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192-00491-JGH/TDS/DAJ
June 8, 1989

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

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket No. STN 50-528 (License No. NPF-41)
Licensee Event Report 89-012-00
File: 89-020-404

Attached please find Licensee Event Report (LER) No. 89-012-00 prepared and submitted pursuant to 10CFR 50.73. In accordance with 10CFR 50.73(d), we are herewith forwarding a copy of the LER to the Regional Administrator of the Region V office.

If you have any questions, please contact T. D. Shriver, Compliance Manager at (602) 393-2521.

Very truly yours,

J. G. Haynes
Vice President
Nuclear Production

JGH/TDS/DAJ/kj

Attachment

cc: D. B. Karner (all w/a)
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NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Palo Verde Unit 1	0 5 0 0 0 5 2 8	1 OF 0 9

TITLE (4)
Emergency Lighting System Deficiencies

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 5	1 0	8 9	8 9	0 1 2	0 0	0 6	0 8	8 9	Palo Verde Unit 2	0 5 0 0 0 5 2 9
									Palo Verde Unit 3	0 5 0 0 0 5 3 0

OPERATING MODE (9)	5	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	X OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	X 50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Timothy D. Shriver, Compliance Manager	6 0 2 3 9 3 - 2 5 2 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 8	3 0	8 9

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On May 10, 1989, Palo Verde Units 1 and 3 were in refueling outages and Palo Verde Unit 2 was in Mode 5 (COLD SHUTDOWN) when APS determined that emergency lighting in Unit 2 did not meet PVNGS design bases or 10CFR50 Appendix R requirements. APS engineering personnel identified twenty-four (24) areas which require the installation of or modification to lighting in order to be able to perform required safe shutdown activities assuming a fire in the control room concurrent with a loss of off-site power. A similar condition is also believed to exist in Units 1 and 3.

The cause of this event is under investigation.

As corrective action, emergency lighting will be installed and/or modified in Unit 2 prior to restart. Additionally, walkdowns will be completed in Units 1 and 3 to evaluate their emergency lighting systems. Any deficiencies wherein emergency lighting does not comply with design requirements will be corrected prior to restart from the current refueling outages.

There have been no previous similar events reported pursuant to 10CFR50.73. This report is also being provided pursuant to Technical Specification 6.9.3.

I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

The following plant conditions existed on May 10, 1989 at approximately 1400 MST when APS engineering department personnel (utility and contractor, non-licensed) determined that lighting in Unit 2 did not meet the design basis provided in the Palo Verde Updated Final Safety Analysis Report (UFSAR):

Palo Verde Unit 1 was in Mode 5 (COLD SHUTDOWN) at approximately 85 degrees Fahrenheit (F) and atmospheric pressure during a scheduled refueling outage.

Palo Verde Unit 2 was in Mode 5 at approximately 125 degrees F and 130 pounds per square inch-absolute.

Palo Verde Unit 3 was in a refueling outage with the core (AC) off-loaded to the Spent Fuel Pool.

B. Reportable Event Description (Including Dates and Approximate Times of Major Occurrences):

Event Classification: A condition that was outside the design basis of the plant (10CFR50.73(a)(2)(ii)). Condition which could adversely affect the ability to achieve and maintain safe shutdown (Technical Specification 6.9.3).

During a March 3, 1989 Unit 3 reactor trip event (Reference LER 530/89-001), concerns were identified with the adequacy and proper operation of emergency and essential lighting (FH)(FG) in the vicinity of the Atmospheric Dump Valves (ADV's)(SB)(V) on the 140 foot elevation of the Main Steam Support Structure (MSSS). The concerns arose as the result of attempts to manually operate the ADV's under less than adequate lighting conditions. Therefore, APS has been conducting an extensive evaluation of the PVNGS emergency and essential lighting systems.

Investigation by APS determined that regulations (i.e., 10CFR50 Appendix R) do not require eight (8)-hour emergency lighting in the immediate vicinity of the ADV's. The ADV's can be operated from the control room and remote shutdown panel; therefore, local-manual control is not required to safely shutdown the unit. Current UFSAR commitments are met by eight(8)-hour emergency lighting installed on the 120 foot elevation of the MSSS. However, based upon lessons learned from the Unit 3 reactor trip event, APS is enhancing the emergency lighting in the ADV area of the MSSS to allow local-manual operation of the ADV's.

