10 CFR 50.90

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102-05286-CDM/TNW/JAP
June 3, 2005

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

References: 1) Palo Verde Nuclear Generation Station – NRC Problem Identification and Resolution Inspection Report 05000528/2004006, 05000529/2004006, and 05000530/2004006, dated August 16, 2004

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. STN 50-528/529/530
Request for Operating License Amendment –
Modification to Diesel Generator Jacket Water Makeup System

Dear Sirs:

On May 21, 2004, the NRC completed a Problem Identification and Resolution Inspection for PVNGS (Reference 1). A finding from this inspection dealt with modifications made to the emergency diesel generator jacket water makeup system. These modifications were performed during the 1993 and 1999 time periods. PVNGS evaluated these modifications per 10 CFR 50.59 and at that time had determined that no prior NRC approvals were necessary for these modifications. It has since been determined that prior NRC approval was required for the implementation of these modifications to the emergency diesel generator jacket water makeup system.

Pursuant to 10 CFR 50.90, Arizona Public Service Company (APS) hereby requests an amendment to the Facility Operating License (Nos. NPF-41, NPF-51, and NPF-74) for PVNGS Units 1, 2, and 3. This proposed amendment seeks NRC approval for plant modifications made to the emergency diesel generator jacket water systems that were implemented during the 1993 and 1999 time period.

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Based on the evaluation contained within this license amendment request (LAR), APS concludes that this change presents no significant hazards consideration under the standards set forth in 10 CFR 50.92 and accordingly, a finding by the Nuclear Regulatory Commission (NRC) of no significant hazards consideration is justified.

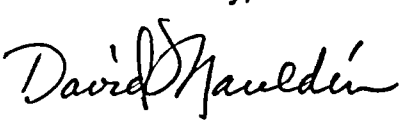
In accordance with the PVNGS Quality Assurance Program, the Plant Review Board and Offsite Safety Review Committee have reviewed and concurred with this proposed amendment. By copy of this letter, this request is being forwarded to the Arizona Radiation Regulatory Agency (ARRA) pursuant to 10 CFR 50.91(b)(1).

APS requests that this proposed amendment be reviewed and approved by December 30, 2005. APS requests to implement the proposed amendment within 90 days of its issuance.

No commitments are being made to the NRC by this letter.

Should you have any questions, please contact Thomas N. Weber at (623) 393-5764.

Sincerely,



CDM/TNW/JAP

Enclosures:

- Enclosure 1 – Notarized affidavit
- Enclosure 2 – APS' Evaluation of Modification to Diesel Generator Jacket Water Makeup System LAR

Attachment:

1. PVNGS Updated Final Safety Analysis Report (UFSAR) Marked-up Pages for the Diesel Generator Jacket Water System (1993 & 1999 time periods)

cc:	B. S. Mallett	Regional Administrator, NRC Region IV
	M. B. Fields	NRC NRR Project Manager for PVNGS
	G. G. Warnick	NRC Senior Resident Inspector for PVNGS
	A. V. Godwin	Arizona Radiation Regulatory Agency (ARRA)

STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, David Mauldin, represent that I am Vice President Nuclear Engineering and Support, Arizona Public Service Company (APS), that the foregoing document has been signed by me on behalf of APS with full authority to do so, and that to the best of my knowledge and belief, the statements made therein are true and correct.

David Mauldin

Sworn To Before Me This 3rd Day Of June, 2005.

Notary Public

SUSIE LYNN ERGISH
Notary Public - Arizona
Maricopa County
My Comm. Expires Jul 14, 2007

Notary Commission Stamp

ENCLOSURE 2

APS' Evaluation

Subject: **Request for Operating License Amendment – Modification to Diesel Generator Jacket Water Makeup System**

1. DESCRIPTION
2. PROPOSED CHANGE
3. BACKGROUND
4. TECHNICAL ANALYSIS
5. REGULATORY ANALYSIS
6. ENVIRONMENTAL CONSIDERATION
7. REFERENCE

1.0 DESCRIPTION

On May 21, 2004, the NRC completed a Problem Identification and Resolution Inspection for the Palo Verde Nuclear Generating Station (PVNGS) (Reference 1). A finding from this inspection dealt with modifications made to the emergency diesel generator jacket water makeup system. These modifications were implemented during the 1993 and 1999 time periods. PVNGS had evaluated these modifications per 10 CFR 50.59 and at that time had determined that the changes did not require prior NRC approval and therefore could be implemented. Therefore, these modifications were made. It has since been determined that prior NRC approval was required for the implementation of these modifications to the emergency diesel generator jacket water makeup system.

