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 RECIP. NAME RECIPIENT AFFILIATION
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SUBJECT: Special Rept 3-SR-87-007: on 871013, emergency diesel generator A tripped on incomplete sequence. Caused by defective power resistor due to overheating & fatigue. Design change initiated to replace power resistors.

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NOTES: Standardized plant.

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EXTERNAL:	EG&G GROH, M		5	5		H ST LOBBY WARD		1	1
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192-00309-JGH-TRB/TJB

November 9, 1987

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 3
Docket No. STN 50-530 (License NPF-65)
Special Report 3-SR-87-007
File: 87-020-404

Attached please find Special Report 3-SR-87-007 prepared and submitted pursuant to Technical Specifications 4.8.1.1.3 and 6.9.2. This report discusses a valid diesel generator failure on October 13, 1987.

If you have any questions, please contact T. R. Bradish, Compliance Lead at (602) 393-3531.

Very truly yours,

J. G. Haynes
Vice President
Nuclear Production

JGH/TRB/TJB/cld

Attachment

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PALO VERDE NUCLEAR GENERATING STATION UNIT 3

VALID DIESEL GENERATOR FAILURE ON OCTOBER 13, 1987

Docket No. 50-530

License No. NPF-65

Special Report 3-SR-87-007

This Special Report describes an event involving a valid failure of an Emergency Diesel Generator. The report is provided pursuant to Technical Specifications 4.8.1.1.3 and 6.9.2 and contains the information recommended in Regulatory Position C.3.b of Regulatory Guide 1.108, Revision 1, August 1977.

At approximately 1640 MST on October 13, 1987, with Palo Verde Unit 3 in Mode 3 (HOT STANDBY), Emergency Diesel Generator "A" tripped on incomplete sequence/underfrequency during the performance of 43ST-3DG01. Technical Specification ACTION Statement 3.8.1.1.b was entered as a result of the Diesel Generator inoperability and a work request was initiated to troubleshoot the problem.

Troubleshooting of the Diesel Generator revealed that the cause of the failure was a defective power resistor (Manufacturer: Woodward Governor Co., Part No. 8271-230). The power resistor receives 135 volts direct current (vdc), reduces it to 24 vdc, and provides it to the Governor Amplifier. The Governor Amplifier is part of the main electronic controls for the Governor which regulates the Diesel Generator's engine speed by controlling the fuel control system. Thus, the loss of the power resistor renders the Diesel Generator incapable of starting in the emergency mode.

The root cause of the power resistor failure has been determined to be overheating and fatigue resulting in premature failure (based on expected qualified life). The major factor contributing to the failure was the levels at which the dc system voltages are maintained. Based on previous vendor recommendations, Palo Verde Nuclear Generating Station (PVNGS) raised the dc system voltages from 125 vdc to a level of approximately 135 vdc - 137 vdc to resolve stratification problems with the station batteries. This dc system voltage increase is within the specification limits (105 vdc - 140 vdc) for the normal operation of dc equipment. Following the dc system voltage level increases, evaluations have been conducted to establish adjusted qualified life expectancies for those components which have been impacted by the dc system voltage increases.

This power resistor failure is the third similar failure in the last two years. After the second failure, the manufacturer determined the cause to be fatigue. As a result, a design change package was initiated to replace the emergency diesel generator power resistors with solid state DC to DC converters in all three units. The third power resistor failure occurred approximately 18 months after it was fully energized. This was the shortest life span associated with the power resistor failures and approved work documents have been initiated to replace the installed power resistors with new power resistors, as necessary, until the design change package can be implemented. The priorities assigned for

replacement activities are consistent with the length of time the power resistors have been in service. In addition, consideration is being given to lowering the dc system voltage to approximately 130.5 vdc - 131.0 vdc.

Following the troubleshooting effort, the power resistor was replaced, the appropriate surveillance test was completed, Technical Specification Action Statement 3.8.1.1.b was exited, and the Diesel Generator was returned to service at 1507 on October 14, 1987. The Diesel Generator was unavailable for approximately 23 hours after the power resistor failure was identified. This is the second (2nd) failure in the last 10 valid tests. In accordance with the Palo Verde Unit 3 Technical Specifications, the current surveillance test interval (once in 31 days) has been increased to once in 7 days based on the number of failures (determined on a per Diesel Generator basis).

