



September 11, 1992

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

Subject: ABB Type 27N Undervoltage Relays
Environmental Qualification Rating, Radiation Tolerance
(10CFR Part 21 Report)

Notification by: ABB Power T&D Company
Protective Relay Division
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The type 27N undervoltage relay is a precision electronic protective relay used in electrical switchgear. A typical application would be for detection of a low voltage condition on a bus energized by a diesel generator.

A group of ABB type 27N Undervoltage Relays have been subjected to an irradiation test program by an independent engineering company. Degradation was found at levels significantly below the those stated in the IEEE 323 Qualification Report supplied by ABB.

The test group consisted of three (3) units built with both time delay and harmonic filter options in addition to the basic undervoltage measurement function. The time delay function was found to be the most sensitive circuit. The circuit failed to initiate a delay when an undervoltage condition occurred, which in this relay, causes an instantaneous response. The most sensitive sample failed at a level between $2.25E03$ and $4.5E03$ rads. The least sensitive sample failed between $1.1E04$ and $3.06E04$. The harmonic filter option caused the pickup/dropout operating points to shift high at test levels above those affecting the time delay, but below the testing end point of $6.3E04$. This option is only available with the time delay models.

Post-irradiation testing with the harmonic filters removed, showed the basic undervoltage function, which constitutes the instantaneous model, was still normal when the testing stopped. Additional testing may be done at a later date to define the upper limit for this circuit function alone.

ABB recommends that all users review applications requiring exposures greater than $1E03$ rads T.I.D. for type 27N Undervoltage Relays with the time delay function option, and greater than $5E04$ rads for the instantaneous models.

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ABB has begun a program to review qualification reports for other products which may also be affected.

The type 27N models affected can be identified by means of their device catalog numbers as follows:

Cat #211Txyz5 or 411Txyz5

Where:

"x" is 0 for instantaneous models

"x" is 4, 5, 6, or 7 for time delay models

"Y" may be 1, 2, 3, or 4 for both models

"z" may be 5 or 7 for both models

The catalog number may be followed by various suffix letters, including -L, -HF, -DP for special features.

These relays were manufactured during a period when corporate name changes occurred. The nameplate may show one of these names: BBC Brown Boveri Electric Co., BBC Brown Boveri, or ASEA BROWN BOVERI.

The attached pages list the known end users for whom ABB supplied IEEE 323 Certification RC-5039-A and IEEE 323 Qualification Report RC-5139-A either directly or indirectly. ABB is notifying users concerning the conditions identified in this report.

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Attachment I - 27M Qualification Reports IssuedTime Delay Models of the 27N relay:Date
Issued

South Carolina Electric & Gas Co., V. C. Summer, PO# A544414 via ABB Power Distribution, Sanford, FL, SO 281026	4/27/90
Washington Public Power Supply System, Hanford #2 via General Electric Co., NEBO, PO 205-XP590	7/21/83
W.P.P.S.S., WNP-2, PO 94714,	4/21/88
Commonwealth Edison Co., Dresden, PO 330765	1/10/90
Public Service Electric & Gas, Salem, PO P2392142	8/21/91
Carolina Power & Light Co., Brunswick, PO 509258-M-AT and PO 6G0915AT	6/4/85 7/18/91
Carolina Power & Light Co., H. B. Robinson, PO 6A6512-BJ	8/20/90
Florida Power Corporation, Crystal River, PO F 9017841D	1/11/85
Florida Power & Light Co., St. Lucie Unit 2 via Ebasco Services Inc., NY, PO NY-422546, Sup 42	7/21/83
Florida Power & Light Co., St. Lucie Unit 2 via Brown Boveri Electric, Chalfont, PA, SO T75256-04046	10/17/83
Florida Power & Light Co., Turkey Point 3,4, PO C9167990247 via ABB Power Distribution Inc., PO 287142	1/30/92
Philadelphia Electric Co., Peach Bottom via BBC Brown Boveri Electric, Tulsa, OK, SO 06941-90	6/7/85
Philadelphia Electric Co., Peach Bottom, PO EE 276320 and PO ME343185-NO and PO NE335804	2/24/87 11/12/88 3/13/89
Philadelphia Electric Co., Limerick via BBC Brown Boveri Inc., Tulsa, OK, SO 527741	11/17/86
Georgia Power, Hatch Unit 2 via Farwell & Handricks, Inc., PO 6118401	6/13/92

ABB Power T & D Company Inc.



Page 2

Tennessee Valley Authority, Bellefonte via Brown Boveri Electric, Chalfont, PA, SO T75664-04172	2/1/84
Entergy Operations, Inc., Grand Gulf, PO GG 10674	1/5/86
Entergy Operations, Waterford 3, PO WP043143	2/5/92
Consumers Power Co., Palisades, PO 2007-7746	9/15/85
Long Island Lighting Co., Shoreham via BBC Brown Boveri, Tulsa, OK, PO 05421-90	4/21/85
Northern States Power Co., Monticello, PO D15882 MQ and PO PA-9527	3/15/84 10/19/89
Northern States Power Co., Monticello, PO PA-6939MQ via ABB Service Co., Mendota Hgts., MN, PO MP-00177-C	11/6/89
Nebraska Public Power District, Cooper via Farwell & Hendricks, PO E1225/60139	12/18/86
Boston Edison Co., Pilgrim, PO NST002656	2/9/88

Certificates issued to extend above reports to additional orders:

Commonwealth Edison Co. via Nutherm International Inc., PO 1131-134-000 and PO 4488-001-002 and PO 4225-01 (thru Hannan Supply CO. PO DC16229)	5/20/92 9/30/91 12/13/90
Philadelphia Electric Co., Peach Bottom, PO BW-G45665N0 and PO BW-633759 and PO BW-376228 and PO BW-376228 and PO BW-633759 and PO BW-6103C7	10/31/91 2/22/91 1/3/91 11/17/90 11/16/90 6/16/89
Philadelphia Electric Co., Lime Rick via Bechtel Construction Inc., #18253-F1-00284 via ASEA BROWN BOVERI, INC., Sanford FL, PO P130841 and PO LS-229591-NB, via Bechtel Construction and PO 18250-F1-00426, via Bechtel Construction and PO 5-27814/3709584, via BBC Brown Boveri, Tulsa, OK	3/8/89 12/9/87 6/30/87, 6/3/87 2/24/87

ABB Power T & D Company Inc.



Page 3

Washington Public Power Supply System, WNP-2, PO 217430	5/18/91
and PO 209383	5/7/90
and PO 203744	8/16/89
and PO 099610	1/10/89
and PO 94714	4/21/88
Nebraska Public Power District, Cooper, PO 326892	1/8/91
and PO 326892	12/6/90
and PO 298081	4/4/89
Carolina Power & Light Co., H. B. Robinson, PO 6C8631BJ	9/27/90
Florida Power Corp., Crystal River 3,	
via ABB Power Distribution, Sanford, FL, PO P650863	9/18/89
and PO P650863	9/14/89
Entergy Operations, Inc., Grand Gulf, PO MP-819711	9/20/88
and PO MP818113	8/24/88
Florida Power & Light Co., St. Lucie, Unit 2	
via Ebasco Services Inc., NY, PO NY-422546, Sup 42	6/5/87
Florida Power & Light, St. Lucie, PO P089802-00	
via BBC Brown Boveri, Inc., Sanford, FL	4/14/87
(End user unknown)	
via Farwell & Hendricks, Inc., PO F0357/60429	3/29/88

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