This license amendment request (LAR) is to amend Operating Licenses NPF-41, NPF-51, and NPF-74 for PVNGS Units 1, 2, and 3, respectively. The purpose of this proposed change is to obtain NRC approval for modifications made to the emergency diesel generator jacket water makeup system.

2.0 PROPOSED CHANGE

This license amendment request (LAR) would revise Operating Licenses NPF-41, NPF-51, and NPF-74 by allowing the following sections in the Updated Final Safety Analysis Report (UFSAR) for PVNGS Units 1, 2, and 3 to reflect the removal of the automatic standpipe fill valve and level control switch/alarm functions for the diesel generator jacket water makeup system:

- The previous section of PVNGS UFSAR section 9.5.5.2 (1993 time period) stated:

  > A level controller in the system surge tank controls a solenoid valve (with a manual bypass) to automatically maintain the inventory of water (approximately 250 gallons) in the DGCWS [diesel generator cooling water system] with makeup from the demineralized water system. In addition, makeup can be provided from the Seismic Category I, Safety Class 3, safety-related condensate storage and transfer system without operator action.

- The previous section of PVNGS UFSAR section 9.5.5.2.1.6 (1999 time period) stated:

  > Surge Tank. The DGCWS surge tank is an atmospheric vessel which accommodates coolant expansion due to temperature changes and provides net positive suction head (NPSH) to the water pumps. The surge tank provides an adequate reserve to compensate for any minor leaks in

the DGCWS. The surge tank is equipped with a low-level alarm switch. Makeup is manually initiated via a bypass around the level control valve. The tank volume is approximately 258 gallons.

- The previous section of PVNGS UFSAR section 9.5, Table 9.5-11 (1999 time period) listed that the method of detection for failures (leaks) in the EDG surge tank (jacket water standpipe), jacket water heat exchanger, and jacket water circulating water piping was a 'low-level alarm'.

- The previous section of PVNGS UFSAR section 9.5, Table 9.5-12 (1999 time period) listed that the method of indication of the EDG jacket water level control was a 'low-level alarm' on the EDG local engine control panel and a 'common trouble alarm' in the Unit Control Room.

The following describes what PVNGS proposes that the UFSAR permanently reflect for the removal of the automatic standpipe fill valve and level control switch/alarm functions for the diesel generator jacket water makeup system:

- PVNGS UFSAR section 9.5.5.2:

  DGCWS makeup to the system surge tank is accomplished manually as needed from the demineralized water system. In addition, makeup can be provided from the Seismic Category I, Safety Class 3, safety-related condensate storage and transfer system. See section 9.2.6 for details. A local gauge glass is provided for the surge tank.

- PVNGS UFSAR section 9.5.5.2.1.6:

  Surge Tank. The DGCWS surge tank is an atmospheric vessel which accommodates coolant expansion due to temperature changes and provides net positive suction head (NPSH) to the water pumps. The surge tank provides an adequate reserve to compensate for any minor leaks in the DGCWS. The surge tank is equipped with a sight glass. Makeup is manually initiated via a manual valve. The tank volume is approximately 258 gallons.

- PVNGS UFSAR section 9.5, Table 9.5-11 lists that the method of detection for failures (leaks) in the EDG surge tank (jacket water standpipe), jacket water heat exchanger, and jacket water circulating water piping is a gauge.

- PVNGS UFSAR section 9.5, Table 9.5-12 lists only local indication, by gauge, for the EDG jacket water level control.

3.0 BACKGROUND

As identified in NRC Problem Identification and Resolution (PI & R) Inspection Report, dated August 16, 2004, for PVNGS (Reference 1), an unresolved item was identified regarding modifications performed to replace the Emergency Diesel Generator (EDG) Jacket Water (JW) standpipe automatic fill valve with a manual valve (along with the removal of the level control function and alarm circuitry). The first modification, installed in 1993 time period, abandoned the automatic solenoid fill valve (due to leakage problems) and implemented the use of the manual bypass valve for filling the JW standpipe. In 1999 another modification was performed to remove the abandoned solenoid valve, associated circuitry and level switch/low-low level alarm. This modification also increased the size of the manual makeup valve to restore the capacity of the makeup system to that of what the automatic valve capacity had. All equipment has been modified in all three units.

