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ILLINOIS POWER

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Docket No. 50-461

Document Control Desk
Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Clinton Power Station's Response to Generic Letter 91-06, "Resolution of Generic Issue A-30, 'Adequacy of Safety-Related DC Power Supplies'"

Dear Sir:

On May 9, 1991, Illinois Power (IP) received Generic Letter (GL) 91-06. Clinton Power Station (CPS) was requested to provide a response to nine questions posed in an attachment to the GL to enable the Nuclear Regulatory Commission (NRC) to determine if further action is required by CPS to resolve Generic Issue A-30. The CPS response to those questions is provided in Attachment 1.

This submittal completes the CPS response to GL 91-06.

I hereby affirm that the information in the letter is correct to the best of my knowledge.

Sincerely yours,

J. S. Perry
Vice President

WTD/alh

Attachment

cc: NRC Clinton Licensing Project Manager
NRC Resident Inspector, V-690
NRC Region III, Regional Administrator

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NRC Generic Letter 91-06 Questions and Clinton Power Station Responses

Question 1) Unit?

Response 1) Clinton Power Station

Question 2.a) What is the number of independent redundant divisions of Class 1E or safety-related dc power for this plant?

Response 2.a) Four

Question 2.b) What is the number of functional safety-related divisions of dc power necessary to attain safe shutdown for this plant?

Response 2.b) Under normal circumstances, one division (either Division 1 or Division 2) is adequate to attain safe shutdown. However, for the purposes of analyzing design basis accidents, two divisions were analyzed to be adequate, with Division 4 and one of the three remaining divisions (Division 1, 2, or 3) assumed to be unavailable.

Question 3.a) Does the control room at this unit have the following separate, independently annunciated alarms for each division of dc power?

1) Battery disconnect or circuit breaker open
2) Battery charger disconnect or circuit breaker open (both input ac and output dc)
3) dc system ground
4) dc bus undervoltage
5) dc bus overvoltage
6) Battery charger failure
7) Battery discharge

Response 3.a)

	Division 1	Division 2	Division 3	Division 4
1.	No	No	Yes	No
2.	No	No	No	No
3.	Yes	Yes	No	Yes
4.	Yes	Yes	No	Yes
5.	No	No	No	No
6.	No	No	No	No
7.	No	No	No	No

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Question 3.b) Does the control room at this unit have the following separate, independently annunciated indications for each division of dc power?

1) Battery float charge current
2) Battery circuit output current
3) Battery discharge
4) Bus voltage

Response 3.b)

	Division 1	Division 2	Division 3	Division 4
1.	Yes	Yes	No	Yes
2.	Yes	Yes	No	Yes
3.	Yes	Yes	Yes	Yes
4.	Yes	Yes	Yes	Yes

Question 3.c) Does the unit have written procedures for response to the above alarms and indications?

Response 3.c) As indicated below:

Item	Division 1	Division 2	Division 3	Division 4
3.a.1.	CPS 5060.01	CPS 5061.01	CPS 5062.21	CPS 5061.01
2.	CPS 5060.04	CPS 5061.04	CPS 5062.26	CPS 5061.04
3.	CPS 3503.01	CPS 3503.01	CPS 3503.01	CPS 3503.01
	CPS 5060.03	CPS 5061.03	CPS 5062.28	
			CPS 5236.19	
			CPS 5062.26	CPS 5061.03
4.	CPS 3503.01	CPS 3503.01	CPS 3503.01	CPS 3503.01
	CPS 5060.02	CPS 5061.02	CPS 5286.07	CPS 5061.02
	CPS 9382.02	CPS 9382.02	CPS 9382.02	CPS 9382.02
5.	CPS 9382.02	CPS 9382.02	CPS 9382.02	CPS 9382.02
6.	CPS 3503.01	CPS 3503.01	CPS 3503.01	CPS 3503.01
	CPS 5060.02	CPS 5061.02	CPS 5062.26	CPS 5061.02
		CPS 5061.04		CPS 5061.04
7.	No	No	No	No
3.b.1.	No	No	No	No
2.	No	No	No	No
3.	No	No	No	No
4.	No	No	No	No

Question 4) Does this unit have indication of bypassed and inoperable status of circuit breakers or other devices that can be used to disconnect the battery and battery charger from its dc bus and the battery charger from its ac power source during maintenance or testing?

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Response 4)

Division 1	Yes
Division 2	Yes
Division 3	No
Division 4	No

Question 5) If the answer to any part of question 3 or 4 is no, then provide information justifying the existing design features of the facility's safety-related dc systems.

