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SUBJECT: Forwards response to Generic Ltr 91-06, "Resolution of Generic Issue A-30, 'Adequacy of Safety-Related DC Power Supplies.'"

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WILLIAM F. CONWAY
EXECUTIVE VICE PRESIDENT
NUCLEAR

161-04240-WFC/GAM

October 25, 1991

Docket Nos. STN 50-528/529/530

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Station P1-37
Washington, D.C. 20555

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Response to Generic Letter 91-06, "Resolution of Generic Issue A-30, "Adequacy of Safety-Related DC Power Supplies," Pursuant to 10 CFR 50.54 (f)"
File: 91-010-026; 91-056-026

Enclosed with this letter is the Arizona Public Service Company (APS) response to Generic Letter 91-06, "Resolution of Generic Issue A-30, "Adequacy of Safety-Related DC Power Supplies," Pursuant to 10 CFR 50.54 (f)." This response is being submitted to the NRC under oath or affirmation.

Should you have any questions regarding this submittal, please contact Michael E. Powell of my staff at (602) 340-4981.

Sincerely,

WFConway

WFC/GAM/gam

Enclosure

cc: J. B. Martin
D. H. Coe
A. C. Gehr
A. H. Gutterman

A001

161-04240-WFC/GAM
October 25, 1991

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, W. F. Conway, represent that I am Executive Vice President - Nuclear, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true and correct.

W. F. Conway

Sworn To Before Me This 25 Day Of October, 1991.

Linda B. Spell
Notary Public

My Commission Expires

June 5, 1992

QUESTION	RESPONSE	
The following information is to be provided for each unit at each site:		
1. Unit:	PVNGS Units 1,2&3	All three PVNGS units are essentially identical, and the information provided herein is applicable to all three units.
2. a. The number of independent redundant divisions of Class IE or safety-related DC power for this plant is: (Include any separate Class IE or safety-related DC, such as any DC dedicated to the diesel generators.)	Two	There are two independent redundant divisions (load groups) of Class IE or safety-related DC power. Each load group is comprised of two subsystems. The two DC load groups are identified in the PVNGS Technical Specifications, Table 3.8-1 as Trains A and B. This configuration is graphically shown in the PVNGS UFSAR Figure 8.3-4.
b. The number of functional safety-related divisions of DC power necessary to attain safe shutdown for this unit is:	One	The PVNGS UFSAR, Section 8.3.2.2.1.3 describes that the complete loss of either of the DC subsystems (one per each DC load group) which supply control power for their respective Class IE AC load groups will not prevent the minimum safety functions from being performed.
3. Does the control room at this unit have the following separate, independently annunciated alarms and indications for each division of DC power?		
a. Alarms:		

QUESTION		RESPONSE	
1.	Battery disconnect or circuit breaker open?	Yes	On annunciator panels ESA-UA-2E and ESB-UA-2F (Procedures 41AL-1ES2A, 41AL-1ES2B, 42AL-2ES2A, 42AL-2ES2B, 43AL-3ES2A, and 43AL-3ES2B).
2.	Battery charger disconnect or circuit breaker open (both input AC and output DC)?	No	A separate independently annunciated alarm for an open charger disconnect or open input circuit breaker is not provided. However, these alarms are provided on the common charger trouble alarm for each charger, which provides annunciation, CRT display, and typewriter printout in the Control Room (Dwg 13-E-PKB-004).
3.	DC system ground?	No	Independent annunciation is not provided, however, DC system ground is alarmed on a common alarm for each DC subsystem, which provides annunciation, CRT display, and typewriter printout in the Control Room (Dwgs 13-E-PKB-001 and 13-E-PKB-002).
4.	DC bus undervoltage?	No	Independent annunciation is not provided, however, DC system undervoltage is alarmed on a common alarm for each DC subsystem, which provides annunciation, CRT display, and typewriter printout in the Control Room (Dwgs 13-E-PKB-001 and 13-E-PKB-002).
5.	DC bus overvoltage?	No	Bus overvoltage is not provided, but overvoltage is alarmed as a part of the common alarm (the charger DC high voltage output relay is monitoring the DC bus potential). The common alarm provides annunciation, CRT display, and typewriter printout in the Control Room (Dwgs 13-E-PKA-002, 13-E-PKA-004, 13-E-PKA-005, 13-E-PKA-007, and 13-E-PKB-004).

