central files

Iowa Electric Light and Power Company
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LDR-80-65

LARRY D. ROOT
ASSISTANT VICE PRESIDENT
NUCLEAR GENERATION

50-331

Mr. James G. Keppler, Director
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Loss of Non-Class-IE Instrumentation and Control Power System Bus During Operation

Reference: IE Bulletin No. 79-27

File: A-101a

Dear Mr. Keppler:

Please find attached our responses to items 1, 2 and 3 of IE Bulletin 79-27.

Very truly yours,

Larry D. Root

L. D. Root
Assistant Vice President
Nuclear Generation

LDR/JVS/n

Enclosure

cc: U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Division of Reactor Operations Inspection
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Response to NRC IE Bulletin No. 79-27

Item No. 1

Review the class-1-E and non-class 1-E buses supplying power to safety and non-safety 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

Refer to Attachment 1 for responses to a) and b). In response to c), our review has determined that no equipment modifications are necessary.

Item No. 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 1-E and non-class 1-E bus supplying power to safety and non-safety 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 1-E or class 1-E 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

A review of instrumentation power supplies is currently in progress. The results of this review will be used to develop the required emergency procedures. A preliminary evaluation has indicated approximately six new emergency procedures will be required. We currently anticipate these new procedures will be drafted and ready to begin the review process by April 30, 1980. The review process should be completed and the procedures approved by May 30, 1980. No design modifications are currently planned or anticipated. During the review of the new emergency procedure, the need for additional administrative controls will be considered and new controls developed if necessary.

Item No. 3

Re-review IE Circular No. 79-02, Failure of 120 Volt Vital AC Power Supplies, dated January 11, 1979, to include both class 1-E and non-class 1-E 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

Our re-review has established that the DAEC does not derive its control and instrumentation power in the manner Arkansas Nuclear One (Unit 2) derives. In view of this and based on the review and analysis performed, we do not intend to modify or impose new administrative controls on our control and instrumentation equipment beyond the ones already specified in the DAEC Technical Specifications.

REVIEW OF THE CLASS 1E AND NON-CLASS 1E BUSES SUPPLYING POWER
TO SAFETY AND NON-SAFETY RELATED INSTRUMENTATION AND CONTROL SYSTEMS

Bus	Class 1E	Non-Class 1E	Instrumentation and Control System Supplied from the Bus	Source of Power to the Bus	Location of Alarm and/or Indication for the Loss of Power to the Bus	Effects of the Loss of Power to the Bus Including the Ability to Achieve a Cold Shutdown Condition	Remarks
Uninterruptible AC Distr. panel 1Y23 (120/240V AC, 1Ø, 3W)		✓ (Ref: Spec E-30 and E-16)	Major loads include the radiation monitors and recorders, feedwater control system instrumentation and control relays demineralized water system level switches, main turbine control and instrumentation, process computer loads, and control rod position indication. Ref: DWG. E-29 SD-57-3	Primary source: MG set. Alternate source: Instrument AC transformer 1Y2. Transfer from the primary source to the alternate source is accomplished by the automatic transfer switch 1Y22.	On the control room panel 1C08A alarms. 1) Uninterruptible AC trouble 2) Uninterruptible MG set loss of DC 3) Uninterruptible MG set DC motor running 4) 250V DC system trouble (NOTE: 250V DC system provides power to the MG set DC motor) Ref: DWG. E-36 COMPUTER INTERFACE: Computer printout "115V AC UNINTER TRBL" is provided under EID No. C1245.	The loads supplied are important to continued plant operation although not necessary for a safe shutdown of the reactor. Control rod position indication and the feedwater control systems are affected as are the computer and various radiation monitors	The MG set and control panel, instrument AC transformer, automatic transfer switch, uninterruptible AC distribution panel are designed as seismic class II system as required by FSAR, Section 12.3.

ATTACHMENT 1

REVIEW OF THE CLASS 1E AND NON-CLASS 1E BUSES SUPPLYING POWER TO SAFETY AND NON-SAFETY RELATED INSTRUMENTATION AND CONTROL SYSTEMS

