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ACCESSION NBR:9203250347 DOC.DATE: 92/03/15 NOTARIZED: NO DOCKET #
 FACIL:STN-50-528 Palo Verde Nuclear Station, Unit 1, Arizona Publi 05000528
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SUBJECT: LER 91-007-01:on 910822,determined that normal HVAC sys
 cooling to various ESF pump rooms not adequate.Caused by
 not recognizing that normal HVAC sys was not 100 percent
 redundant to some components.Guidance issued.W/920315 ltr.

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NOTES:STANDARDIZED PLANT

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Arizona Public Service Company

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JAMES M. LEVINE
VICE PRESIDENT
NUCLEAR PRODUCTION

192-00776-JML/TRB/KR

March 15, 1992

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Mail Station P1-37
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 91-007-01
File: 92-020-404

Attached please find Supplement 01 to Licensee Event Report (LER) 91-007 prepared and submitted pursuant to 10CFR50.73. This supplement is being submitted to provide the results of the APS Engineering evaluation of the licensing and design basis for the Essential Chilled Water System. In accordance with 10CFR50.73(d), a copy of this supplement is being forwarded to the Regional Administrator, NRC Region V.

If you have any questions, please contact Thomas R. Bradish, Compliance Manager, at (602) 393-5421.

Very truly yours,

James M. Levine

JML/TRB/KR

Attachment

cc: W. F. Conway (all with attachment)
J. B. Martin
D. H. Coe
INPO Records Center

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I. DESCRIPTION OF WHAT OCCURRED:

A. Initial Conditions:

At 1010 MST on August 22, 1991, Palo Verde Units 1, 2, and 3 were in Mode 1 (POWER OPERATION). Units 1 and 3 were at approximately 100 percent power. Unit 2 was at approximately 90 percent power.

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

Event Classification: Operation prohibited by the PVNGS Technical Specifications (TS).

At approximately 1010 MST on August 22, 1991, an evaluation was completed by APS Engineering (utility, nonlicensed) pertaining to the capability of the normal heating, ventilation, and air conditioning (HVAC) (AHU) systems to meet essential HVAC cooling loads in areas served by the Essential Chilled Water System (ECWS) (BI/KM). The evaluation determined that the normal HVAC system cooling to various Engineered Safety Features (ESF) pump rooms is not adequate to meet essential cooling loads (Note: See Section II for a system description). The TS BASES 3.7.6 for the Essential Chilled Water System (ECWS) states that the normal HVAC system is redundant to the essential HVAC system. The TS BASES further states that based on the availability of normal HVAC and the high reliability of offsite power, the allowed out-of-service time, pursuant to TS 3.7.6, for a train of the ECWS is 7 days. However, the allowed out-of-service time for affected ESF pumps is 72 hours. Therefore, whenever the ECWS was inoperable for greater than 72 hours in Modes 1 through 3 (POWER OPERATION, STARTUP, and HOT STANDBY), the appropriate ACTION statements for the affected ESF pumps (e.g., be in at least HOT STANDBY within the next 6 hours) were not met. This condition has occurred in each of the three units at least once since February, 1990.

The Engineering evaluation disclosed that the normal HVAC system is not designed to provide 100 percent redundancy to the essential HVAC system. Engineering calculation results demonstrate that the normal HVAC cooling capacities can meet the essential cooling loads for the Control Room, the ESF switchgear rooms, the battery rooms, the remote shutdown rooms, the D.C. equipment rooms, and the electrical penetration rooms. However, normal HVAC system cooling for the affected ESF pump rooms [i.e., Auxiliary Feedwater (BA) (AFW) pump rooms, Essential Cooling Water (BI) (ECW) pump rooms, Containment Spray (BE) (CS) pump rooms, High Pressure Safety Injection (BQ) (HPSI) pump rooms, and Low Pressure Safety

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Injection (BP) (LPSI) pump rooms] is not adequate to meet essential cooling loads.