As part of the APS investigation, engineering department personnel have been reviewing the adequacy of emergency lighting available for performing a shutdown outside the control room due to a fire and assuming a concurrent loss of off-site power and unavailability of normal and essential lighting (per 10CFR50 Appendix R requirements). Utilizing appropriate design documentation and 42AO-2ZZ44, "Shutdown Outside the Control Room Due to Fire and/or Smoke," APS Nuclear Engineering Department (NED) personnel identified the equipment required to be operated from outside the control room. Next, Unit 2 Operations, Engineering Evaluations Department (EED), and Operations Standards personnel performed system walkdowns to identify potential lighting problems. The system walkdowns were performed using the following acceptance criteria:

1. The Safe Shutdown equipment in 42AO-2ZZ24, "Shutdown Outside the Control Room Due to Fire and/or Smoke (Unit 2)," was accessible utilizing a Safe Shutdown pathway being illuminated with eight (8)-hour emergency lighting.

2. The Safe Shutdown equipment was identifiable utilizing the Equipment Identification Tag and available eight (8)-hour emergency lighting.

3. The actions required by 42AO-2ZZ44 were capable of being performed utilizing available eight (8)-hour emergency lighting.

The potential lighting problems identified during the system walkdowns were reviewed to determine which of the problems were design basis deficiencies (i.e., not in compliance with 10CFR50 Appendix R and UFSAR Design Bases). The review was performed by management and engineering personnel from EED, NED, and Operations Standards. Based upon the results of the system walkdowns and engineering reviews, APS has determined that the following emergency lighting was required to be added in the following Unit 2 areas in order to meet the Emergency Lighting System Design Basis requirements in Section 9.5.1 of the UFSAR or the requirements of 10CFR50 Appendix R (III)(J):

1. Emergency lighting is being added for operating SIB-UV-671, "Containment Spray Control Valve" (BE)(V). SIB-UV-671 is located on the 88 foot elevation of the Auxiliary Building (NF) and is required to be closed in order to prevent the inadvertent loss of Refueling Water Tank (RWT)(CB)(TK) water and/or the initiation of an undesired Recirculation Actuation (JE)(BP).

2. Emergency lighting is being added for performing necessary operations in Auxiliary Relay Cabinet ZAA-C03 (CAB). The cabinet is located on the 120 foot elevation of the Auxiliary Building. A disconnect switch (JS) is required to be opened in order to prevent spurious signals from opening of Auxiliary Spray Valve CHA-HV-205 (CB)(V) and subsequent uncontrolled cool-down.

3. Emergency lighting is being installed for six (6) valves which are required to be operated in order to sample Reactor Coolant System (RCS)(AB) boron concentration:

   a. Valves EW-HCV-146 and EW-HCV-66, "Nuclear Cooling Water System (NCWS)(CC) Supply Isolations" are located in the Shutdown Heat Exchanger (BP)(HX) Valve (V) Gallery on the 70 foot elevation of the Auxiliary Building. These valves are required to be unlocked and opened in order to provide a source of cooling water (Essential Cooling Water System (BI)) to the Nuclear Sampling System sample cooler (CLR).

   b. Valve SSN-V819, "RCS Hot Leg Loop 1 Sample Line Isolation Valve (SSN-HV15) Bypass" (V) is located on the 88 foot elevation of the Auxiliary Building. This valve is required to be opened to provide a flow path for the RCS water since valve SSN-HV15, "RCS Hot Leg Loop 1 Sample Line Isolation Valve" (V) fails shut upon a loss of power.

   c. Valves NC-V049, "Sample Cooler AX-9 Inlet" (CLR) and NC-V054, "Sample Cooler AX-9 Outlet" are located on the 140 foot elevation of the Auxiliary Building. These valves are required to be checked open in order to ensure that the RCS sample is sufficiently cooled.

   d. Valve NCN-UV-99, "Normal Chillers Return to Nuclear Cooling Isolation" is located on the 77 foot elevation of the Auxiliary Building. This valve is required to be shut in order to isolate the Normal Chillers (KM)(CHU) so that an excessive demand is not placed on the Essential Cooling Water System.