PVNGS previously evaluated these modifications per 10 CFR 50.59 and had determined at that time that the changes did not require prior NRC approval before implementation. This was based on the standpipe automatic level control valve and level switch/alarm being maintenance and engineering design features that do not support the safety design function of the JW system. Therefore, these modifications were made. It has since been determined that prior NRC approval was required for the implementation of these modifications to the emergency diesel generator jacket water makeup system.

The purpose of the DGCWS makeup system is to maintain the EDG in a ready-state condition for emergency operations. This function was originally facilitated by an automatic fill valve and a level control switch/alarm for the DGCWS. The proposed change would allow this function to be performed by operator monitoring and manual fill operations of the standpipe.

4.0 TECHNICAL ANALYSIS

The design function of the emergency diesel generator (EDG) system is to function as a standby source of onsite Class 1E AC power for the Engineered Safety Features (ESF) equipment for safe plant shutdown and decay heat removal in the event of loss of preferred (offsite) power. Each PVNGS unit has two 100% redundant EDG. The diesel generator cooling water system (DGCWS) removes waste heat of combustion from the diesel generator engine. The DGCWS then transfers this heat to the essential spray pond system through the diesel generator jacket water heat exchanger. The DGCWS initially preheats the combustion air during diesel generator engine starts by providing warm water through the combustion air heaters. Each diesel generator engine is provided with an identical and independent DGCWS.

The design of the DGCWS includes a surge tank that is sized to accommodate the expansion and contraction of the DGCWS water volume due to heating and cooling and to compensate for minor leaks and evaporation that may occur. The surge tank is also referred to as a standpipe.

The DGCWS is classified as safety related since removal of heat during emergency operations is necessary for an EDG to perform its safety related design basis function. While makeup flow to the DGCWS may be needed to maintain the system when it is in a stand-by or operating mode, no makeup flow is credited for the system to operate during the initial 25 hours of an emergency event. This is the case since the DGCWS is designed as a closed loop system with only a minor loss of inventory postulated during any of its operating modes. The available volume in the surge tank provides a sufficient source of makeup water inventory to cover any minor leaks or evaporation that may occur during emergency operations. Because of this, being able to automatically add water to the DGCWS during emergency operations is not required to satisfy a safety related design basis function. This conclusion is supported by the original design of the control circuitry for the automatic makeup valve. The control circuitry was designed such that the automatic makeup valve would automatically close if its surge tank level dropped below the low-low level set point. Because of this, the automatic fill function would not provide any makeup flow below the low-low alarm set point. In addition, since the surge tank is sized to accommodate for minor leaks and evaporation, makeup flow when the level is above the low-low set point but below the control point, is not required to support EDG operation. Therefore, the original design of the automatic fill function was intended as a maintenance feature and good engineering design feature for operator convenience when an EDG is in the stand-by or operating mode. Its main function is to ensure that the EDG is set-up and ready to respond to an emergency, in the event that one was to occur.

Removal of the EDG Jacket Water Standpipe Automatic Fill Valve

The DGCWS surge tank is of sufficient size to support emergency operations of the EDG without makeup for an initial 25 hour period. For PVNGS, a 10 CFR 50, Appendix R evaluation requires a minimum water volume in the DGCWS such that the diesel could operate for 25 hours without makeup. The design allowable leakrate limit for 10 CFR 50, Appendix R makeup interval concerns for the DGCWS is 2.9 gallons per hour (gph). The cooling water system has an administrative allowable leakage limit of 1.6 gph. This rate (1.6 gph) and required surge tank minimum levels (at least 10 inches visible in the sight glass), ensures that operators can easily determine that sufficient water volume exists for diesel operations. Procedural controls require the operators to record the level (along with many other EDG parameters) every 12 hours when the engine is in a standby condition and thirty minutes after initial loading and every two hours during loaded operation. The frequency of these checks by the operators would also compensate for credible errors in the monitoring of the jacket water level. The 1.6 gph administrative leak rate limit is more restrictive than actual allowable leak rates. Subsequent to the 25 hours, compensatory measures (i.e., manual makeup) can and

would be taken to restore the EDG jacket water level, if necessary. The minimum level for Appendix R criteria for the diesel generator jacket water standpipe, allowing for increased stem packing leakage or pump seal leakage due to degraded equipment performance, is the bottom of the sight glass for the standpipe.

