



SACRAMENTO MUNICIPAL UTILITY DISTRICT □ 6201 S Street, Box 15830, Sacramento, California 95813; (916) 452-3211

February 22, 1980

Nuclear Regulatory Commission
Attention: Mr. R. H. Engelken, Director
Region V Office of Inspection &
Enforcement
1990 North California Boulevard
Walnut Creek Plaza, Suite 202
Walnut Creek, California 94596



Docket No. 50-312
Rancho Seco Nuclear Generating
Station, Unit No. 1
IE Bulletin 79-27

Dear Mr. Engelken:

The Sacramento Municipal Utility District has reviewed IE Bulletin 79-27 concerning the loss of non-class-1-E instrumentation and control power system bus during operation. The following information is provided in response to the items in this Bulletin.

- 1. Review the class 1-E and non-class 1-E 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 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.

1.a. Answer

Rancho Seco has seven buses supplying instrumentation and control systems for the plant. Of the seven, four are class 1-E, and the remaining three are non-class 1-E systems. The identification of each power source is:

- | | |
|-----------------------|-----|
| 1. Vital power source | 1-A |
| 2. Vital power source | 1-B |
| 3. Vital power source | 1-C |
| 4. Vital power source | 1-D |
| 5. Power source | 1-E |
| 6. Power source | 1-F |
| 7. Power source | 1-J |

Each of the above systems has annunciator indication of either trouble or failure within the control room. The identification of each follows:

1. Vital power bus 1A trouble; 125v DC bus A trouble (two separate points)
2. Vital power bus 1B trouble; 125v DC bus B trouble (two separate points)
3. Vital power bus 1C trouble; 125v DC bus C trouble (two separate points)
4. Vital power bus 1D trouble; 125v DC bus D trouble (two separate points)
5. Turbine plant 120v AC bus 1E and 1F trouble;
6. 125v DC bus E trouble; 125v DC bus F trouble (two separate points)
7. Channel "A" power failure (for indication of loss of Safety Features "A" digital power)
8. Channel "B" power failure (for indication of loss of Safety Features "B" digital power)
9. NNI "X" power fail - Note: This power source is supplied from vital bus 1-D.
10. NNI "Y" or "Z" power failure - Note supplied from 1-J
11. ICS or "fan" power failure - Note: This power source is supplied from vital bus 1-C.
12. ICS or NNI 120v AC power transfer. - Note: The source of power when transfer occurs is taken from the 1-J bus.

Therefore, indication of trouble or bus loss for either the class 1-E or non-class 1-E is adequately indicated to the operator.

- b. Identify the instrument and control system loads connected to the bus and evaluate the effects of loss of power to those loads including the ability to achieve a cold shutdown condition.

1.b. Answer

The instrument and control loads connected to each bus is as follows:

1. Vital bus "A" (Class 1E)
 - Safety Features actuation Channel "A" analog
 - Safety Features actuation Channel "A" digital
 - Reactor Protection system Channel "A"
 - Control rod trip breaker "A"
2. Vital bus "B" (Class 1E)
 - Safety Features actuation Channel "B" analog
 - Safety Features actuation Channel "B" digital
 - Reactor protection system Channel "B"
 - Control rod trip breaker "B"
3. Vital bus "C" (Class 1E)
 - Safety Features actuation Channel "C" analog
 - Reactor protection system Channel "C"
 - Integrated control system "X"
 - Control rod drive system logic
4. Vital bus "D" (Class 1E)
 - Reactor protection system Channel "D"
 - Non-nuclear instrumentation system "X"
 - Non-nuclear instrumentation system "Y"
 - Control rod drive system logic
5. Bus 1E (non Class 1-E)
 - Polishing demin control
 - Console and vertical board instruments
 - Plant instrument power
 - Plant miscellaneous control
 - Reactor building instrument power
6. Bus 1F (non Class 1-E)
 - Make-up demin control
 - Pressurizer control
 - Reactor instrument power
 - Pressurizer level control
7. Bus 1J (non Class 1-E)
 - Control rod drive system logic
 - Integrated control system alternate
 - Non-nuclear instrumentation alternate "X"
 - Non-nuclear instrumentation alternate "Y"
 - Auxiliary boilers E-360 and E-365 control

1b Continued

The effects of a loss of Class 1E power to the loads.

1. Safety Features actuation Channel "A" analog
 - a. The effect of a loss of power to this channel results in a channel trip on the analog subsystem.

