NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 665-5000

October 16, 1985

Docket No. 50-245
B11799

Director of Nuclear Reactor Regulation
Attn: Mr. Christopher I. Grimes, Chief
Systematic Evaluation Program Branch
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

References: (1) J. F. Opeka letter to C. I. Grimes, dated May 17, 1985.

(2) H. L. Thompson letter to J. F. Opeka, dated July 31, 1985.

Gentlemen:

Millstone Nuclear Power Station Unit No. 1
Integrated Safety Assessment Program

In Reference (1), Northeast Nuclear Energy Company (NNECO) provided a proposed scope for the Integrated Safety Assessment Program (ISAP) review of Millstone Unit No. 1. In Reference (2), the Staff formally issued the results of the ISAP screening review process, establishing the scope of ISAP for Millstone Unit No. 1 and initiating issue-specific evaluations. Reference (1) also indicated that for each issue or topic included in ISAP, NNECO would provide a discussion of the safety objective and an evaluation of the plant design with respect to the issue being addressed to identify specific items to be considered in the integrated assessment. In accordance with this commitment, the review for the following ISAP topic is attached:

- ISAP Topic 1.21 - "Fault Transfers"

If you have any questions concerning the attached reviews, please do not hesitate to contact us.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

J. F. Opeka
Senior Vice President

By: C. F. Sears
Vice President

cc: J. A. Zwolinski

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Docket No. 50-245

ISAP TOPIC 1.21

FAULT TRANSFERS

October, 1985

I. Introduction

SEP Topic VI-7.C.1, Independence of Redundant Onsite Power Systems, reviewed the AC and DC power systems at Millstone Unit No. 1. The safety objective of this SEP topic was to ensure that the onsite electrical power supplies and their onsite distribution systems have sufficient independence to perform their safety function assuming a single failure. This review ensures that the onsite power systems satisfy General Design Criterion 17.

II. Review Criteria

Regulatory Guide 1.6 - Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems

IEEE Std. 308-1974 - IEEE Standard Criteria for Nuclear Power Generating Stations

10CFR50, Appendix A, GDC 17

III. Related Topics/Interfaces

ISAP Topic 2.18 - 4.16 KV, 480 V and 125 VDC Plant Distribution Protection

IV. Evaluation

The onsite AC and DC power supplies and their distribution systems were reviewed to the following guidelines:

- AC Systems

  When operating from onsite power sources, redundant power sources and load groups should be independent at least to the following extent:

  (1) The standby source of one load group should not be automatically paralleled with the standby source of another load group under accident conditions.

  (2) No provisions should exist for automatically transferring one load group to another load group or loads between redundant power sources.

  (3) If means exist for manually connecting redundant load groups together, at lease one interlock should be provided to prevent an operator error that would parallel their standby power sources.

- DC Systems

  (1) Each DC load group should be energized by a battery and battery charger. The batter/charger combination should have no automatic connection to any other redundant DC load group.

The current Millstone Unit No. 1 design utilizes automatic bus transfer switches (ABTs) to assure that certain vital electrical loads receive power from redundant sources. If a fault were present on any of the loads which are connected to one source of power and this results in a low voltage condition, the ABT could potentially transfer the same fault to the redundant power source. Such a transfer could cause the failure of both sources due to the subsequent protective breaker isolation function. The worst case that could occur is when each of the redundant supply buses was powered separately by one of the two sources of site emergency power (i.e., the gas turbine and diesel generators). As discussed in Reference (1), at Millstone Unit No. 1, there are 7 ABTs that fall into this category. These are:

- 480 VAC MCC EF-7, Diesel Generator Motor Control Center
  (Powers 1-SW-9, the nonvital cooling loop isolation valve in the service water system.)

- 120/240 VAC VAC-1, Vital AC Switchboard
  (Provides 120V AC power to the feedwater/FWCI, and a number of control board instruments including level indicators.)

- 120/240 VAC IAC-1, Instrument AC Switchboard

- 480 VAC MCC EF-3, LPCI MOVs 1-LP-10B and 9B
  (Powers the LPCI injection MOV and normally open globe stock check valve.)

- 480 VAC MCC FE-3, LPCI MOVs 1-LP-10A, 9A and 8A
  (Powers the LPCI injection MOV, normally open globe stop check valve and normally open LPCI loop cross-tie MOV.)

- 125 VDC MCC EF-3, MCC Control Power

- 125 VDC MCC FE-3, MCC Control Power

These ABTs are depicted on the attached Figures 1 and 2.

- <u>AC Systems</u>

  The ABT associated with 480 VAC MCC EF-7, above, has been disarmed as committed in Reference (2) and is not available to automatically transfer the loads of one load group to the power source of another. The emergency feeder breaker has been racked out so that the ABT cannot automatically transfer to the alternate source of power following failure of the normal power source.