This minimum Appendix R sight glass level (the bottom site glass pipe tap – 13' 3" elevation) is well below the control range of the automatic makeup valve control circuitry. The automatic makeup valve control range was such that the makeup valve opened at 13' 11 ¾" and the valve closed at 14' 11 ¾". The control logic shows that the automatic makeup valve closes automatically once the level in the tank has lowered to an elevation of 13' 7" (low level cutout). This feature ensures that in the event of excessive leakage, inventory in the condensate storage and demineralized water tanks (makeup sources) are maintained. The 13' 7" is 4 inches above the bottom pipe tap of the sight glass (13' 3"). Therefore, since PVNGS' Appendix R evaluation does not credit makeup until 25 hours have elapsed after the initiating event and the minimum level required to support the cooling system design function is below the low level cutout of 13' 7", the automatic makeup feature is not being credited for supporting the cooling water system design function. Manual makeup is available and is credited after the initial 25 hours of an emergency event to maintain adequate jacket water standpipe level. This twenty-five hour period before operator intervention, which is assumed to occur, sufficiently bounds the thirty minutes of no operator action that is normally assumed in most of the accident analyses. Hence, the auto makeup feature could not maintain minimum Appendix R water levels for excessive leakage, is not credited for maintaining levels during an event, manual makeup is available to maintain adequate water levels (along with operator monitoring), and therefore automatic makeup is not required to support the safety design basis function of this cooling water system.

Based upon the above, automatic makeup to the DGCWS is not required to maintain a minimum water level during emergency operation and this level can be adequately maintained and monitored by operators. The minimum water level is provided by the volume of the surge tank. The automatic makeup function was to ensure that the EDG was in a ready-state for emergency operations, but not credited to function during an emergency for makeup water to the DGCWS. While the PVNGS UFSAR did contain a description of the component function of the automatic make up valve, this automatic function is not required to support the safety function of the cooling water system nor is it credited for supporting the cooling water system safety design function. Removal of the automatic feature also serves to provide a better alert to operators of a leak condition. Prior to its removal, the automatic valve would cycle to maintain level within its operating range, which is above the low level alarm setpoint. Operators would only be alerted to leaks once the level dropped (due to makeup control system malfunctions or excessive leakage) to the alarm set point (13' 7").

The area operator walkdown procedures instruct the operators to log the standpipe level (along with many other EDG parameters) and ensure it is in the normal operating range. If the level is not, operators are required to restore level and conduct further investigation of the condition and notify appropriate personnel. This ensures that

enough water remains in the jacket water system to allow the diesel to remain operational and evaluations are performed in order to detect any abnormal leakrates. Recent station experience (past six years) has shown that the DGCWS leakage rate has been much lower than the administrative allowable leakage limit of 1.6 gph. The only intermittent leakage is from component design leakage rates as stated in the PVNGS Design Basis Manual. In this time frame this leakage limit has only been exceeded twice due to individual component failures causing high leakrates.

Removal of the EDG Jacket Water Standpipe Level Control and Alarm Circuitry

The alarm function of the Diesel Generator Cooling Water system (DGCWS) is to help maintain the EDG in a ready condition while the EDG is in a standby condition. As originally designed and installed, the surge tank low level alarm (13' 7") was one of a number of other non-critical alarms that are annunciated at the EDG local control and annunciator panel. These non-critical alarms are grouped together and annunciated in the unit control room as a single "Lo Priority Trouble" alarm window. Since the source of power to the local annunciator is non-class (non-safety related), the low level alarm can not be relied upon to provide operator information during an emergency event. This in turn means that the unit control room "Lo Priority Trouble" alarm window is assumed to not function during an emergency operation. Therefore, the low level switch does not serve a safety related design basis function.

It is important to note that when the EDG is in standby, the most likely cause of leakage is due to corrosion. Large leaks only occur when the EDG is operating where vibrations and stress can cause components to break. Therefore, the only time the low level alarm would be relied upon is when the EDG is running during testing (non-emergency mode of operation). Although the alarm may also come in when the EDG is running or during an emergency event; no credit is taken for the alarm. Therefore, the primary function of the low alarm is to warn of a large break during testing or a standby condition. The purpose of this alarm would be to allow the engine to be stopped before it could be challenged and tripped on jacket water over temperature condition during testing or if a significant leak were to develop on the jacket water system while the EDG is in a standby condition.