Bus	Class 1E	Non-Class 1E	Instrumentation and Control System Supplied from the Bus	Source of Power to the Bus	Location of Alarm and/or Indication for the Loss of Power to the Bus	Effects of the Loss of Power to the Bus Including the Ability to Achieve a Cold Shutdown Condition	Remarks
Reactor Protection System Panel 1Y30, consisting of Bus A and Bus B	✓		BUS A: a) Primary isolation and reactor protection panel 1C15 (Channel "A") b) Power range neutron monitor cabinet "A" (panel 1C37) c) Inboard primary isolation valve relay board 1C41 d) Start up range neutron monitoring cabinet "A" (panel 1C36) BUS B: a) Primary isolation and reactor protection panel 1C17 (Channel "B") b) Power range neutron monitor cabinet "B" (panel 1C37) c) Process radiation monitors vert. board 1C10 d) Outboard primary containment isolation valve relay board 1C42 e) Start up range neutron monitoring cabinet "B" (panel 1C36) REF: Dwg. E-29	PRIMARY SOURCE MG set 1G51 for Bus A MG set 1G61 for Bus B ALTERNATE SOURCE FOR BUS A AND B Safeguard MCC 1B32 via 15 kVA, 1Ø, 60 Hz, 480-120/240V transformer 1Y32	Loss of power to the Bus "A" will result into one of the following alarm on the control room panel 1C05-A: a) Trip system "A" reactor auto scram b) Trip system "A" reactor manual scram Loss of power to the Bus "B" will result into one of the following alarms on the control room panel 1C05-B: a) Trip system "B" reactor auto scram b) Trip system "B" reactor manual scram	Since the power for the reactor protection is supplied by two independent high inertia AC motor-generator sets, one power supply can be lost without causing a plant shutdown or affecting ability to shut the plant down (loss of one bus causes half scram). Loss of power to Bus "A" and "3" will scram the plant in a fail safe mode. Reference: FSAR Appendix "M", page M.3-12. A comprehensive comparison of the reactor protection system with the design requirements of IEEE 279-1968 has been assembled into topical report "Compliance of Protection System to Industry Criteria and General Electric BWR Nuclear Steam Supply System" (DAEC FSAR Table 1.1-10, Report No. 29-GE/NEDO 10139). The results of this analysis show that the BWR reactor protection system which will produce protective actions during and after a postulated reactor loca will meet the design requirements of IEEE 279-1968.	The reactor protection system is designed as a seismic Class I system as required by FSAR, Section 12.3. NOTE: MG sets 1G51 and 1G61 are non-safety related.

ATTACHMENT 1

REVIEW OF THE CLASS 1E AND NON-CLASS 1E BUSES SUPPLYING POWER TO SAFETY AND NON-SAFETY RELATED INSTRUMENTATION AND CONTROL SYSTEMS

Bus	Class 1E	Non-Class 1E	Instrumentation and Control System Supplied from the Bus	Source of Power to the Bus	Location of Alarm and/or Indication for the Loss of Power to the Bus	Effects of the Loss of Power to the Bus Including the Ability to Achieve a Cold Shutdown Condition	Remarks
Essential 125V DC Bus 1D10 (DC Distr. panel No. 1)	✓		The 125V DC Buses 1D10 and 1D120 provide a reliable source of continuous power for circuit breaker control, instrumentation, protective apparatus and other essential auxiliaries during the normal mode of plant operation and, in concert with other Class 1E systems, to provide the electrical power, control and instrumentation for safe plant shutdown following LOCA or LOOP. The details of the loads supplied from panels 1D10 and 1D20 are shown on Dwg. E-27.	For Bus 1D10: a) Class 1E, 125V DC charger No. 1 (1D12) supplied by Class 1E MCC 1B32 b) Class 1E, 125V DC battery 1 (1D1) For Bus 1D20: a) Class 1E, 125V DC charger No. 2 (1D2) supplied by Class 1E MCC 1B42. b) Class 1E, 125V DC battery 2 (1D2) Note: Class 1E battery charger 1D120 is a spare with two output circuit breakers and is used only when either battery charger 1D12 or 1D22 is inoperative.	On the Control Room Panel 1C09A: a) 125V DC charger No. 1 (1D12) trouble b) 125V DC charger No. 3 (1D120) trouble c) 125V DC system 1 trouble On the Control Room Panel 1C09B: a) 125V DC charger No. 2 (1D22) trouble b) 125V DC system 2 trouble Computer Interface: Activation of any of the 125V DC systems or charger annunciators provide a computer alarm and a 125V DC "trouble" print out. The computer input is provided by annunciator auxiliary contacts. (RRID No. C1244 and C1250) Ref: Dwgs. E-36 and E-37	Both the requirements of the DAEC technical specifications and the essential nature of the loads supplied impose restrictions on shutdown of the 125V DC system. During special or infrequent operating conditions, or as a result of inoperable components, the system can be placed in a mode of operation that is different from its normal operational mode. During these conditions, strict compliance is required to the limiting conditions of operation as defined by the DAEC technical specifications.	The 125V DC system is designed as a seismic Class I system as required by FSAR Section 12.3.
Essential 125V DC Bus 1D20 (DC Distr. panel No. 2)	✓ Ref: Specs E-11, E-12, and E-29						