The PVNGS TS definition for OPERABLE - OPERABILITY establishes a requirement that systems and components which are supported by other equipment during Design Basis Accidents should be considered inoperable during the time period the supporting function is not available. By taking credit for the available normal cooling and the high reliability of offsite power as allowed by the existing TS BASES, the Control Room, the ESF switchgear room, the electrical penetration room, and the affected D.C. equipment room can be maintained OPERABLE with the associated ECWS train inoperable. However, the affected ESF pumps (AFW, ECW, CS, HPSI and LPSI) are required to be declared inoperable and the associated 72 hour ACTION statements entered as a result of the loss of an ECWS train. The Plant Review Board (PRB) met to perform a special review of the safety issues concerning the Essential Chilled Water System (ECWS) Technical Specification (TS) 3.7.6 and the associated TS BASES. Based upon the information provided by Engineering, the PRB recommended, and the Units implemented, an administratively imposed 72 hour ACTION statement which replaced the 7 day ACTION when only one train of the ECWS is OPERABLE.

Subsequent to the determination that the normal HVAC cooling is not adequate to meet essential cooling loads in the affected ESF pump rooms, Engineering personnel (utility, nonlicensed) discerned that normal HVAC is not capable of maintaining the space design conditions in the ESF switchgear rooms, the battery rooms, and the D.C. equipment rooms during Design Basis Accident conditions involving a seismic event, a loss of offsite power, or a Safety Injection Actuation System (JE)(BP/BQ) (SIAS) actuation. During these events, normal HVAC cooling is isolated from or becomes unavailable to these rooms. These rooms are served by the essential HVAC system during a Design Basis Accident. However, the normal HVAC system maintains the space design conditions in these rooms during normal operating conditions.

APS evaluated the Licensing and Design Basis for the ECWS and determined that the existing TS 3.7.6 LCO ACTION b. is sufficient to preclude entering the TS LCOs for the affected equipment and that it was not necessary to reduce the ECWS allowed out-of-service time to 2 hours with only one train of the ECWS OPERABLE. TS 3.7.6 LCO ACTION b. requires that "With only one essential chilled water system OPERABLE: 1. Within 1 hour verify that the normal HVAC system is providing space cooling to the vital power distribution rooms that depend on the inoperable essential chilled

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water system for space cooling." The ACTION is to ensure operability of the vital bus inverters and the emergency battery chargers located in the D.C. Equipment rooms. The D.C. Equipment rooms have a high heat load in a small space and could overheat on loss of HVAC. The 1 hour ACTION time limit for verification of normal HVAC is closely related to the TS 3.8.2.1 LCO ACTION a. which requires restoration of the inoperable D.C. train within 2 hours. Normal HVAC is also verified to be providing space cooling to the ESF Switchgear rooms and the battery rooms. The batteries are included as part of the D.C. trains' electrical sources listed in TS 3.8.2.1 Table 3.8-1. Based on the availability of normal HVAC and the high reliability of offsite power as allowed by the existing TS BASES, the allowed out-of-service time for a train of the ECWS can remain at the administratively imposed 72 hours and the affected ESF switchgear room, battery room, and D.C. equipment room can be maintained OPERABLE with the associated ECWS train inoperable during normal plant operation.

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

Not applicable - no structures, systems, or components were inoperable at the start of the event which contributed to this 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 failures of components with multiple functions were involved.

- G. For a failure 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 that rendered a train of a safety system inoperable were involved.

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

Not applicable - there have been no component or system failures or procedural errors identified. There were no procedural errors which contributed to this event.

I. Cause of Event:

An independent investigation of this condition was conducted in accordance with the APS Incident Investigation Program. The investigation determined that the error in the TS BASES 3.7.6 section resulted from Bechtel, Combustion Engineering, and APS personnel reviewing TS 3.7.6 and TS BASES 3.7.6 not recognizing that the normal HVAC system was not 100 percent redundant to some components served by the essential HVAC system (SALP Cause Code A: Personnel Error).

No unusual characteristics of the work location (e.g., noise, heat, poor lighting) directly contributed to this event. There were no procedural errors which contributed to this event.

J. Safety System Response:

Not applicable - 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:

Trains A and B essential or emergency heating, ventilation, and air conditioning (HVAC) system provides space cooling to the following areas and the associated train A or B of equipment:

1. Control Building (NA): Control Room, ESF Switchgear rooms, D.C. equipment rooms, battery rooms, and remote shutdown rooms.
2. Auxiliary Building (NF): Electrical penetration rooms, Essential Cooling Water (ECW) pump rooms, Containment Spray (CS) pump rooms, High Pressure Safety Injection (HPSI) pump rooms, and Low Pressure Safety Injection (LPSI) pump rooms; and

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3. Main Steam Support Structure (NM): Auxiliary Feedwater (AFW) pump rooms.