1b Continued

2. Safety Features Actuation Channel "A" digital
 - a. The effect of a loss of power to this channel will result in a subsystem trip, however, no actuation to the end devices connected to the system will result. This system requires power to actuate the output relays within the system. However, if either of the other two active channels sense a trip requirement, the "B" subsystem devices will be actuated.
3. Reactor Protection System Channel "A"
 - a. The effect of a loss of power to this channel will result in a channel trip.
4. Control Rod Trip Breaker "A"
 - a. The effect of a loss of power to this system will cause a breaker to trip open.
5. Safety Features Actuation Channel "B" Analog
 - a. The effect of a loss of power to this channel is the same as item "1" above.
6. Safety Features Actuation Channel "B" Digital
 - a. The effect of a loss of power to this channel is the same as item "2" above. ("A" devices will actuate)
7. Reactor Protection System Channel "B"
 - a. The effect of a loss of power to this channel will result in a channel trip.
8. Control Rod Trip Breaker "B"
 - a. The effect of a loss of power to this channel will result in the breaker tripping open.
9. Safety Features Actuation Channel "C" Analog
 - a. The effect of a power loss to this subsystem will result in a channel trip, thus resulting in a 1 out of 2 of the remaining channels to actuate all end devices.
10. Reactor Protection System Channel "C"
 - a. The effect of a power loss to this channel will result in a channel trip.

11. Integrated Control System (Supplied from "C")
 - a. The effect of a loss of power to the ICS will result in a power transfer of the ICS via a automatic transfer to a non-Class 1E bus. Therefore, a loss of power on this channel will have no affect on the operation of the ICS. However, if the assumption is taken that a non 1E bus is not available then the ICS failure mode is that all controlled devices will revert to their 50% position.
 12. Control Rod Drive System Logic (Supplied from "C")
 - a. The effect of a loss of power from this source would not affect the operation of the control rod drive system. Redundant power supplies are fed from a separate Class 1E source which would take over the load independently.
 13. Reactor Protection System Channel "D"
 - a. The effect of a power loss to this channel will result in a channel trip.
 14. Non-nuclear Instrumentation System "X" Power and "Y" Power (Supplied from "D")
 - a. The effect of a loss of power from this source would cause the following:
 - 1) Each source of power, one to the "X" supply and one to the "Y", is backed with an automatic transfer switch. If the entire source was lost, both would be transfered to a non-Class 1E bus. Therefore, no adverse affects would be noted.
 15. Control Rod Drive System Logic (Supplied from "D")
 - a. The effect would be the same as 12 above. The redundant power supplies will assume all load for the system.
- The following lists the effect of power loss to non-Class 1E buses and addresses only those items essential to plant operation as far as instrumentation and control is concerned.
16. Polishing Deminerlizer Control (Supplied from E)
 - a. A loss of power to this subsystem would effectively cause a loss of feedwater which would result in transferring to the auxiliary feedwater system. In addition,

16.a Continued

Rancho Seco has the capability of manually bypassing the polishing system which would allow returning to the normal feedwater system if desired. The bypass could be initiated within 10 minutes if this mode was required.

17. Console and Vertical Board Instruments

- a. The instruments and indicators fed from bus "E" are not essential to plant operation, therefore, loss of power would have no adverse affect.

18. Plant Instrument Power, Plant Miscellaneous Control, and Reactor Building Instrument Power

- a. The systems listed here are not essential to plant operations, therefore, loss of power to this system would have no adverse affect.

19. Make-up Demin Control Fed From the "F" Bus

- a. The make-up demin system is not essential to obtaining a cold shutdown, therefore, loss of power to this system would have no adverse affect. In addition, a manual bypass of the system can be initiated to maintain flow in the system for letdown and make-up.
- b. Rancho Seco has the capability through cross ties between this bus (F) and the power system (J) to maintain both buses on the line on a failure of either. To initiate this cross tie would take approximately 5 minutes to restore the power to the lost system. Operating procedures are available to cover this requirement.

20. Any other system, fed by either the "F" bus or the "J" bus, necessary for a controlled shutdown of the plant, can be handled in the same manner as stated in item 19.b.

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

1.c. Answer

Based on the results of this review, no design modifications are proposed.

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.

Answer

As described in response to Question 1.b 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 that may be required to achieve a cold shutdown condition there is an automatic transfer to another power source. Therefore, no additional emergency procedures are required.

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 modification or administrative controls to be implemented as a result of the re-review.

Answer

As a result of the District's re-review of IE Circular No. 79-02 Failure of 120 Volt Vital AC Power Supplies, it has been determined that no additional changes are required in either design or administrative control.

Mr. Engelken

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February 22, 1980

Please advise if we can provide any additional information; however, we consider this response to complete the requirements fo the subject bulletin and will take no further action unless so advised.

Sincerely yours,

W. S. Bossenmaier

W. S. Bossenmaier
Acting General Manager

cc: Office of Inspection and Enforcement
Division of Reactor Operations Inspection