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10 CFR 50.90

Palo Verde Nuclear
Generating Station

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102-06370-DCM/DFS
June 22, 2011

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

Dear Sirs:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2, and 3
Docket Nos. STN 50-528, 50-529, and 50-530
Request for Amendment to Technical Specification 3.7.4,
"Atmospheric Dump Valves (ADV)"**

Pursuant to 10 CFR 50.90, Arizona Public Service Company (APS) hereby requests to amend Renewed Operating License Nos. NPF-41, NPF-51, and NPF-74, by amending the Technical Specifications (TS) that are incorporated as Appendix A to the Renewed Operating Licenses for PVNGS Units 1, 2, and 3. The proposed license amendment request (LAR) will revise TS 3.7.4, "Atmospheric Dump Valves (ADV)," to be more restrictive by requiring four ADV lines to be OPERABLE in MODES 1, 2, and 3, as well as in MODE 4 when a SG is relied upon for heat removal. This proposed LAR will also make corresponding revisions to the Conditions, Required Actions, and Completion Times associated with one or more inoperable ADV lines. This proposed LAR ensures consistency between the TS and the PVNGS licensing and design bases. Consistent with the guidance in Nuclear Regulatory Commission (NRC) Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," the requirement for four OPERABLE ADV lines (two per SG) is currently being administratively implemented to ensure that appropriate actions are in place while this license amendment is pursued.

In letter no. 102-06241, dated August 25, 2010, APS initially submitted an LAR to revise TS 3.7.4 from requiring one OPERABLE ADV line per SG to require two OPERABLE ADV lines per SG along with corresponding changes to the Conditions, Required Actions and Completion Times. By letter dated October 6, 2010 (ADAMS Accession No. ML102730762), the NRC staff informed APS that additional information was required prior to acceptance of the LAR for NRC review. APS responded by letter dated October 20, 2010 (ADAMS Accession No. ML103010172). A public meeting was held on November 18, 2010, to discuss the NRC concerns with the LAR. Subsequently, by letter dated December 9, 2010, APS withdrew the LAR. The NRC staff acknowledged

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the withdrawal in a letter dated December 21, 2010 (ADAMS Accession No. ML103440282). On March 29, 2011, a public pre-licensing meeting was held with the NRC at which APS provided proposed TS changes and discussed the APS response to the NRC questions contained in the NRC letter dated December 21, 2010. The proposed changes to TS 3.7.4 included in the enclosure are based on the discussions in the public pre-licensing meeting. The summary of the meeting on March 29, 2011, was documented in an NRC letter dated April 27, 2011(ADAMS Accession No. ML110890816).

Approval of the proposed LAR is requested by June 30, 2012. Once approved, the amendment shall be implemented within 90 days.

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

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

Should you need further information regarding this LAR, please contact Russell A. Stroud, Licensing Section Leader, at (623) 393-5111.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 6/22/11
(Date)

Sincerely,

D.C. Morris

DCM/RAS/DFS/gat

Enclosure: Evaluation of the Proposed Change

cc: E. E. Collins Jr. NRC Region IV Regional Administrator
L. K. Gibson NRC NRR Project Manager for PVNGS
J. R. Hall NRC NRR Senior Project Manager
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ENCLOSURE

Evaluation of the Proposed Change

**Subject: Request for Amendment to Technical Specification 3.7.4,
Atmospheric Dump Valves (ADVs)**

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- 1. Technical Specification Page Markups
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- 3. Technical Specification Bases Page Markups
- 4. Response to Four Questions Contained in NRC Letter dated December 21, 2010, Acknowledging APS Withdrawal of the ADV LAR

1.0 SUMMARY DESCRIPTION

This evaluation supports an Arizona Public Service Company (APS) request to amend Renewed Operating License Nos. NPF-41, NPF-51, and NPF-74 for Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3, respectively.

The proposed license amendment request (LAR) will revise Technical Specification (TS) 3.7.4, "Atmospheric Dump Valves (ADV)," to be more restrictive by requiring four ADV lines to be OPERABLE in MODES 1, 2, and 3, as well as in MODE 4 when a Steam Generator (SG) is relied upon for heat removal. This proposed LAR includes a change to the Limiting Condition for Operation (LCO) for TS 3.7.4, with corresponding revisions to the TS Conditions, Required Actions (RAs), and Completion Times (CTs) associated with one or more inoperable ADV lines. This proposed LAR ensures consistency between the TS and the PVNGS licensing and design bases. Consistent with the guidance in Nuclear Regulatory Commission (NRC) Administrative Letter 98-10, "Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety," the requirement for four OPERABLE ADV lines (two per SG) is being administratively implemented to ensure that appropriate protective actions are in place while this license amendment is pursued.

2.0 DETAILED DESCRIPTION

The proposed LAR revises the Limiting Condition for Operation (LCO) for TS 3.7.4 as follows:

From: One ADV line per steam generator (SG) shall be OPERABLE

To: Four ADV lines shall be OPERABLE

The ACTIONS table associated with TS 3.7.4 is revised as follows:

1. Condition A Completion Time (CT) is modified:

From: 72 hours

To: 7 days

2. Condition A is also modified by adding the following:

NOTE - Separate Condition entry is allowed for each SG

3. Condition B is modified as follows:

From: Two required ADV lines inoperable

To: Two or more ADV lines inoperable with both ADV lines inoperable on one or more SGs

4. Condition B Required Action (RA) is modified as follows:

From: Restore one ADV line to OPERABLE status

To: Restore one ADV line to OPERABLE status on each SG

These changes to TS 3.7.4 are proposed to ensure that the number of ADV lines maintained in an operable condition will allow each unit to be safely shut down after a

design basis event concurrent with a loss of offsite power and the most limiting single failure. The modified LCO ensures that single failure requirements are satisfied for mitigation of design basis accidents.