  A detailed discussion of the safety functions served by the remaining 6 ABTs was provided in Reference (1). Following discussions with the NRC Staff, NNECO docketed Reference (2) which provided a revised proposal to address the ABT issue. Reference (2) also discussed two other Millstone Unit No. 1 projects which directly related to the fault transfer issue.

First, ISAP Topic 2.18 is intended to document the circuit breaker coordination at Millstone Unit No. 1, including the upstream feeder breakers for the portions of the AC system utilizing ABTs. Second, during the 1985 refueling outage the transformers which provide normal and emergency power feeds to the IAC and VAC switchboards are being replaced with regulating transformers.

o DC Systems

DC MCCs DC-11A-1, 2 and 3 are each provided with manual transfer switches, which are administratively controlled. As stated in Reference (1), the feeder breaker from the alternate DC source to the transfer switch is kept on the open position, and thus deenergized. Thus, NNECO concludes that an adequate level of protection is provided.

V. Conclusions

There are six remaining ABTs in the 480 VAC, 120 VAC and 125 VDC systems at Millstone Unit No. 1. NNECO's studies have concluded that disarming or removal of the six ABTs is not practical due to the safety function of these devices. NNECO, in support of this, provided an analysis of the public safety impact of removal of the ABTs in Reference (3). This analysis showed either no significant impact on public risk or an actual increase in risk.

The issue of overall power system reliability and the acceptability of the use of ABTs should be evaluated further.

