VERMONT YANKEE NUCLEAR POWER CORPORATION

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B.4.1.1.

WVY 80-37

REPLY TO:
ENGINEERING OFFICE
TURNPIKE ROAD
WESTBORO, MASSACHUSETTS 01581
TELEPHONE 617-366-9011

March 10, 1980

United States Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406

Attention: Office of Inspection and Enforcement
Mr. Boyce H. Grier, Director

References: (1) License No. DPR-28 (Docket No. 50-271)
(2) USNRC Letter to VYNPC dated November 30, 1979; IE Bulletin No. 79-27

Subject: Response to IE Bulletin No. 79-27: Loss of Non-Class-1E Instrumentation and Control Power System Bus During Operation

Dear Sir:

The following information is submitted in response to Reference (2):

ITEM 1: "Review the Class 1E and Non-Class 1E buses supplying power to safety and non-safety related instrumentation and control systems which could affect the ability to achieve a cold shutdown condition using existing procedures or procedures developed under Item 2 below."

Response:

The following buses provide power to the systems required to achieve a cold shutdown.

1. 125 V DC Distribution Panel DC-1
2. 125 V DC Distribution Panel DC-1C
3. 125 V DC Distribution Panel DC-2
4. 125 V DC Distribution Panel DC-2C
5. 120 V AC Reactor Protection System Bus A
6. 120 V AC Reactor Protection System Bus B
7. 120/240 V Uninterruptible (Vital) AC Distribution Panel
8. 120 Volt Vital AC Subpanel A
9. 120/240 V AC Instrumentation Distribution Panel
10. 120 Volt IAC Subpanel A

ITEM 1(a): "For each bus identify and review the alarm and/or indication provided in the control room to alert the operator to the loss of power to the bus."

Response:

The buses listed above are provided with the following alarms and/or indication in the control room to alert the operator to the loss of power to the bus.

1. 125 V DC Distribution Panel DC-1

   - Voltmeter
   - Battery Voltage Low Alarm
   - Battery Charger - AC Failure Alarm
   - Load Feeder Breakers Trip Alarm

2. 125 V DC Distribution Panel DC-1C

   - Trip of Main Incoming Breaker Alarm

   (This panel is connected to 125 V DC Distribution Panel DC-1. The indication and alarms for panel DC-1 also apply to this panel.)

3. 125 V DC Distribution Panel DC-2

   - Voltmeter
   - Battery Voltage Low Alarm
   - Battery Charger - AC Failure Alarm
   - Load Feeder Breakers Trip Alarm

4. 125 V DC Distribution Panel DC-2C

   - Trip of Main Incoming Breaker Alarm

   (This panel is connected to 125 V DC Distribution Panel DC-2. The indication and alarms for panel DC-2 also apply to this panel.)

5. 120 V AC Reactor Protection System Bus A

   - No specific bus alarm or indication

(The loss of an RPS bus is a fail-safe measure which places the plant in a half-scram condition.)

6. 120 V AC Reactor Protection System Bus B

   - No specific bus alarm or indication

   (The loss of an RPS bus is a fail-safe measure which places the plant in a half-scram condition.)

7. 120/240 V AC Uninterruptible (Vital) AC Distribution Panel

   - Loss of Power Alarm

   (This panel is normally fed by the vital motor generator set MG-2-1A. A control room alarm is also provided to indicate if the MG set automatically transferred to the dc supply or if the dc supply is lost.)

8. 120 Volt Vital AC Subpanel A

   - No specific bus alarms or indication

   (This panel is connected to 120/240 Volt Uninterruptible (Vital) AC Distribution Panel.)

9. 120/240 VAC Instrumentation Distribution Panel

   - No specific bus alarm or indication

10. 120 Volt IAC Subpanel A

    - No specific bus alarms or indication

    (This panel is connected to 120/240 volt AC Instrumentation Distribution Panel.)

In addition, the following power alarms are provided on a system basis in the main control room:

"System II, Core Spray, RHR, HPCI Bus Logic Power Failure"
"System I, Core Spray, RHR, HPCI Bus Logic Power Failure"
"HPCI Inverter Circuit Failure"

ITEM 1(b): "For each bus identify the instrument and control system loads connected to the bus and evaluate the effects of loss of power to these

loads including the ability to achieve a cold shutdown condition."

Response: The loads connected to each bus that are required to achieve a cold shutdown condition listed below. We have reviewed the loading of each bus and have determined that failure of any single bus will not affect the ability to achieve a cold shutdown condition.