ATTACHMENT 1

REVIEW OF THE CLASS 1E AND NON-CLASS 1E BUSES SUPPLYING POWER
TO SAFETY AND NON-SAFETY RELATED INSTRUMENTATION AND CONTROL SYSTEMS

Bus	Class 1E	Non-Class 1E	Instrumentation and Control System Supplied from the Bus	Source of Power to the Bus	Location of Alarm and/or Indication for the Loss of Power to the Bus	Effects of the Loss of Power to the Bus Including the Ability to Achieve a Cold Shutdown Condition	Remarks
±24V DC distribution panel No. 1 (1D50) and ±24V DC distribution panel No. 2 (1D60)	✓ (Ref: Specs E-29, E-11 and E-12)		FROM BUS 1D50 (PANEL 1): a) Start up range NMS panel 1C36 b) Process radiation monitor SB (panel 1C10) c) Start up range NMS panel 1C36. FROM BUS 1C60 (PANEL 2): a) Start up range NMS panel 1C36 b) Process radiation monitor SB (panel 1C10) c) Start up range NMS panel 1C36. Ref: Dwg. E-28	TO PANEL NO. 1 (1D51): a) Class 1E battery chargers 1D51 and 1D52 b) Class 1E battery 1D5 TO PANEL 2 (1D60): a) Class 1E battery chargers 1D61 and 1D62 b) Class 1E battery 1D6 Ref: Dwg. E-28	ON THE CONTROL ROOM PANEL 1C05A: ±24 Volt DC system "A" trouble. ON THE CONTROL ROOM PANEL 1C05A: ±24 Volt DC system "B" trouble. COMPUTER INTERFACE: Computer print out "±24V DC SYS A/B TRBL" is provided under NID No. C1247.	Both the requirement of the DAEC technical specifications and the essential nature of the loads supplied to use restrictions on shutdown of the 24V DC system. Infrequent shutdown will be in compliance with the limiting conditions of operation as defined by the DAEC technical specifications.	The ±24 Volt DC system is designated as a safety related Class I system as required by the DAEC FSAR Section 12.3.

ATTACHMENT 1

REVIEW OF THE CLASS 1E AND NON-CLASS 1E BUSES SUPPLYING POWER
TO SAFETY AND NON-SAFETY RELATED INSTRUMENTATION AND CONTROL SYSTEMS

Bus	Class 1E	Non-Class 1E	Instrumentation and Control System Supplied from the Bus	Source of Power to the Bus	Location of Alarm and/or Indication for the Loss of Power to the Bus	Effects of the Loss of Power to the Bus Including the Ability to Achieve a Cold Shutdown Condition	Remarks
250 Volt DC distr. panel 1D40 250 Volt DC panels 1D41 and 1D42 are subfed from the panel 1D40	✓ ✓ (Ref: Specs E11, E12 and E29)		The 250 Volt DC system provides a reliable and independent source of power to valves, pumps and the uninterruptible AC motor generator (MG) which serves redundant and/or emergency functions and, in concert with other Class 1E electric systems, provides the electric power required for safeguards systems for safe plant shutdown. For the details of the loads supplied, please see Dwg. E-28.	To 250V DC distribution panel 1D40: a) Class 1E battery charger 1D44 fed from Class 1E MCC 1B42 b) Alternate Class 1E battery charger 1D43 fed from Class 1E MCC 1B32. c) Class 1E, 250V DC battery 104. (Ref: Dwg. E-28)	ON THE CONTROL ROOM PANEL 1C05B: a) 250 Volt DC system trouble b) 250 Volt DC charger 1D43 trouble c) 250 Volt DC charger 1D44 trouble Ref: Dwg. E-37 COMPUTER INTERFACE: The following print out is provided: a) "250V DC SYS TRBL" MID No. C1246 b) "250V DC CHGR 1D43 TRBL" MID No. C1248 c) "250V DC CHGR 1D44 TRBL" MID No. C-1249	During special or infrequent operating conditions, or as a result of inoperable components, the system can be placed in a mode of operation that is different from its normal operational mode. During these conditions, strict compliance to the limiting conditions of operation as described in the DAEC technical specifications is required.	The 250 Volt DC system is designed as a seismic class I system as required by the DAEC FSAR Section 12.3. Loss of the 250V DC system would prevent operation of the HPCI system. However, the HPCI system is backed up by the auto-depressurization system and the low pressure cooling systems which do not require 250V DC power for operation.

ATTACHMENT 1