It is concluded that the modifications to remove the automatic standpipe fill valve and level control switch/alarm are appropriate based on:

1) The original automatic fill valve's main purpose was to automatically maintain the jacket water standpipe level and be ready for emergency operations (not credited or relied on to function during an emergency event to keep or maintain the operability of the EDG),

2) Adequate monitoring (every 12 hours while the EDG is in standby and every 2 hours when the EDG is loaded) exists to maintain and monitor the level of

the DGCWS standpipe, both in the standby and emergency mode of operation (these monitoring frequencies of checks by the operators would also compensate for credible errors in the monitoring of the jacket water level during these periods of time), and

3) The level control switches' low level alarm was powered by non-class power which means this switch can not be relied upon or credited during an emergency event.

Therefore, these features (i.e., automatic fill valve and level switch/alarm) are not credited for the safety design functions of the EDG or the DGCWS (manual monitoring and makeup are adequate for maintaining the DGCWS level) and their removal is justified.

5.0 REGULATORY ANALYSIS

No Significant Hazards Consideration

This license amendment request (LAR) is to amend Operating Licenses NPF-41, NPF-51, and NPF-74 for Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3, respectively. The purpose of this proposed change is to obtain the NRC approval for modifications to the emergency diesel generator jacket water makeup system.

As identified in NRC Problem Identification and Resolution (PI & R) Inspection Report, dated August 16, 2004, for PVNGS (Reference 1), an unresolved item was identified regarding the modifications to replace the Emergency Diesel Generator (EDG) Jacket Water (JW) standpipe automatic fill valve with a manual valve (along with the removal of its associated level control function and alarm circuitry). The first modification, installed in the 1993 time period, abandoned the automatic solenoid fill valve (due to leakage problems) and implemented the use of the manual bypass valve for filling the JW standpipe. In 1999 another modification was performed to remove the abandoned solenoid valve, associated circuitry and level switch/low-low level alarm. This modification also increased the size of the manual makeup valve to restore the capacity of the makeup system to that of what the automatic valve capacity had. All equipment has been removed in all three units.

PVNGS previously evaluated these modifications per 10 CFR 50.59 and had determined at that time that the changes did not require prior NRC approval and therefore could be implemented. This was based on the standpipe automatic level control valve and level switch/alarm being maintenance features that do not support the design function of the EDG jacket water system. Therefore, these modifications were made. It has since been determined that prior NRC approval

was required for the implementation of these modifications to the emergency diesel generator jacket water makeup system.

The DGCWS surge tank is of sufficient size to support emergency operations of the EDG without makeup for an initial 25 hour period. For PVNGS, a 10 CFR 50, Appendix R evaluation requires a minimum water volume in the DGCWS such that the diesel could operate for 25 hours without makeup. This minimum level related to 10 CFR 50, Appendix R criteria, for the diesel generator jacket water standpipe, allows for stem packing leakage or pump seal leakage due to degraded equipment performance and evaporation. This minimum Appendix R sight glass level (the bottom site glass pipe tap – 13' 3" elevation) is well below the control range of the automatic makeup valve control circuitry. The automatic makeup valve control range was such that the makeup valve opened at 13' 11 ¾" and the valve closed at 14' 11 ¾". The control logic shows that the automatic makeup valve closes automatically once the level in the tank has lowered to an elevation of 13' 7" (low level cutout). This feature ensures that in the event of excessive leakage, inventory in the condensate storage and demineralized water tanks (makeup sources) are maintained. The 13' 7" is 4 inches above the bottom pipe tap of the sight glass (13' 3"). Therefore, since PVNGS' Appendix R evaluation does not credit makeup until 25 hours have elapsed after the initiating event and the minimum level required to support the cooling system design function is below the low level cutout of 13' 7", the automatic makeup feature is not being credited for supporting the cooling water system design function. Operator monitoring and manual makeup is available and is credited after the initial 25 hours of an emergency event to maintain adequate jacket water standpipe level.

