

<b>PLANT</b>	Palo Verde Nuclear Generating Station	<b>EVENT DATE</b>	September 22, 2006
<b>RESPONSIBLE BRANCH CHIEF</b>	Troy Pruett - Greg Werner Acting	<b>EVALUATION DATE</b>	September 26, 2006
<b>BRIEF DESCRIPTION OF THE SIGNIFICANT OPERATIONAL EVENT OR DEGRADED CONDITION</b>			
<p>On July 25, 2006, Unit 3, Train A, EDG failed to develop output voltage during a surveillance test. The licensee's root cause determined plastic debris potentially prevented auxiliary contacts from properly functioning resulting in shorting out the generator field during startup preventing a proper field flash. Two replacement relays obtained from the licensee warehouse exhibited the same degraded condition. A third relay was satisfactorily tested and installed. The diesel was subsequently tested and declared operable on July 26, 2006.</p> <p>On September 22, 2006, Unit 3, Train A, EDG failed to develop output voltage during a surveillance test. The licensee determined the same auxiliary contact resulting in the previous failures was faulty. The licensee identified that this failure was attributed to a bent metal actuator arm that is used to actuate the auxiliary contacts associated with the field shorting circuit. Additionally, the licensee determined that this bent metal actuator arm exists in all six EDG's at the facility. Based on previous failures identified in July it appears this bent arm is the underlying root cause for the field shorting auxiliary contacts failure to operate reliably and this condition is transportable to all operating EDG's at the facility. During original plant construction a vendor representative straighten out the K1 relay arms. However, the spares in the warehouse still had bent arms.</p> <p>Originally, the K1 relay had a spare set of contacts. The vendor had bent the two spare contactor arms back since they were not to be used. The licensee then decided to use the contacts to short out the generator field when the diesel was secured. During original plant construction, the licensee wired the contacts to short out the generator field. However, when the diesel was started for routine testing, the contacts inadvertently operated to short out the generator field. This prevented the generator from developing an output voltage.</p> <p>Following the July 2006 failure, the licensee replaced the K1 relay with warehouse spares at that time. These are the relays that failed on September 22, 2006. An NRC inspector looked at the remaining spare. The spare contact arms on those relays were also bent back. This calls into question the reliability and operability of the six EDGs for the three Palo Verde units. This could also affect the reliability and operability of any other relays that this vendor supplied to the nuclear industry.</p>			

Y/N	DETERMINISTIC CRITERIA
N	<p><b>a. Involved operations that exceeded, or were not in, the design basis of the facility</b></p> <p>Remarks-</p>
Y	<p><b>b. Involved a major deficiency in design, construction, or operation having potential generic safety implications</b></p> <p>Remarks- The defective spare relays could affect operability of all the Palo Verde Emergency Diesel Generators.</p>
N	<p><b>c. Led to a significant loss of integrity of the fuel, primary coolant pressure boundary, or primary containment boundary of a nuclear reactor - significant loss applies to each boundary</b></p> <p>Remarks-</p>
N	<p><b>d. Led to the loss of a safety function or multiple failures in systems used to mitigate an actual event</b></p> <p>Remarks-</p>
Y	<p><b>e. Involved possible adverse generic implications</b></p> <p>Remarks- This could affect Emergency Diesel Generators at other nuclear power plants</p>
N	<p><b>f. Involved significant unexpected system interactions</b></p> <p>Remarks-</p>
Y	<p><b>g. Involved repetitive failures or events involving safety-related equipment or deficiencies in operations</b></p> <p>Remarks- There was a least one other failure with the same symptoms in 2006.</p>
N	<p><b>h. Involved questions or concerns pertaining to licensee operational performance</b></p> <p>Remarks-</p>
N	<p><b>x. Involved one or more of the radiological or materials criterion provided in MD 8.3 guidance</b></p> <p>Remarks-</p>

# CONDITIONAL RISK ASSESSMENT

IF IT IS DETERMINED THAT A RISK ANALYSIS IS NOT REQUIRED - ENTER NA BELOW  
AND CONTINUE TO THE DECISION BASIS BLOCK

RISK ANALYSIS BY- D. Passehl

DATE- September 26, 2006

## Brief description for the basis of the assessment:

The risk analyst's review considered the impact of the Unit 3 "A" EDG inoperable. Because the EDG failed in a similar fashion on July 25, 2006, the risk analyst performed a condition risk assessment assuming a duration of 59 days (7/25 - 9/22/2006).