Each of the areas served by the essential HVAC system is cooled by heat exchangers which are supplied with chilled water from either Train A or Train B of the Essential Chilled Water System (ECWS). The ECWS consists of two separate redundant chilled water safety related trains. Each train is a closed loop system, with the pump circulating water through the chillers to the heat exchangers.

The Technical Specification (TS) 3.7.6 BASES for the Essential Chilled Water System (ECWS), states, "OPERABILITY of the essential chilled water system ensures that sufficient cooling capacity is available for continued operation of equipment and control room habitability during accident conditions." The ECWS does not function during normal plant power operation or shutdown. Both trains of the ECWS are automatically started by a Safety Injection Actuation Signal (SIAS), a Control Room Essential Filtration Actuation Signal (CREFAS), a Control Room Ventilation Isolation Actuation Signal (CRVIAS), a Loss of Power (LOP) signal, or an Auxiliary Feedwater Actuation Signal (JE)(BA) (AFAS).

TS 3.7.6 ACTION a. for the ECWS requires that "with only one essential chilled water loop OPERABLE, restore at least two loops to OPERABLE status within 7 days or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours." The TS BASES states that a 7 day ACTION requirement for a single ECWS out of service, is based on the high reliability of offsite power and the availability of the normal HVAC system.

During normal plant operating conditions, cooling in the areas served by the essential HVAC system is provided by the normal HVAC system. Central cooling coils in the normal HVAC system are supplied with chilled water from the Normal Chilled Water System. Cooled air is supplied via duct work to each space.

The OPERABILITY of the Essential Chilled Water System (ECWS) ensures that sufficient cooling capacity is available for continued operation of equipment and control room habitability during accident conditions. The redundant cooling capacity of this system, assuming a single failure, is consistent with the assumptions used in the safety analysis. In addition, the ACTION requirements for TS 3.7.6 ensure that a functional train of safe shutdown equipment is available to put the plant in a safe, stable condition for the range of Design Basis events. Therefore, there were no safety consequences or implications resulting from this event. There was no impact on the health and safety of the public.

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III. CORRECTIVE ACTION:

A. Immediate:

The Plant Review Board (PRB) met to perform a special review of the safety issues concerning the Essential Chilled Water System (ECWS) Technical Specification (TS) 3.7.6 and the associated TS BASES. Based upon information provided by Engineering, the PRB recommended that an administratively imposed 72 hour ACTION statement replace the 7 day ACTION with only one train of the ECWS OPERABLE.

Administrative guidance was provided to Units 1, 2, and 3 to enter the TS LCO for the affected equipment in conjunction with TS ACTION 3.7.6 a., reducing the ECWS allowed out-of-service time from 7 days to 72 hours with only one train of the ECWS OPERABLE.

B. Action to Prevent Recurrence:

Based on the potential adverse affects imposed by a seismic event, a loss of offsite power, or a SIAS to the normal HVAC system's ability to provide space cooling in the ESF switchgear rooms, the battery rooms, and the D.C. equipment rooms, APS evaluated the Licensing and Design Basis for the Essential Chilled Water System (ECWS) and determined that the existing TS 3.7.6 LCO ACTION b. is sufficient to preclude entering the TS LCOs for the affected equipment and that it was not necessary to reduce the ECWS allowed out-of-service time to 2 hours with only one train of the ECWS OPERABLE.

As a compensatory measures for providing space cooling support to areas served by the essential HVAC system, procedural guidance has been established for providing temporary ventilation to the affected D.C. equipment rooms if normal and essential HVAC cooling become unavailable.

TS 3.7.6 changes are expected to be submitted to the NRC by April 30, 1992, to correct the ECWS TS BASES error and to reduce the ECWS TS LCO allowed out-of-service time from 7 days to 72 hours with only one train of the ECWS OPERABLE.

IV. PREVIOUS SIMILAR EVENTS:

No other previous events have been reported pursuant to 10CFR50.73 where the Technical Specification BASES were discovered to be inconsistent with the design criteria.