Area operator personnel walkdown and log the EDG parameters twice daily when the diesel generator is in a standby mode (not running) and are required more frequently (every two hours) when the EDG has been loaded for testing or responding to an emergency signal. The anticipated leakage for the EDG jacket water cooling system pump seals, valve packing, or normal evaporation would be sufficiently low so that enough reserve water would remain in the cooling system to ensure proper operation during the time period between walkdowns. During standby or emergency diesel operations the area operators would monitor and manually refill the EDG jacket water cooling system standpipe (surge tank), if needed. These operator actions are in place.

Hence, the auto makeup feature could not maintain minimum Appendix R water levels for excessive leakage, is not credited for maintaining levels during an event, manual makeup is available to maintain adequate water levels (along with operator monitoring), and therefore automatic makeup is not required to support the safety design basis function of this cooling water system.

Arizona Public Service Company (APS) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

The emergency diesel generator (EDG) is a system that must function in response to an accident that has been evaluated in either Chapter 6 or 15 of the PVNGS UFSAR. It is designed to respond to certain described accident scenarios. None of the accidents evaluated are initiated within the EDG system. Therefore, this request to allow the replacement of the automatic makeup feature(s) with a manual feature can not increase the probability of an accident previously postulated in the UFSAR.

None of the accidents evaluated which credit operation of the EDG system require automatic fill of the DGCWS in order to mitigate the consequences of the accident. The fill system, whether automatic in nature as originally designed or manual, simply maintains the EDG in the ready state.

Therefore, the proposed change does not involve a significant increase in the consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

The EDG is a piece of equipment important to safety. This modification replaces the automatic water makeup function for the EDG jacket water cooling system with that of manual operator actions. The jacket water makeup is needed for normal leakage and possible evaporation. Area walkdowns occur twice daily when the diesel generator is in a standby mode (not running) and more frequently (thirty minutes after initial loading and every two hours while loaded) when the EDG is being tested or has responded to an emergency event. The area operator walkdown procedures instruct the operators to log the standpipe level and ensure it is in the normal operating range. If the level is not, operators are required to restore level and conduct further investigation of the condition and notify appropriate personnel. This ensures that enough water remains in

the jacket water system to allow the diesel to remain operational and evaluations are performed in order to detect any abnormal leakrates. Therefore, the normal area operator walkdowns and frequencies are adequate to ensure that sufficient jacket water standpipe inventory is maintained.

With this modification, the EDG is still maintained and monitored for proper conditions in a standby status to ensure that it will respond to emergencies when called upon. Once the EDG responds to an emergency signal and is loaded, its jacket water system is required to be monitored every two hours to help ensure that all parameters are observed and maintained for proper operation, including its jacket water standpipe level.

So, with these measures in place it can be expected that the EDG will be maintained capable of performing as designed to any emergency safety signal. The DG safety system and its support jacket water cooling system do not initiate any accident events.

Therefore, the modification of this non-safety support system cannot create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

The PVNGS UFSAR states that the design basis function for the emergency diesel generators is to provide a standby source of onsite Class 1E AC power for the two trains of engineered safety features equipment for safe plant shutdown and decay heat removal in the event of loss of preferred (off-site) power. Supporting this design basis function of supplying emergency power is the function of the emergency diesel generator jacket cooling water system, which is to remove rejected heat from each diesel engine at the rated design load of the emergency diesel generator. The UFSAR further describes the emergency diesel generator jacket cooling water surge tank (standpipe), stating that the surge tank is sized to provide an adequate reservoir to compensate for any minor leaks. The UFSAR also described makeup to the jacket cooling water system as being automatically actuated and provided from the safety-grade condensate transfer system or manually from the demineralized water systems. The subject modification replaced the automatic features with

manual operator action – the sources of the makeup water have not changed.

The PVNGS engineering analyses and the safety analyses that demonstrate the functional goals and the design basis of the emergency diesel generator system do not credit any makeup water supply to the jacket cooling water system of the emergency diesel generator for an initial 25 hours into an event. Operator monitoring and manual makeup provides adequate control for maintaining the DGCWS standpipe level, both for standby and loaded conditions. An automatically actuated makeup water supply is not essential to the safe and continued operation of the emergency diesel generator. Makeup water is provided as a convenient source of water to compensate for anticipated normal system losses and evaporation. It is not provided to serve as an emergency source of makeup water to the jacket cooling water system in the event of a major failure or leak occurring within the jacket cooling water system.