QUESTION	RESPONSE	
6. Battery charger failure?	No	Independent annunciation is not provided, however, battery charger failure is alarmed on a common alarm for each DC subsystem, which provides annunciation, CRT display, and typewriter printout in the Control Room (Dwgs 13-E-PKB-001 and 13-E-PKB-002).
7. Battery discharge?	No	However, battery discharge is alarmed indirectly. During normal operation, the 125 VDC load and battery charging current is supplied by the battery charger. Failure of the battery charger to supply those loads is alarmed. Charger output voltage is alarmed (charger undervoltage relay) at 120 volts DC. If the bus voltage drops to 112 volts, the DC bus undervoltage relay will actuate an additional alarm (Procedures 41AL-1RK1A, 42AL-2RK1A, 43AL-3RK1A).
b. Indications:		
1. Battery float charge current?	No	Battery current indication does not read float charge current (it has 0-1500 amp scale). However, the control room has voltage indication that corresponds to charge/discharge. Also, float charge current is verified during the 7-day surveillance (Procedure 32ST-9PK01).
2. Battery circuit output current?	Yes	Panel B01 (Dwgs 13-E-PKB-001 and 13-E-PKB-002).
3. Battery discharge?	No	Battery discharge indicator is not provided; however, a weekly surveillance test is performed to obtain specific gravity and voltage of each designated pilot cell. This indicates the state of battery charge (Procedure 32ST-9PK01).

QUESTION		RESPONSE	
	4. Bus voltage?	Yes	Panel B01 (Dwgs 13-E-PKA-002, 13-E-PKA-004, 13-E-PKA-005, 13-E-PKA-007).
	c. Does the unit have written procedures for response to the above alarms and indications?	Yes	These procedures are: Procedures 41AL-1RK1A, 41AL-1ES2A, 41AL-1ES2B 42AL-2RK1A, 42AL-2ES2A, 42AL-2ES2B 43AL-3RK1A, 43AL-3ES2A, 43AL-3ES2B
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?	Yes	Annunciation is provided when battery breakers are not in the closed operating position. Annunciation is provided when the charger AC power breaker is open or the DC disconnect is open, as discussed in question 3.a.2 response (Dwgs 13-E-PKB-001, 13-E-PKB-002, 13-E-PKB-004).
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. *See note below.		Justification is provided in the Comments/Justification section following each specific question with a "no" answer.
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? and	No	Physical separation, electrical isolation, and redundancy are provided to prevent the occurrence of common mode failures. In addition, no provision exists for transferring loads between redundant 125 V-DC subsystems (UFSAR 8.3.2.2.1.3 and 8.3.2.2.1.16).

QUESTION		RESPONSE
(2) Do plant procedures prohibit maintenance or testing on redundant DC divisions at the same time?	Yes	This is addressed in Procedures 40AC-90P18, and 73AC-9ZZ04. Also, Technical Specifications 3.8.2.1 and 3.8.2.2 require at least one operable DC train in all modes.
If the facility Technical Specifications have provisions equivalent to those found in the Westinghouse and Combustion Engineering Standard Technical Specifications for maintenance and surveillance, then question 7 may be skipped and a statement to that effect may be inserted here:		The PVNGS Technical Specifications have provisions equivalent to those found in the Combustion Engineering Standard Technical Specifications for maintenance and surveillance; however, question 7 will be answered for verification purposes.
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:		
1. Pilot cell electrolyte level?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK01.
2. Specific gravity or charging current?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK01.
3. Float voltage?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK01.

QUESTION		RESPONSE	
	4. Total bus voltage on float charge?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK01.
	5. Physical condition of all cells?	Yes	Procedure 32ST-9PK01.
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:		Technical Specification 4.8.2.1.b specifies these surveillance requirements be performed at least once per 92 days and within 7 days after a battery discharge with a battery terminal voltage below 105 volts, or battery overcharge with a battery terminal voltage above 145 volts. Technical specification Table 4.8-2, footnote (1) specifies that if any category A parameter (including pilot cell specific gravity or battery charging current less than two amps on charge) is outside the 7 day surveillance requirement, all category B measurements (including those parameters in Question 7.b, 1 through 6 of this response below) must be taken and found within their allowable values.
	1. Electrolyte level of each cell?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK02.
	2. The average specific gravity of all cells?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK02.
	3. The specific gravity of each cell?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK02.
	4. The average electrolyte temperature of a representative number of cells?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK02.