Response 5) 3.a.1 Divisions 1 & 2 have a Battery Feed Breaker trip connected in parallel with the respective Charger Feed Breaker Trip Inverter Feed Breaker and Distribution Panel Feed Breaker Trip at annunciator windows 5060-1E and 5061-1E. However, each incoming signal is monitored independently by the Performance Monitoring System Computer. Whenever the subject windows illuminate, the Main Control Room operators, with the help of CPS Annunciator Procedures listed in the response to question 3.c, can identify the source of the incoming signal. Division 4 battery feed is fused at 125 VDC MCC 1DC15E, compartment 1A. The pulling or the blowing of this fuse would result in the loss of indication on the Main Control Room ammeter 1II-DC008.

3.a.2 The ac input and dc output of the Division 1, 2, & 4 battery chargers are annunciated by charger relays K-1 and K-3. These relay contacts are connected in parallel at annunciator windows 5060-4E, 5061-4E and 5061-4F. Division 3 annunciates the battery charger dc output only at window 5062-6A. Loss of input ac power to the charger results in an annunciation of the charger output alarm.

3.a.3 Division 3 has 125Vdc Ground Annunciation (5286-4A) at a local annunciation panel 1E22-S001B which illuminates "Trouble Diesel Gen 1C" annunciator window (5062-6C) in the Main Control Room. Therefore, all grounds on Class 1E dc systems will be alarmed in the Main Control Room.

3.a.4 There is a voltage alarm which senses and annunciates low dc voltages at local panel 1E22-S001C (125V dc Bus). This alarm illuminates the "Charger Failure" window (5286-2A) at local panel 1E22-S001B. All alarms at this local panel will illuminate annunciator window 5062-6C (Trouble Diesel Gen 1C) in the Main Control Room. Although not independent, an undervoltage condition on the Division 3 125V dc Bus would be annunciated.

3.a.5 No division has an independent alarm which would indicate an overvoltage condition. However, each division has a high-voltage alarm in its respective charger which is connected in parallel to the other charger alarms. The annunciator windows are: Division 1, 5060-4E; Division 2, 5061-4E; Division 3, 5062-6A; and Division 4, 5061-4F. Based on the above, the Main Control Room would be aware of an overvoltage condition on any dc Bus.

3.a.6 Battery charger failure alarms for all divisions are connected in parallel with the other charger alarms. They are annunciated in the windows mentioned above in 3.a.5. This ensures the proper response to charger failures by the operators in the Main Control Room.

3.a.7 An independent alarm to annunciate a battery discharge is not needed. A battery discharge would result from either testing of the battery or a battery charger failure. Testing of the battery requires prior approval of the Main Control Room and battery charger failures are annunciated in the Main Control Room. Therefore, the control room operators would know if a battery is discharging.

3.b.1 Division 3 does not have current indication in the Main Control Room. A problem with the battery float current would be caused by the battery charger being out of adjustment or a charger failure. A charger failure is annunciated in the Main Control Room. Normal battery maintenance at CPS, as required by IEEE 450-1975 and Technical Specifications, would identify any charger adjustment needed prior to degradation of the battery.

3.b.2 The Main Control Room does not have indication of the Division 3 battery output current, but can adequately monitor a battery discharge by using volt meter E22-R618.

3.c CPS has the majority of the alarms referred to in question 3.a; many of the alarms are connected in parallel at the same divisional independent annunciator window. Those conditions in question 3.a for which CPS does not have alarms are adequately covered by other alarms. All annunciator windows for these alarms have written procedures to respond to the condition. Indications do not require a written procedure for response. Normal operating conditions are addressed by the alarm annunciator procedures. CPS has adequate procedures to address problems that can arise on the dc system.

4. The Divisions 3 & 4 ac input sources do not have bypass indication. Indication would not be required with the ac input sources removed because a charger failure alarm would be annunciated. The Division 3 battery and charger output breakers annunciate when opened. The Division 4 battery and charger outputs are fused and bypass status is not indicated. The Main Control Room must be informed prior to battery or charger maintenance/testing; therefore, this indication is not needed.

Question 6.1) Have you conducted a review of maintenance and testing activities to minimize the potential for human error causing more than one dc division to be unavailable?

Response 6.1) Yes

Question 6.2) Do plant procedures prohibit maintenance or testing on redundant dc divisions at the same time.