Makeup to the system is required to compensate for normal expected system losses, minor leaks, and evaporation. In addition, an engineering calculation has been performed to address 10 CFR 50, Appendix R concerns, which demonstrates that no operator action is required or credited during the first twenty-five hours of emergency diesel generator loaded operation provided that the initial water level is at the specified minimum level. This twenty-five hour period before operator intervention, which is assumed to occur, sufficiently bounds the thirty minutes of no operator action that is normally assumed in most of the accident analyses.

In addition, the area operator walkdown procedures instruct the operators to log the standpipe level and ensure it is in the normal operating range. If the level is not, operators are required to restore level and conduct further investigation of the condition and notify appropriate personnel. This ensures that enough water remains in the jacket water system to allow the diesel to remain operational and evaluations are performed in order to detect any abnormal leakrates.

Therefore, APS has concluded that the proposed license amendment request does not involve a significant reduction in a margin of safety.

Based on the above, Arizona Public Service Company (APS) concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

6.0 ENVIRONMENTAL CONSIDERATION

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environment impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCE

Reference:

1. Palo Verde Nuclear Generation Station – NRC Problem Identification and Resolution Inspection Report 05000528/2004006, 05000529/2004006, and 05000530/2004006, dated August 16, 2004.

Attachment 1

PVNGS
Updated Final Safety Analysis Report (UFSAR)
Marked-up Pages for the Diesel Generator Jacket Water Modifications
(1993 & 1999 time periods)

change
DGCWS makeup to the system surge tank is accomplished manually as needed from the demineralized water system
3465
3/8

~~A level controller in the system surge tank controls a solenoid valve (with a manual bypass) to automatically maintain the inventory of water (approximately 250 gallons) in the DGCWS with makeup from the demineralized water system.~~ In addition, makeup can be provided from the Seismic Category I, Safety Class 3, safety-related condensate storage and transfer system ~~without operator action~~. A local gauge glass is provided for the surge tank. A silicon based dispersion agent is added to the DGCWS for corrosion control.

delete

A 40 kW electric immersion heater in the DGCWS provides standby heating for the DGCWS. Water is circulated by a small warmup pump. Heater power and pump operation are controlled by a thermostat, to maintain water temperature within the manufacturer's recommended range. 3

Only vertical and horizontal piping runs are provided in order to eliminate air pockets. The height of the surge tank ensures that the pump suction piping and most of the remaining system is initially filled with water. During startup, air trapped in the engine will be displaced by the pump discharge. The design, due to the height of the surge tank, ensures that the DGCWS remains filled with water.

9.5.5.2.1 Component Description

9.5.5.2.1.1 Jacket Water Heat Exchanger. The jacket water heat exchanger is a horizontal shell and tube type. The exchanger, which carries the jacket cooling water on the shell side, is designed to remove 5,520,000 Btu/hr, with the jacket water cooled from 170F to 160F. In addition, 110F ESPS water is carried on the tube side.

9.5.5.2.1.2 Jacket Water Pump. The jacket water pump is a centrifugal pump that is engine-driven by a chain drive, and is mounted on the front of the engine. Lubrication is automatic, from the engine oil supply. The pump operates at

- Frequency and voltage regulation
- Automatic or manual regulator selection
- Exciter field removal and reset
- Manual emergency start, simulated LOP
- Manual emergency start, simulated ESFAS (SIAS/CIAS)
- Manual emergency stop
- OFF-LOCAL-REMOTE control selection
- Emergency mode interlock defeat switch

The local control operation is annunciated in the control room. The dc power source for the Class 1E diesel generator instrumentation and control system is associated with the same load group as the diesel generator.

C. Each diesel generator is equipped with the following alarms on the local control panel:

- Lube oil low pressure (engine, turbo)
- Lube oil high or low temperature
- Jacket coolant low pressure
- Jacket coolant high or low temperature (Jacket water temp. high or off normal)
- ~~Jacket coolant low level in expansion tank~~
- Fuel oil high level in day tank
- Fuel oil low level in day tank
- Fuel oil low level in storage tank
- Fuel oil low pressure
- Fuel oil transfer pump low discharge pressure
- Incomplete sequence (start failure)

the operation of the pump and heater. There are no interlocks with other systems.

