Central file

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March 3, 1980

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DOCKET 50-255 - LICENSE DPR-20 -
PALISADES PLANT - RESPONSE TO IE
BULLETIN 79-27, LOSS OF NON-CLASS 1E
INSTRUMENTATION AND CONTROL POWER
SYSTEM BUS DURING OPERATION

Consumers Power Company's response to IE Bulletin 79-27 (loss of non-Class 1E instrumentation and control power system bus during operation) is as follows:

General System Description

The Palisades Plant has five independent 120 V a-c instrumentation and control (I&C) power distribution buses. Four of these buses, labeled Y10, Y20, Y30, and Y40 are Class 1E buses receiving their power from the two station batteries through four inverters. These buses, also called 120 V a-c buses, are powered solely through the inverters from the batteries. There is not any alternate or preferred a-c supply with static switches like those described in IE Bulletin 79-27 and IE Circular 79-02 at the Palisades Plant. The remaining I&C bus is the Y01 instrumentation and control bus which is non-Class 1E. Y01 receives its power from one of two sources, 480 V MCC #01 or 480 V MCC #03.

Item 1

Review the Class 1E and non-Class 1E buses supplying power to safety and nonsafety-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. For each bus:

a. 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.

b. 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.

c. Describe any proposed design modifications resulting from these reviews and evaluations, and your proposed schedule for implementing those modifications.

Response to Item 1

a. The preferred a-c buses, Y10, Y20, Y30, Y40 have undervoltage alarms, 27-1, 27-2, 27-3 and 27-4, which annunciate in the control room on Panel C11, Points 43, 44, 45 and 46, respectively.

The non-Class 1E bus Y01 has undervoltage relays installed but the output contacts are not connected to any alarm or indicator.

b. The following instrumentation is available at the redundant safety injection control panel (C33) and/or the main control room (MCR) for use in safely shutting down the plant:

Scheme No	Description	Panel(s)
IP 32,33	Feedwater Flow Control - SG	Both
IL 34	Pressurizer Wide-Range Level Ind	Both
IL 37-40	Pressurizer Level - L-0102	MCR
IM 04, 05	Steam Generator Aux FW Controls	Both
IP 33-36	Pressurizer Pressure - P-0102	MCR
IP 60	Pressurizer Wide-Range Pressure - P-0103	Both
IP 73	Pressurizer Narrow-Range Pressure - P-0104	MCR

The above schemes (except IL 34, IP 60, and IP 73) are separated into either left-right or 4-channel schemes. This separation precludes the single failure of one bus affecting the plant's ability to safely shut down. These left-right and 4-channel schemes receive their power from the preferred a-c buses, Y10, Y20, Y30 and Y40.

Schemes IL 34 and IP 60 are powered from the non-Class 1E bus Y01 and are not part of a left-right or 4-channel scheme which make them susceptible to a single bus failure. However, these instruments are provided by the 4-channel schemes IL 37-40 and IP 33-36 in the MCR.

Scheme IP 73 is powered from the preferred bus Y40, but is not part of a left-right or 4-channel scheme which makes it susceptible to the failure of the bus. However, this parameter, pressurizer pressure is also available from the 4-channel schemes IP 33-36; the failure of Y40 would not prevent the safe shutdown of the plant.

Based on the above evaluation, the loss of any single instrument and control bus will not prevent the operators from safely shutting the plant down from the MCR. Failure of bus Y01, while shutting down the plant from

the C33 panel, would cause loss of pressurizer pressure and level. However, this panel is used in the event that the MCR becomes inhabitable or main control panel instruments and controls are rendered useless. A new safe shutdown panel is being installed as part of a fire protection modification. (Major damage to the controls in the main control panels by fire also renders the instruments in C33 useless.) This modification provides redundancy for those parameters required to shut the plant down so that it is not necessary to modify the power supplies to schemes IL 34 and IP 60.

c. Based on the above reviews and evaluations, it is not necessary to make any design modifications to the Class 1E, non-Class 1E instrument and control power supplies, or the instruments required to safely shut the plant down.

   Bus Y01 does not have an alarm or indication available to the operator in the MCR but, as was shown above, the loss of bus Y01 does not prevent the safe shutdown of the plant. Therefore, this type of alarm is not necessary.

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 nonsafety-related instrument and control systems. The emergency procedures should include:

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

b. The use of alternate indication and/or control circuits which may be powered from other non-Class 1E and 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 to Item 2

A more thorough review of this item is needed. A response will be made to the NRC on this item on or before April 1, 1980 (prior to plant start-up from the present outage).

Item 3

Rereview IE Circular 79-02, Failure of 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 rereview of IE Circular 79-02, describe any proposed design modifications or administrative controls to be implemented as a result of the rereview.

Response to Item 3

The review of IE Circular 79-02 revealed that the Palisades Plant inverters were not designed the same way as those which malfunctioned at Arkansas Nuclear One - Unit 2.

The integrated control system inverters at ANO 2 have the ability to supply power to the 120 V instrument buses either by inverting d-c to a-c or by an alternate 120 V a-c supply connected to the emergency diesel generators. A static transfer switch is used to transfer from the normal supply to the alternate supply. It was during this transfer that a loss of instrument power occurred.

The Palisades Plant inverters that feed the preferred 120 V a-c Class 1E buses do not have this transfer feature which precludes the transfer of safety systems to a dead bus.

The non-Class 1E bus, Y01, is not supplied from an inverter, therefore, items addressed in the circular are not applicable for this bus either.

As a result of the above review, no new design modifications or administrative controls are necessary.

David P Hoffman (Signed)

David P Hoffman
Nuclear Licensing Administrator

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