In order to help you evaluate the cost of implementing the requirements of this bulletin, we offer the following information:

- a) Our estimate of the time it took to perform the requested review and investigation needed to address the concerns of I. E. Bulletin 83-08, is 120 engineering hours.
- b) Our estimate of the time spent to prepare this written report is 24 engineering hours.

Should you or any members of your staff have any questions regarding our response to this bulletin please do not hesitate to call my office.

Very truly yours,


B. R. McCaffrey
Manager, Nuclear Compliance and Safety

JB:lb

cc: C. Petrone

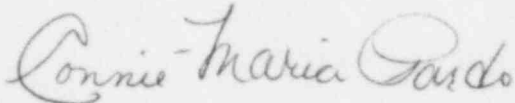
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STATE OF NEW YORK)
 : ss:
COUNTY OF SUFFOLK)

BRIAN R. MCCAFFREY, being duly sworn, deposes and says I am the Manager, Nuclear Compliance and Safety for the Long Island Lighting Company. I have read I.E. Bulletin No. 83-08: "Electrical Circuit Breakers With An Undervoltage Trip Feature In Use In Safety-Related Applications Other Than The Reactor Trip System." I have also read this response which was prepared under my direction and dated April 16, 1984. The facts set forth in this response are based upon reports and information provided to me by the employees, agents and representatives of Long Island Lighting Company responsible for the activities described in said I.E. Bulletin and in said response. I believe the facts set forth in said responses are true.


Brian R. McCaffrey

Sworn to before me this
16 day of April 1984



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No. 52-45156-10
Qualified in Suffolk County
Commission Expires March 30, 1985