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102-08410-CDH/LMW
June 3, 2022

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: **Palo Verde Nuclear Generating Station (PVNGS) Units 1 and 3**
Docket No. STN 50-528 and 50-530
License No. NPF-41 and NPF-74
Licensee Event Report Supplement 2021-001-01

Enclosed, please find Licensee Event Report (LER) supplement 50-528/2021-001-01, that has been prepared and submitted pursuant to 10 CFR 50.73. This LER supplement provides the cause and corrective actions for previously reported specified system actuations that occurred in Units 1 and 3 on October 20, 2021.

In accordance with 10 CFR 50.4, copies of this LER supplement are being forwarded to the Nuclear Regulatory Commission (NRC) Regional Office, NRC Region IV and the Senior Resident Inspector.

Arizona Public Service Company makes no commitments in this letter. If you have questions regarding this submittal, please contact Michael DiLorenzo, Department Leader, Regulatory Affairs, at (623) 393-3495.

Sincerely,

Harbor, Cary
(Z16762)

Digitally signed by Harbor,
Cary (Z16762)
Date: 2022.06.03 13:56:16
-07'00'

CDH/LMW

Enclosure

cc: S. A. Morris NRC Region IV Regional Administrator
S. P. Lingam NRC NRR Project Manager for PVNGS
L. N. Merker NRC Senior Resident Inspector for PVNGS



LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)
 (See NUREG-1022, R.3 for instruction and guidance for completing this form <https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

1. Facility Name
Palo Verde Nuclear Generating Station (PVNGS) Unit 1

2. Docket Number
05000528

3. Page
1 OF 4

4. Title
Unit 1 and Unit 3 Emergency Diesel Generator Actuation on Loss of Offsite Power to Class 4.16 kV Buses

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
10	20	2021	2021	001	01	06	03	2022	PVNGS Unit 3	05000530
									Facility Name	Docket Number
										05000

9. Operating Mode : 1 / 1 **10. Power Level** 100/100

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	

Other (Specify here, in Abstract, or in NRC 366A).

12. Licensee Contact for this LER

Licensee Contact: Michael DiLorenzo, Department Leader, Regulatory Affairs
 Phone Number (Include Area Code): 623-393-3495

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To IRIS	Cause	System	Component	Manufacturer	Reportable To IRIS
A	EA	SWGR	G080	Y					

14. Supplemental Report Expected

No Yes (If yes, complete 15. Expected Submission Date)

15. Expected Submission Date

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)
 On October 20, 2021, at approximately 1446 Mountain Standard Time, a valid actuation of the emergency diesel generators (EDGs) for Palo Verde Nuclear Generating Station Unit 1 train 'B' and Unit 3 train 'A' occurred due to an undervoltage condition on their respective 4.16 kilovolt (kV) safety buses. Both EDGs started and loaded as designed, including associated train essential spray pond pumps and the Unit 1 B-train auxiliary feedwater pump.

The loss of power to the Unit 1 and Unit 3 safety buses and resulting component actuations were the result of an unintended personnel contact with an energized portion of the Unit 2 S06 intermediate bus during maintenance. Unit 1 and Unit 3 entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.1, Condition A, for one required offsite circuit inoperable, which was exited after off-site power was restored to the units' respective safety buses.

The root cause of the event was attributed to overconfidence of the work team during validation activities. The team incorrectly assumed the work planning and clearance processes had established conditions for conducting work activities safely. Corrective actions to address the cause of the event include developing and implementing a plan to reinforce the belief and value that, "I am responsible for my own protection". Additional actions include monitoring worker behaviors, developing and delivering training on electrical safe work practices, increased oversight and engagement by station leaders and evaluating and increasing knowledge and proficiency of electrical workers.

No similar events have been reported by PVNGS in the last three years.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collections Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk ail: oir_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Palo Verde Nuclear Generating Station	05000-528	2021	001	01

NARRATIVE

All times are Mountain Standard Time and approximate unless otherwise indicated.

1. REPORTING REQUIREMENT(S):

This Licensee Event Report (LER) is being submitted pursuant to 10 CFR 50.73 (a)(2)(iv)(A) to report a valid automatic actuation of the circuitry that starts the emergency diesel generator (EDG) (EIS: EK) for Unit 1 and Unit 3 following an undervoltage condition on the affected safety bus for each unit on October 20, 2021. The event included actuations of the associated essential spray pond (SP) pumps (EIS: BS) and the Unit 1 B auxiliary feedwater (AF) pump (EIS: BA). This event was reported to the NRC on October 20, 2021, via the event notification system (ENS 55534) and was updated on December 3, 2021.

2. DESCRIPTION OF STRUCTURE(S), SYSTEM(S) AND COMPONENT(S):

The safety related equipment for each Palo Verde Nuclear Generating Station (PVNGS) unit is powered by one of two load groups (A-train and B-train). Either of the associated trains can provide power for safe plant shutdown. Each alternating current (AC) train includes one Class 1E 4.16 kilovolt (kV) bus (EIS: EB).

The preferred and alternate power sources for each load group is offsite 525 kV AC power (EIS: EK) and is supplied via the 13.8 kV secondary windings of two of the three startup transformers (EIS: EA) to six 13.8 kV intermediate buses; Each unit receives 13.8 kV power from two of the intermediate buses. Class 1E 4.16 kV safety load group power is provided from the associated intermediate bus engineered safety feature (ESF) transformers. The standby power supply for each safety load group consists of one EDG (EIS: EK), including its auxiliary and fuel systems. The standby power supply functions as a source of AC power for safe plant shutdown in the event of loss of preferred power and for post-accident operation of ESF loads.