Response 6.2) No

Question 7) Are maintenance, surveillance and test procedures regarding station batteries conducted routinely at this plant? Specifically:

a. At least once per 7 days are the following verified to be within acceptable limits:

Response 7)

1. Pilot cell electrolyte level? Yes
2. Specific gravity * or charging current? Yes
3. Float voltage*? Yes
4. Total bus voltage on float charge? Yes
5. Physical condition of all cells? No

* Specific gravity (2) and float voltage (3) on pilot cell only

b. At least once per 92 days, or within 7 days after a battery discharge, overcharge, or if the pilot cell readings are outside the 7-day surveillance requirements, are the following verified to be within acceptable limits:

1. Electrolyte level of each cell? Yes
2. The average specific gravity of all cells? Yes
3. The specific gravity of each cell? Yes
4. The average electrolyte temperature of a representative number of cells? Yes
5. The float voltage of each cell? Yes
6. Visually inspect or measure resistance of terminals and connectors (including the connectors at the dc bus)? Yes

c. At least every 18 months are the following verified:

1. Low resistance of each connection (by test)? Yes
2. Physical condition of the battery? Yes
3. Battery charger capability to deliver its rated ampere output to the dc bus? No
4. The capability of the battery to deliver its design duty cycle to the dc bus? Yes*
   * Once per 60 month interval, a performance discharges test is performed in lieu of the battery service test.
5. Each individual cell voltage is within acceptable limits during the service test? Yes

d. At least every 60 months, is capacity of each battery verified by performance of a discharge test? Yes

e. At least annually, is the battery capacity verified by performance discharge test, if the battery shows signs of degradation or has reached 85% of the expected service life? No

This is done at least once per 18 months.

Question 8) Does this plant have operational features such that following loss of one safety-related dc power supply or bus:

a. Capability is maintained for ensuring continued and adequate reactor cooling? Yes
b. Reactor coolant system integrity and isolation capability are maintained? Yes
c. Operating procedures, instrumentation (including indicators and annunciators), and control functions are adequate to initiate systems as required to maintain adequate core cooling? Yes

Question 9) If the answer to any part of question 6, 7, or 8 is no, then provide your basis for not performing the maintenance, surveillance and test procedures described and/or the bases for not including the operational features cited.

Response 9) 6.2 At CPS, it is not necessary nor desirable to place such a restriction on the operation of the plant. CPS Technical Specifications, the USAR or procedures do not prohibit maintenance/ testing on redundant DC divisions nor is it desirable to have such restrictions. Much of battery maintenance is passive in nature and can be performed on different divisions at the same time. Examples of this type of corrective maintenance are: Taking specific gravity and voltage readings, equalizing the battery, and watering the battery. In cases where nonpassive maintenance is in progress on one division (i.e. cleaning intercell connectors) and a failure occurs on another (i.e., charger failure), it is in the best interest of public safety to work on both divisions until they are both restored. Routine work at CPS is

scheduled on a 12-week rolling schedule which assigns work along divisional lines. Emergent work will be scheduled as the situation requires by Shift Supervisors.

7.a.5 A weekly check of the physical condition of all cells is not required by CPS Technical Specifications. IEEE-450-1975 requires that items in section 3.3 be checked on a regularly scheduled basis. On a weekly basis, CPS inspects the cell post area for seal leakage. On a quarterly basis, CPS inspects: battery and room cleanliness, exposed copper on visible surfaces of lead plated components, battery racks, corrosion inhibiting lubricants, flame arrestors, cell installation abnormalities, and area for evidence of electrolyte spillage. Once every 18 months, the battery is completely inspected. The dc System Engineer informally inspects the battery routinely and initiates any correct maintenance needed. Based on the above, CPS adequately observes the physical condition of the cell.

7.c.3 Division 4 battery charger is rated at 300 amps. The Division 4 battery has the same amp-hr rating as Division 3 (368 amp-hrs). Division 3 battery charger is rated at 100 amps. CPS Technical Specifications require both Division 3 and 4 chargers to be tested at 100 amps for four hours. Based on the rating of the Division 4 battery, CPS believes testing the charger at 100 amps is sufficient.

7.e A performance discharge test is done once per 18 months to conform to the requirement of CPS Technical Specification 4.8.3.2f. The loss of battery capacity can be monitored visually and with routine battery maintenance. CPS monitors the physical condition of the battery as described in 9-7.a.5. In addition, CPS currently operates on an 18-month fuel cycle. It would be overly restrictive to require the plant to shut down to perform this discharge test. With the above visual inspections, CPS believes it is acceptable to test the batteries every 18 months instead of every 12 months.