4. Emergency lighting is being installed for flow indicator NC-FI-55, "Sample Cooler AX-9 Nuclear Cooling Water Flow Indication" (FI). The flow indicator is located on the 140 foot elevation of the Auxiliary Building. The flow indicator is required to be monitored during boron sampling to ensure that Nuclear Cooling Water System flow is present.

5. Emergency lighting is being added for performing necessary actions in Direct Current (DC) Control Centers E-PKA-M41 and E-PKB-M42 (EJ). The DC Control Centers are located on the 100 foot elevation of the Control Building (NA). Several control switches and breakers are required to be operated inside the control centers in order to prevent spurious actuations. These actions are required to preclude steam generator (SG) overfilling, uncontrolled RCS cool-down, degraded core cooling, and to isolate spurious control room signals.

6. Emergency lighting is being added for monitoring Emergency Diesel Generator "B" (EK)(DG) operation on panel J-DGB-B01 (PNL). The panel is located on the 100 foot elevation of the Diesel Generator Building (NB).

7. Emergency lighting is being installed for breakers E-NAN-S01L, E-NAN-S01M, E-NAN-S02L, and E-NAN-S02M, "13 kv Supply Breakers to Reactor Coolant Pumps (RCPs)" (BKR)(EA). The breakers are located on the 100 foot elevation of the Turbine Building (NM). The breakers are required to be opened to stop the RCP's and remove fuses (FU) in order to prevent inadvertent pump restarts.

8. Emergency Lighting is being added for performing necessary actions in Motor Control Center E-PHB-M32 (ED). The control center is located on the 100 foot elevation of the Control Building. Breaker PHB-M3222 (BKR) is required to be closed following an Emergency Diesel Generator start in order to sequence on the Engineered Safety Features (ESF) Equipment Room Essential Air Handling Units (VI)(AHU).

9. Emergency lighting is being added for performing necessary actions in Auxiliary Relay Cabinet ZJB-C01 (CAB). The cabinet is located on the 100 foot elevation of the Control Building. Disconnect switches are required to be operated in order to prevent spurious signals from opening of ESF Switchgear Room Isolation Dampers (DMP). This is required in order to ensure continued habitability of the ESF Switchgear Rooms and Remote Shutdown Rooms.

10. Emergency lighting is being added for determining the level in the "B" Train Essential Chilled Water System (EC)(KM) surge tank. The EC Surge Tank is located on the 74 foot elevation of the Control Building. The EC Surge Tank Level Indicator (LI) is required to be periodically checked to ensure adequate Chilled Water System inventory.

11. Emergency lighting is being added for opening and racking-out non-class 1E Pressurizer (AB)(PZR) Heater (HTR) Breakers (EA)(BKR) in load center E-NGN-L11. The load center is located on the 100 foot elevation of the Auxiliary Building. This is required in order to prevent spurious signals causing heater operation.

12. Emergency lighting is being added for performing necessary actions in Auxiliary Relay Cabinets ZAN-C01 and ZAN-C02. The cabinets are located at the 120 foot elevation of the Auxiliary Building. Disconnect switches are required to be operated in order to prevent spurious signals from inadvertently operating Charging System valves (CB)(V). This is required in order to maintain control of RCS inventory and boron concentration, and to prevent inadvertent Loss of Auxiliary Spray Flow.

13. Emergency lighting is being added for operating CH-HV-524, "Charging Line Isolation Valve" (CB)(V). The valve is located on the 80 foot level of the Auxiliary Building. The valve is required to be opened in order to ensure a Charging System flowpath for boration.

14. Emergency lighting is being added for illuminating the "B" Emergency Diesel Generator Jacket Cooling Water Surge Tank Level Indicator (LB)(LI); Drain Line N-033-HBDA; valve P-DGB-V013, "Jacket Water Make-up Combined Header Stop"; valve P-DGB-V064, "Jacket Water Make-up Combined Header Solenoid Stop Bypass"; and valve P-DGB-V072, "Jacket Water Standpipe Drain." These components are located on the 100 foot elevation of the Emergency Diesel Generator Building. These components are required to be illuminated in order to support local jacket cooling water make-up requirements.

15. Emergency lighting is being added for ensuring Safe Shutdown access/egress pathways in the following locations:

    a. Turbine Building 100 foot elevation, Room T101.

    b. Auxiliary Building 70 foot elevation, Room A-B27

    c. Control Building east stairwell from the 74 foot elevation to the 100 foot elevation, corridor J-A08, Stairway B.

    d. Control Building/Turbine Building breezing access/egress on the 100 foot elevation near room J-123.

e. Auxiliary Building 70 foot elevation, Room A-B18.