3. INITIAL PLANT CONDITIONS:

On October 20, 2021, Palo Verde Unit 1 and Unit 3 were in Mode 1 (Power Operation) at 100 percent power, normal operating temperature and normal operating pressure. There were no inoperable structures, systems, or components at the time that contributed to this event. Unit 2 was defueled for a refueling outage.

4. EVENT DESCRIPTION:

On October 20, 2021, at 1446, a valid loss of power (LOP) actuation occurred due to an undervoltage condition on the Unit 1 train 'B' and Unit 3 train 'A' safety buses which resulted in an automatic actuation of the circuitry that starts the Unit 1 B-train EDG and Unit 3 A-train EDG. Both EDGs started and loaded as designed. The EDG actuations were accompanied by the start of associated train essential SP pumps in both units. The Unit 1 B-train EDG actuation was also accompanied by the start of the Unit 1 B-train essential auxiliary feedwater pump, as required for the undervoltage condition. By design, actuation of the Unit 3 A-train steam-driven auxiliary feedwater pump was not required in response to the EDG actuation.

The undervoltage condition on the Unit 1 and Unit 3 Class 1E 4.16 kV buses resulted from an electrical fault that occurred when a worker (utility, non-licensed) contacted an energized 13.8 kV element in the back side the "B" cubicle of Unit 2 S06 switchgear, which opened 525 kV breakers supplying the startup transformer AE-NAN-X02. This de-energized the startup transformer which was powering the Unit 1 13.8 kV intermediate bus S06 and the Unit 3 13.8 kV intermediate bus S05, which fed the respective Unit 1 B-train and Unit 3 A-train



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Palo Verde Nuclear Generating Station	05000-528	2021	001	01

4.16 kV Class 1E kV buses.

Both Units 1 and 3 entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.1, Condition A, for one required offsite circuit inoperable. At 2032, on October 20, 2021, Unit 1 restored offsite power to B-train safety bus from the alternate supply and exited the LCO condition. On October 21, 2021, at 1545, Unit 3 restored offsite power to A-train safety bus from the alternate supply and exited the LCO condition.

Unit 2 safety buses and required offsite circuits were unaffected by the AE-NAN-X02 startup transformer trip. Unit 1 A-train and Unit 3 B-train safety buses were supplied by startup transformers AE-NAN-X01 and AE-NAN-X03 and remained energized.

Unit 2 was in a refueling outage and the unintended contact with the energized 13.8 kV element of the Unit 2 S06 switchgear occurred during scheduled inspection and cleaning of the de-energized portions of the switchgear during the outage.

5. ASSESSMENT OF SAFETY CONSEQUENCES:

There were no inoperable structures, systems, or components at the time that contributed to this event. The EDGs responded as designed to the undervoltage condition on their respective safety buses. Essential SP and AF pumps actuated as required for the LOP.

This event did not result in any challenges to the fission product barriers or result in the release of radioactive materials.

This event did not prevent the fulfillment of a safety function, nor did it result in a safety system functional failure as described by 10 CFR 50.73 (a)(2)(v).

6. CAUSE OF THE EVENT:

The direct cause of the undervoltage and the EDG and pump actuations was unintended personnel contact with an energized portion of the Unit 2 S06 switchgear when the electrician working in one of the switchgear cubicles reached into an area outside the clearance boundary to perform a task. The personnel contact with the switchgear resulted in an electrical fault. The fault caused the startup transformer to be isolated from offsite power, which de-energized the 13.8 kV power provided to the affected intermediate buses providing power to the Unit 1 B-train safety bus and the Unit 3 A-train safety bus. When the 13.8 kV safety buses de-energized, the resulting undervoltage signal caused an automatic actuation of the circuitry that starts the Unit 1 B-train EDG, the Unit 3 A-train EDG and the required pumps.

The root cause of the event was attributed to overconfidence of the work team during validation activities. The team incorrectly assumed the work planning and clearance processes had established conditions for conducting work activities safely. This led to gaps in behaviors during the performance of clearance and energized circuit validation prior to commencing work. In this event, the team performed an inadequate clearance boundary verification using a marked-up copy of the site electrical distribution one-line drawing, which shows only the power feeds into the switchgear, not the cross-ties between the switchgear cubicles as is provided on the switchgear detailed one-line drawing.

The event evaluation also identified that contrary to a station procedure, the work team had utilized an organizationally accepted behavior that performing Live-Dead-Live checks is not required when there is confidence that energy is not present.



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7. CORRECTIVE ACTIONS:

Immediate corrective actions were taken to restore offsite power to Unit 1 safety bus 1E-PBB-S04 and Unit 3 safety bus 3E-PBA-S03. Alternate supply power was provided from startup transformers AE-NAN-X01 and AE-NAN-X03 respectively, through their associated intermediate buses to the safety buses.

Corrective actions to address the cause of the event include, Electrical Maintenance department leaders developing and implementing a plan to reinforce the belief and value that, "I am responsible for my own protection", to address worker overconfidence that the work planning and clearance processes will protect them.

Additional corrective actions include monitoring worker behaviors, developing and delivering training to workers on electrical safe work practices, increased oversight and engagement by station leaders, and evaluating and increasing knowledge and proficiency of electrical workers.

8. PREVIOUS SIMILAR EVENTS:

No EDG or ESF actuations resulting from personnel contact with energized circuits have been reported by Palo Verde in the last three years.