9.5.5.2.1.4 Temperature Control Valve. This is a self-contained, temperature-actuated, three-way valve that responds to the jacket water pump discharge temperature. The entire cooling water flow passes through the jacket water cooler when the jacket water temperature at the inlet to the valve exceeds approximately 175F.

9.5.5.2.1.5 Combustion Air Cooler/Heater. These coolers are of radiator-type design. Each cooler has two water sides, one side for ESPS cooling water to cool the combustion air after engine warmup, and one side for jacket cooling water to preheat the combustion air when the air is below 100F. The jacket water flow ~~is~~ bypassed around the cooler when the combustion air reaches 100F.

9.5.5.2.1.6 Surge Tank. The DGCWS surge tank is an atmospheric vessel which accommodates coolant expansion due to temperature changes and provides net positive suction head (NPSH) to the water pumps. The surge tank provides an adequate reserve to compensate for any minor leaks in the DGCWS. The surge tank is equipped with a ~~low level alarm switch~~ sight glass. Makeup is manually initiated via a ~~bypass around the level control~~ manual valve. The tank volume is approximately 258 gallons.

9.5.5.2.1.7 Electric Immersion Heater. The electric immersion heater is rated at 40 kW, three-phase, 480V, and 60 Hz. Power is supplied from a 480V, Class 1E motor control center.

Table 9.5-11

DIESEL GENERATOR COOLING WATER SYSTEM

SINGLE FAILURE ANALYSIS (Sheet 1 of 2)

Component	Failure Mode/Cause	Effects on System	Method of Detection	Inherent Compensating Provision	Remarks
Essential spray ponds system	Leak or rupture in supply line/ corrosion	Loss of cooling of combustion air, jacket circ. water loop and lube oil circ. loop	High temperature indication and alarm on jacket water circulating loop and lube oil circulating loop	Redundant diesel generator remains in service	
Circulating water temperature control valve	Fails to throttle flow to cooler/ valve sticks open	Continuous flow through cooler causing low temperature in system. Diesel runs cold, less efficient	Low temperature indication on jacket water circulating loop	Redundant diesel generator remains in service	Operator may throttle cooling water flow
	Fails to throttle flow to bypass/ heat exchanger/valve sticks closed	Loss of cooling of jacket water circulating loop excessive temperature	High temperature indication and alarm on jacket water circulating loop	Redundant diesel generator remains in service	
Engine-driven circulating water pump	Inoperable/ mechanical failure	Low header pressure	Low-pressure alarm	Redundant diesel generator remains in service	
Surge tank	Leaks/corrosion	Low water level	~~low-level alarm~~ Gauge	Makeup water replaces losses	

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Table 9.5-11

DIESEL GENERATOR COOLING WATER SYSTEM

SINGLE FAILURE ANALYSIS (Sheet 2 of 2)

Component	Failure Mode/Cause	Effects on System	Method of Detection	Inherent Compensating Provision	Remarks
Jacket water heat exchanger	Leaks/corrosion ruptures	Low level in surge tank	~~Low level alarm~~ Gauge	Redundant diesel generator remains in service	
Standby electric jacketwater heater	Open circuit /circuitry fault	Drop in circulating water temperature. Diesel generator not at optimum temperature to start	Low temperature indication and alarm on jacket water circulating loop	Redundant diesel generator remains in service	Diesel generator will start but may not do so within TS required time frame
Standby jacket water circulation pump	Inoperable/mechanical or electrical failure	Drop in jacket water temperature. Diesel generator not at optimum temperature to start	Low temperature indication and alarm on jacket water circulating loop	Redundant diesel generator remains in service	Diesel generator will start but may not do so within TS required time frame
Jacket water circulating water piping	Line break or major leak/vibration	Low level in surge tank. Diesel generator not operative	~~Low level alarm~~ Gauge	Redundant diesel generator remains in service	

Table 9.5-12

DIESEL GENERATOR COOLING WATER SYSTEM - INDICATIONS, ALARMS, AND SENSORS

(Sheet 2 of 2)

Parameter	Local Indication	Local Engine Control Panel	Control Room	Comments
Engine return jacket water temperature	• Gauge	• Gauge • Alarm (high or low)	• Common trouble alarm	High temperature shuts down diesel in test mode only
Jacket water level control	• Gauge	• ~~Alarm (low level)~~ Gauge	~~• Common trouble alarm~~	