VI. Reference

1. W. G. Counsil letter to D. M. Crutchfield, dated April 12, 1983.

2. W. G. Counsil letter to D. M. Crutchfield, dated December 6, 1983.

3. J. F. Opeka letter to C. I. Grimes, dated September 6, 1985.

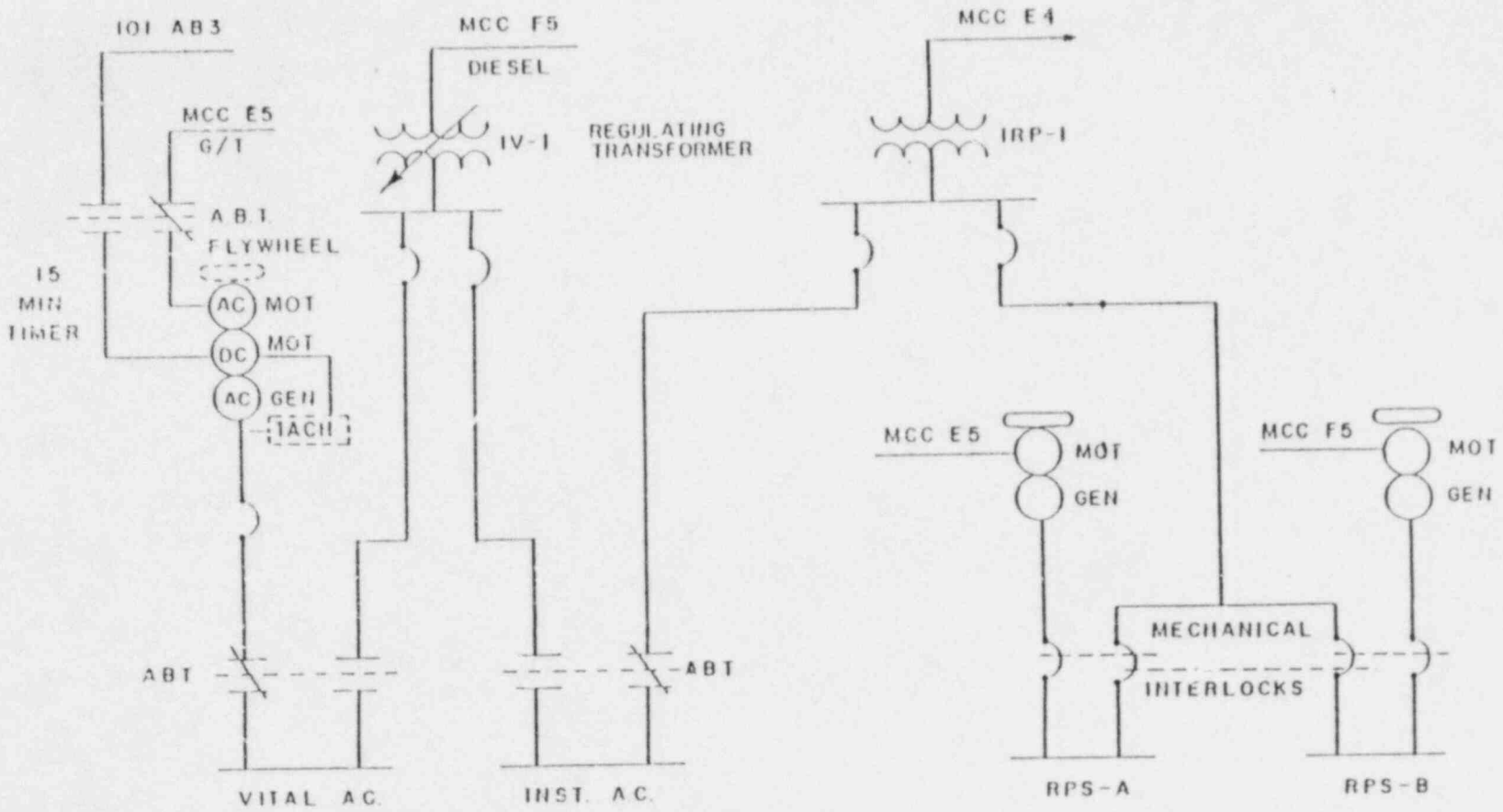

FIGURE 1 VITAL AC – INSTRUMENT AC REACTOR PROTECTION BUSES

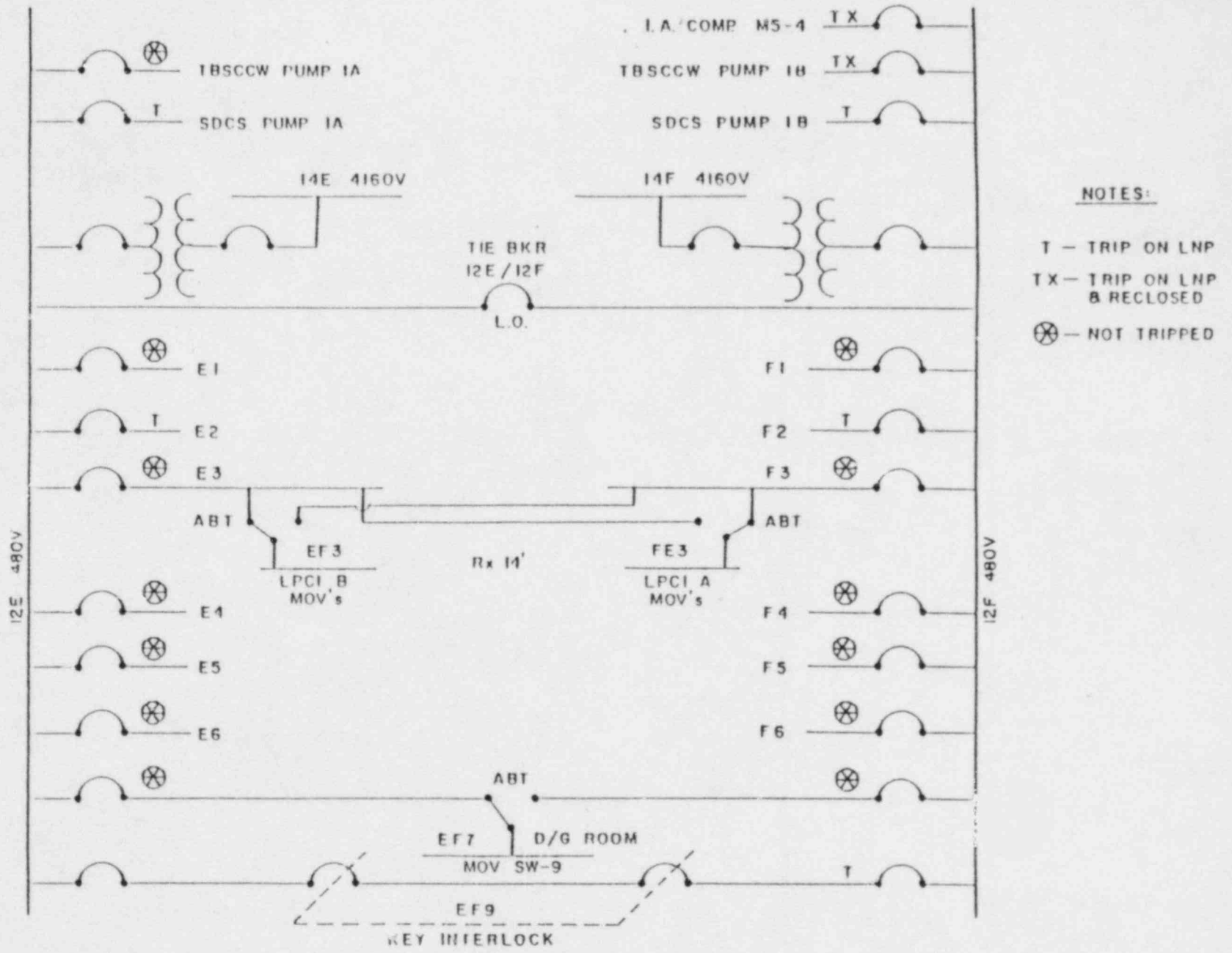

FIGURE 2 480 VOLT DISTRIBUTION 12E – 12F BUS