16. Existing 1-1/2 hour lighting is being upgraded to 8 hour emergency lighting in the following areas for access/egress:

a. Control Building 100 foot elevation, Room J-103.

b. Auxiliary Building 100 foot elevation west hallway near Room A-101.

c. Auxiliary Building 120 foot level: Room A-206, corridor near Room A-216, and corridor near Room A-236.

17. Emergency Lighting is being added for performing necessary operations in Auxiliary Relay Cabinet ZAA-C06 (CAB). The cabinet is located on the 120 foot elevation of the Auxiliary Building. Disconnect switch DS-21-08 is required to be opened in order to prevent spurious signals from inadvertently opening an RCS vent valve resulting in an uncontrolled loss of RCS inventory.

18. Emergency Lighting is being added for E-PKD-H14, "Channel 'D' Battery Charger" (EJ)(BYC). The charger is located on the 100 foot elevation of the Control Building. The charger is required to be disconnected in order to prevent spurious signals for inadvertently actuating the battery charger.

The lighting issues described above are also believed to exist in Units 1 and 3 since they were constructed similarly. Further engineering walkdowns of emergency lighting systems are being performed in Units 1 and 3 to determine if additional problems exist. If additional problems are identified, they will be described in a supplement to this report.

C. Status of structures, systems, or components that were inoperable at the start of the event that contributed to the event:

Other than the emergency lighting deficiencies described above, no structures, systems, or components were inoperable at the start of this event which contributed to the event.

D. Cause of each component or system failure, if known:

Not applicable - no component or system failures were involved.

E. Failure mode, mechanism, and effect of each failed component, if known:

Not applicable - no component failures were involved.

F. For failures of components with multiple functions, list of systems or secondary functions that were also affected:

Not applicable - no component failures were involved.

G. For failures that rendered a train of a safety system inoperable, estimated time elapsed from the discovery of the failure until the train was returned to service:

Not applicable - no failures were involved.

H. Method of discovery of each component or system failure or procedural error:

Not applicable - there were no component or system failures or procedural errors.

I. Cause of Event:

An independent investigation of this event is being conducted in accordance with the PVNGS Incident Investigation Program. The investigation is expected to be completed by July 31, 1989. Based upon the results of this investigation, a supplement to this report is expected to be submitted by August 30, 1989 to describe the cause of this event.

J. Safety System Response:

There were no safety system responses and none were necessary.

K. Failed Component Information:

Not applicable - no component failures were involved.

II. ASSESSMENT OF THE SAFETY CONSEQUENCES AND IMPLICATIONS OF THIS EVENT:

10CFR50 Appendix R paragraph III.J states, "Emergency Lighting Units with at least an 8-hour battery power supply shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto." The PVNGS UFSAR Section 9.5.1.1.1 Safety Design Basis Eighteen for the unit lighting system states, "Emergency lighting systems shall be provided in accordance with the guidance provided in NRC Branch Technical Position APCSB 9.5-1 (revised February 2, 1977) and 10CFR50, Appendix R, Section III.J (issued September 1, 1982), in areas needed for operation of safe shutdown equipment and in access and egress routes thereto ..."

The lighting deficiencies discussed in Section I.B could have resulted in operations personnel not being able to expeditiously perform required shutdown activities in the event that a plant shutdown was required due to a fire in the control room with a concurrent loss of off-site power. However, it should be noted that flashlights were available for use by operations personnel which could have been utilized to perform the required activities.

III. CORRECTIVE ACTIONS:

A. Immediate:

Immediate corrective action was taken to prepare appropriate documentation for installing emergency lighting in Unit 2.

B. Action to Prevent Recurrence:

As action to prevent recurrence, APS engineering and operations department personnel have performed comprehensive lighting system walkdowns in Unit 2 and will perform appropriate system walkdowns in Units 1 and 3 prior to restart from their current refueling outages. Appropriate emergency lighting will be installed and/or modified to correct the lighting deficiencies prior to restarting Units 1, 2, and 3 from their current shutdowns.

IV. PREVIOUS SIMILAR EVENTS:

There have been no previous similar events reported pursuant to 10CFR50.73.