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APR 15 1981

MEMORANDUM FOR: Edward L. Jordan, Deputy Director
Division of Resident and Regional
Reactor Inspection, IE

AEOD/E133

FROM: Carlyle Michelson, Director
Office for Analysis and Evaluation
of Operational Data

SUBJECT: INADEQUACIES IN PERIODIC TESTING OF CE PWR REACTOR PROTECTION SYSTEM (RPS)

References: (1) St. Lucie Unit 1 LER 80-67/01X-1
(2) IE Inspection Report No. 50-335/80-38

Based on a review of an event that occurred at St. Lucie Unit 1 on November 30, 1980, it can be surmised that certain deficiencies could exist in the procedure used for periodic testing of CE RPS. Specifically, the present method of testing does not verify independent trip actuation of the undervoltage trip and shunt trip of the trip circuit breakers (TCBs).

AEOD believes that there is a need for informing licensees of operating CE PWRs regarding the concern of inadequacy in the RPS test procedures and for requiring the licensees to revise the appropriate test procedures to assure that both the undervoltage trip and shunt trip independently trip the TCBs. We consider that an IE Circular should be issued addressing this concern.

A brief description of the event at St. Lucie Unit 1 and our comments regarding the event are provided in the enclosed report.

Original Signed by
Carlyle Michelson

Carlyle Michelson, Director
Office for Analysis and Evaluation
of Operational Data

Enclosure:
As stated

cc w/enclosure:
HDenton, NRR
DEisenhut, NR
GLainas, NRR
FRosa, NRR
JTBeard, NRR
IVillalva, IE

REVIEW OF EVENT AT ST. LUCIE UNIT 1 ON NOVEMBER 30, 1980

Description of Event

On November 30, 1980, the plant operators were in the process of locating a ground in the "A" dc bus. Part of the procedure requires de-energization of the dc control power to two reactor trip circuit breakers (TCBs) at a time. These breakers are designed to trip (fail-safe mode) on undervoltage upon loss of control power. The four TCBs (TCBs 1, 3, 5, and 7) that are supplied control power from the "A" dc bus did not trip on undervoltage when the control power was de-energized. The operators did verify that the shunt trip of all four TCBs was functioning. Operators also verified that the TCBs of "B" dc bus (TCBs 2, 4, 6, and 8) did trip on undervoltage and in fact caused a plant trip while testing. Since the shunt trip on all eight TCBs was functioning, the capability of plant trip due to measured Reactor Protection Systems variables (high neutron flux, low steam generator level, etc.) was not degraded.

Investigation by the licensee revealed that the existing periodic RPS test procedure does not verify the independent trip operation of the undervoltage trip and the shunt trip.

Comments

Referring to Figure 1, it can be seen that each TCB can be tripped by either the energization of the shunt trip coil or the de-energization of the undervoltage coil. During a reactor trip or CEDM power trip test these coils operate simultaneously causing the trip opening of the associated TCBs. During the event, however, upon de-energization of the 125 V dc control power the undervoltage trip coils did not open to trip TCBs 1, 3, 5, and 7. The arrangement of the RPS and the relevant test procedure appear to be similar for most of the operating CE PWRs.

The test procedure at St. Lucie has since been revised to test undervoltage coils by removing dc control power from them. A review of the reactor trip circuit breaker wiring diagram at St. Lucie apparently shows that a local trip circuit exists that uses the shunt trip device. A test using this local trip circuit is also being included in the St. Lucie procedure. The inclusion of these two tests (along with the existing testing) would verify the functionability of both the undervoltage trip and shunt trip of the TCBs.

We believe that similar modifications that would address the verification of function of the undervoltage trip and shunt trip of the TCBs should be included in the procedures used by other CE reactor licensees.

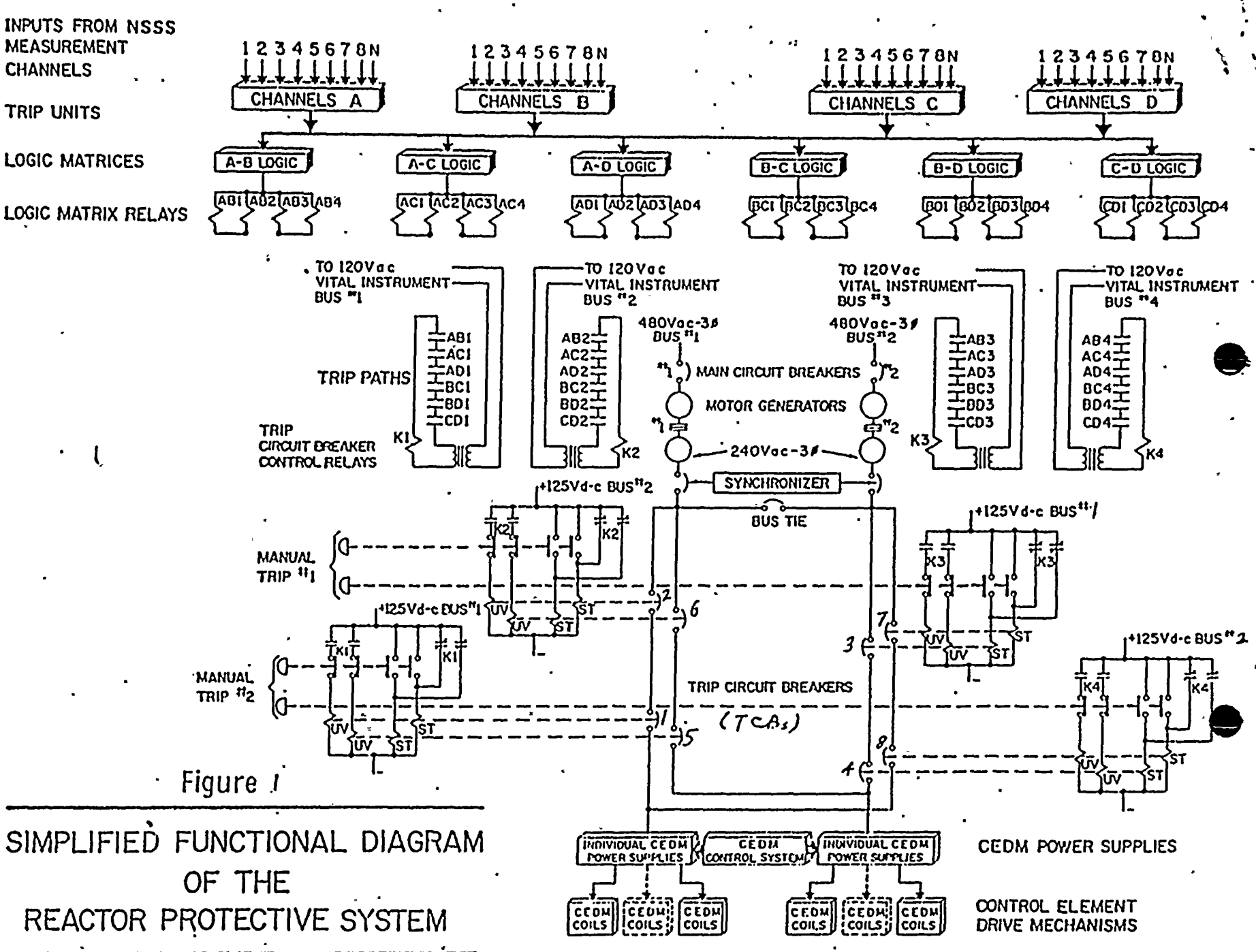

Figure 1

SIMPLIFIED FUNCTIONAL DIAGRAM
OF THE
REACTOR PROTECTIVE SYSTEM