QUESTION		RESPONSE	
5.	The float voltage of each cell?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK02.
6.	Visually inspect or measure resistance of terminals and connectors (including the connectors at the DC bus)?	No	Technical Specification Surveillance Requirement 4.8.2.1 and Procedure 32ST-9PK02 require visual inspection or resistance measurement of battery terminals and connectors during the 92 day surveillance test of station batteries. However, the DC bus connector visual inspection is done as part of the inspection and testing of the DC motor control center, scheduled every third refueling outage. Increased periodicity of the DC bus connector visual inspection is not considered necessary because these connectors are not in close proximity to the battery cells, and therefore are not subject to the potentially corrosive environment of the battery.
c.	At least every 18 months are the following verified:		
1.	Low resistance of each connection (by test)?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK03.
2.	Physical condition of the battery?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK03.
3.	Battery charger capability to deliver rated ampere output to the DC bus?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9ZZ34.

QUESTION		RESPONSE	
	4. The capability of the battery to deliver its design duty cycle to the DC bus?	Yes	Technical Specification Surveillance Requirement 4.8.2.1; Procedure 32ST-9PK03.
	5. Each individual cell voltage is within acceptable limits during the service test?	Yes	Procedure 32ST-9PK03 requires that each cell voltage be monitored during the 18 month battery service discharge test, so that the test can be suspended when any cell voltage drops below acceptable limits.
	d. At least every 60 months, is capacity of each battery verified by performance of a discharge test?	Yes	Technical Specification Surveillance Requirement 4.8.2.1.
	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?	Yes	Technical Specification Surveillance Requirement 4.8.2.1.
8.	Does this plant have operational features such that following loss of one safety-related DC power supply or bus:		

QUESTION	RESPONSE	
a. Capability is maintained for ensuring continued and adequate reactor cooling?	Yes	The PVNGS UFSAR, Section 8.3.2.2.1.13 discusses how each unit has separate and independent DC electric systems capable of supplying minimum ESF loads and loads required for attaining a safe and orderly cold shutdown of the unit assuming a single failure. Procedures 41AO-1ZZ17, 42AO-2ZZ17 and 43AO-3ZZ17 provide guidance to the operators for actions following loss of 125 VDC Class IE electrical power and address the capability to ensure that continued and adequate core cooling is maintained.
b. Reactor coolant system integrity and isolation capability are maintained?	Yes	The PVNGS UFSAR, Section 8.3.2.2.1.13 discusses how each unit has separate and independent DC electric systems capable of supplying minimum ESF loads and loads required for attaining a safe and orderly cold shutdown of the unit assuming a single failure. Procedures 41AO-1ZZ17, 42AO-2ZZ17 and 43AO-3ZZ17 provide guidance to the operators for actions following loss of 125 VDC Class IE electrical power and address maintaining reactor coolant system integrity and isolation capability.
c. Operating procedures, instrumentation (including indicators and annunciators), and control functions are adequate to initiate systems as required to maintain adequate core cooling?	Yes	Procedures 41AO-1ZZ17, 42AO-2ZZ17, 43AO-3ZZ17, provide guidance to the operators for actions following loss of 125 VDC Class IE electrical power. These procedures describe the indicators and annunciators and control functions to initiate systems as required to maintain adequate core cooling.

QUESTION	RESPONSE
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. *See note below.	The basis for the "no" answers to questions 6(1) and 7.b.6 are provided in the Response section for those questions. All other parts to question 6, 7 and 8 are answered "yes".
*Note: For questions involving supporting type information (question numbers 5 and 9), instead of developing and supplying the information in response to this letter, you may commit to further evaluate the need for such provisions during the performance of your individual plant examination for severe accident vulnerabilities (IPE). If you select this option, you are required to: (1) So state in response to these questions, and (2) Commit to explicitly address questions 5 and 9 in your IPE submittal per the guidelines outlined in NUREG-1335 (Section 2.1.6, Subitem 7), "Individual Plant Examination: Submittal Guidance."	The supporting information and justification for any "no" responses has been provided in this submittal. No further evaluation of the need for the provisions with "no" responses is planned.