The risk analyst used the Palo Verde 1, 2 & 3 Revision 3P SPAR Model Level 1, Change 3.21, created October 2005.

NRC Evaluation (Condition Assessment):

The following basic event was set to "True" (always failed):

EPS-DGN-FS-DGA (Diesel Generator A Fails to Start)

Setting this basic event to "True" appropriately adjusts the common cause failure to start probability for the other EDGs as well.

NRC Result:

$$\text{CCDP} = 7.4 \times 10^{-5}/\text{yr} \times (59/365) = 1.2 \times 10^{-5}$$

The threshold for initiating a special inspection is CCDP of  $>1\text{E-}6$ .

THE ESTIMATED CONDITIONAL CORE DAMAGE FREQUENCY (CCDP) IS

$1.2 \times 10^{-5}$

WHICH PLACES THE RISK IN THE RANGE OF A Special

INSPECTION PROCEDURE.

## RESPONSE DECISION AND BASIS

**USING THE ABOVE INFORMATION AND OTHER KEY ELEMENTS OF CONSIDERATION AS APPROPRIATE, DOCUMENT THE RESPONSE DECISION TO THE EVENT OR CONDITION, AND THE BASIS FOR THAT DECISION**

<b>Response to the event or condition</b>	Conduct a special inspection at Palo Verde to ascertain the extent of the relay failures and design problems.
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### BASIS FOR THE RESPONSE

Based on the CCDP evaluation, MD 8.3 criteria, and potential for diesel failures due to generic relay failures, a special inspection is warranted to determine the significance and extent of condition.

<b>COMPLETED BY</b>	Francis L. Brush <i>/RA/</i>	<b>DATE</b>	September 28, 2006
<b>BRANCH CHIEF REVIEW</b>	Greg Werner <i>/RA/</i>	<b>DATE</b>	September 28, 2006
<b>DIVISION DIRECTOR APPROVAL</b>	Anton (Tony) Vegel for <i>/RA/</i>	<b>DATE</b>	September 28, 2006



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
611 RYAN PLAZA DRIVE, SUITE 400  
ARLINGTON, TEXAS 76011-4005

September 29, 2006

MEMORANDUM TO: Bruce S. Mallett, Regional Administrator

FROM: Greg Werner, Acting Chief, Project Branch B, **/RA/**  
Division Reactor Projects

SUBJECT: MANAGEMENT DIRECTIVE 8.3 EVALUATION FOR  
PALO VERDE NUCLEAR GENERATING STATION (PV 06-19)

Pursuant to Regional Office Policy Guide 0801, "Documenting Management Directive 8.3 Reactive Team Inspection Decisions," the enclosed table provides the Management Directive 8.3 evaluation for determining that a special inspection will be conducted at the Palo Verde Nuclear Generating Station, Unit 3, for the failure of Emergency Diesel Generator 3A to develop an output voltage when started for a surveillance test.

Enclosure:  
MD 8.3 Decision Documentation Form

cc w/Enclosure via e-mail:  
T. Gwynn, DRA  
A. Howell, D/DRP  
D. Chamberlain, D/DRS  
M. Herrera, DRMA  
G. Warnick, SRI  
P. Benvenuto, RI  
J. Melfi, RI  
M. Fields, NRR

SUNSI Review Completed: FLB ADAMS:  Yes     No    Initials: FLB  
 Publicly Available     Non-Publicly Available     Sensitive     Non-Sensitive

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RIV:SPE:DRP\D	AC:DRP/B	SRA:DRS	D:DRS	D:DRP
FLBrush;mjs	GEWerner	DPassehl	DDChamberlain	ATHowell
<i>/RA/</i>	<i>/RA/</i>	<i>/RA/</i>	<i>RCaniano for</i>	<i>AVegel for</i>
9/28/06	9/28/06	9/28/06	9/29/06	9/29/06

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