1. 125 V DC Distribution Panel DC-1

   - 4 kV ac bus switchgear controls, relaying, metering and indication
   - 125 V DC Distribution Panel DC-1C

2. 125 V DC Distribution Panel DC-1C

   - RCIC relay logic (partial)
   - HPCI relay logic (partial), turbine controls, turbine auxiliaries instruments and indication
   - RHR loop B relay logic, instrumentation and controls
   - Main Steam Isolation Valve Solenoids
   - CS loop B relay logic, instrumentation and controls
   - Safety Relief Valve Solenoids

3. 125 V DC Distribution Panel DC-2

   - 4 kV ac bus switchgear controls, relaying metering and indication
   - 125 V DC Distribution Panel DC-2C

4. 125 V DC Distribution Panel DC-2C

   - RCIC relay logic (partial), turbine controls, turbine auxiliaries, instruments and indication
   - HPCI relay logic (partial)
   - RHR loop A relay logic, instrumentation and controls
   - CS loop A relay logic, instrumentation and controls

- Safety Relief Valve Solenoids
- Main Steam Isolation Valve Solenoids

5. 120 V AC Reactor Protection System Bus A
   - Reactor Protection System Logic A
   - Power Range Neutron Monitoring System "A"
   - Off-Gas and Steam Line Rad Monitoring "A"
6. 120 V AC Reactor Protection System Bus B
   - Reactor Protection System Logic B
   - Power Range Neutron Montoring System "B"
   - Off-Gas and Steam Line Rad Monitoring "B"
7. 120/240 Volt Uninterruptible (Vital) AC Distribution Panel
   - 120 Volt Vital AC Subpanel A
   - HPCI Suction Valve Logic
   - Feedwater Flow and Reactor Level Control
   - Main Steam Isolation Valve Solenoids

   (Upon loss of the normal power supply to this panel, the control room operator can transfer to the alternate power supply by operating a manual transfer switch located in the main control room.)
8. 120 Volt Vital AC Subpanel A
   - RCIC Instrument Power
9. 120/240 Volt AC Instrumentation Distribution Panel
   - 120 Volt IAC Subpanel A
   - RHR Instrument Power (partial)
   - CS Instrument Power

(Upon loss of the normal power supply to this panel, the control room operator can transfer to the alternate power supply by operating a manual transfer switch located in the control room.)

10. 120 Volt IAC Subpanel A

- RHR Instrument Power (partial)

ITEM 1(c): "For each bus describe any proposed design modifications resulting from these reviews and evaluations, and your proposed schedule for implementing those modifications."

Response:

As a result of this investigation, Vermont Yankee is evaluating the need for the installation of alarms in the main control room to indicate loss of voltage to 120 V AC RPS Bus A, 120 V AC RPS Bus B, 120 Volt Vital AC Subpanel A, 120/240 Volt AC Instrumentation Distribution Panel and to 120 Volt IAC Subpanel A.

The RPT/Analog Trip System modification scheduled for implementation during the 1980 fall refueling outage will provide station operators with additional indication of vessel level and pressure to further enhance the existing instrumentation. Two separate and independent 24 volt dc systems will be provided for the operation of these instruments.

ITEM 2: "Prepare emergency procedures or review existing ones that will be used by control room operators, including procedures required to achieve a cold shutdown condition, upon loss of power to each Class 1E and Non-Class 1E bus supplying power to safety and non-safety related instrument and control systems. The emergency procedures should include:

a. the diagnostics/alarms/indicators/symptoms resulting from the review and evaluation conducted per Item 1 above,

b. the use of alternate indication or control circuits which may be powered from other Non-Class 1E or Class 1E instrumentation and control buses,

c. methods for restoring power to the bus.

Describe any proposed design modification or administrative controls to be implemented resulting from these procedures, and your proposed schedule for implementing the changes."

Response:

Procedures for dealing with particular instrumentation power buses exist as follows:

1. Normal and Emergency 125 V dc operation,

2. Alarm Response,

3. 120/240 V ac Uninterruptible (Vital) MG Set.

No procedures exist at present to deal with the loss of the 120 V ac Instrument Bus.

The procedures listed above will be reviewed and modified as necessary, to include the information required in item 2. New procedures will be developed as necessary, to address the loss of the 120 V ac Instrument bus. These formal procedural modifications will be completed by June 30, 1980. In the interim, station operators will be made aware of the results of the evaluation performed to answer this Bulletin.

ITEM 3: "Re-review IE Circular No. 79-02, Failure to 120 Volt Vital AC Power Supplies, dated January 11, 1979, to include both Class 1E and Non-Class 1E safety related power supply inverters. Based on a review of operating experience and your re-review of IE Circular No. 79-02, describe any proposed design modifications or administrative controls to be implemented as a result of the re-review."

Response:

We believe that IE Circular No. 79-02 is not applicable to the Vermont Yankee design for the following reasons:

Vermont Yankee does not use inverters to power the instrumentation and control buses or panels. A motor generator set is used to power the 120/240 vital uninterruptible distribution panel. A small inverter is used to power part of the HPCI system instrumentation; however, the concerns expressed in the circular are not applicable to this inverter.

We trust that you will find this information satisfactory; however, should you desire additional information, please contact us.

Very truly yours,

VERMONT YANKEE NUCLEAR POWER CORPORATION

J. G. Kay for

R. L. Smith
Licensing Engineer

SFU/wpc