3.0 TECHNICAL EVALUATION

TS 3.7.4 specifies operability and surveillance requirements for SG ADV lines. Each PVNGS unit is designed with two SGs, each of which discharges into two Main Steam lines. Each Main Steam line has five Main Steam Safety Valves (MSSVs) and one ADV connected to it. As a result, each unit has the availability of up to twenty MSSVs and four ADVs.

In the event the turbine is unavailable, steam can normally be directed to the preferred heat sink through the Steam Bypass Control System (SBCS) which can route steam directly to the main condenser or to the atmosphere. The SBCS is not safety-related and is not available if the Main Steam Isolation Valves (MSIVs) are closed or if there is a loss of power to the SBCS, or when the main condenser is not available as a heat sink.

There are four ADV lines, two per SG, each of which has the capacity to cool the Reactor Coolant System (RCS) to the Shutdown Cooling (SDC) system entry conditions should the SBCS be unavailable. Each ADV line consists of a normally closed ADV and a normally open block valve. TS 3.7.4 currently requires one of the two existing ADV lines per SG be OPERABLE in MODES 1, 2, and 3, as well as in MODE 4 when a SG is relied upon for heat removal. The block valves are not credited to isolate a stuck-open ADV and do not have a credible failure mode that would result in their inadvertent closure.

UFSAR Design Descriptions

The PVNGS UFSAR describes the ADVs and their functions for removing heat from the reactor coolant system and mitigating the consequences of accidents.

UFSAR Section 10.3.2.2, "Component Description [Main Steam Supply System]," provides the following component description of the main steam lines:

The main steam lines deliver the required steam flow from the secondary side of the two steam generators to the high-pressure turbine; while branch lines deliver steam to the moisture separator/reheater, feedwater pump turbines, steam seal system, and the auxiliary steam system.... Each main steam line contains five spring-loaded safety valves, one atmospheric dump valve, and one isolation valve. All of these valves are located outside the containment and are installed as close as possible to the containment wall....

UFSAR Section 10.3.2.2.4, "Atmospheric Dump Valves," provides the following description of the ADVs:

Atmospheric dump valves, one per main steam line, are provided to allow cooldown of the steam generators when the main steam isolation valves are closed, or when the main condenser is not available as a heat sink. Each atmospheric dump valve is sized to hold the plant at hot standby

while dissipating core decay heat or to allow a flow of sufficient steam to maintain a controlled reactor cooldown rate. No automatic control capability is required or provided.

UFSAR Section 5.1.5, "CESSAR Interface Evaluation," provides the following description of the ADVs:

G. Thermal Limitations

- 4. One atmospheric dump valve is provided in each of the main steam lines to allow cooldown of the steam generators when the main steam line isolation valves are closed, or when the main condenser is not available as a heat sink. Each ADV is sized to hold the plant at hot standby dissipating core decay and reactor coolant pump heat, and to allow controlled cooldown from hot standby to shutdown cooling initiation temperatures. To meet this requirement, each atmospheric dump valve has a capacity of 1.47×10^6 pounds per hour at 1000 psia.*

USFAR Accident, Design Bases Analyses

The safety analyses in the PVNGS UFSAR credit the ADVs as dual use components that fulfill both heat removal and containment isolation design basis safety functions, in accordance with 10 CFR Part 50, Appendix A, General Design Criteria (GDC) 34 and 57, respectively. As containment isolation valves, the ADV function is to close; however, the ADV function for heat removal is to open. Therefore, the control features of the ADVs ensure the valves fail closed, while they can be opened remotely from the control room via instrument air or a local nitrogen system. A manual, non-safety-related handwheel is also provided for local operation.

The UFSAR safety analyses assume an initial condition of four operable ADVs and account for credible limiting single failures that may result in a loss of capability of ADVs to perform their intended safety functions. These single failures include a failure of remote operation of one ADV to open; or a failure of remote operation of one ADV to close after it has been opened by plant operators. Also, the UFSAR safety analyses bound a condition where an electrical failure renders two ADVs, one on each steam generator, unavailable to open via remote operation. There are no credible single failures that could fail multiple ADVs in an open position. The failure of two ADVs in the opened position is not credible as the ADVs are "powered components" which fail closed on a failure of the control circuits that provide the signal for the ADV to open or a loss of electric power to those control circuits. In addition, a loss of the air supply to the ADV and its backup nitrogen system will result in the associated ADV failing in the closed position.

- **Loss-of-Coolant Accident (LOCA) Long-Term Cooling (LTC) Analysis**

The LOCA LTC analysis in UFSAR Section 6.3.3.4 evaluates post-LOCA mitigation strategies that will maintain the core at safe temperatures and avoid the precipitation of boric acid in the core region. The LTC analysis credits two mitigation strategies depending upon the break size. If the break is sufficiently small, the Reactor Coolant System (RCS) will eventually refill and successful operation of the shutdown cooling system will be assured. If the break is large enough to prevent refill of the RCS, then

long-term cooling will be afforded by simultaneous hot and cold side injection. Regardless of the mitigation strategy employed, the analysis assumes that plant operators will open one ADV per SG within one hour post-LOCA to release steam from the SGs and to initiate cooldown. The design basis event combination for this analysis includes an initiating break, a loss of offsite power, and a single failure of an active component. Consideration of the single failure criterion implies that the ADV TS LCO should require more than two OPERABLE ADVs (i.e., one per SG).

- Steam Generator Tube Rupture (SGTR) with a Coincident Loss of Offsite Power and a Single Failure (SGTRLOPSF) Analysis

In the SGTRLOPSF analysis in UFSAR Section 15.6.3.3, the radiological consequences are maximized by assuming a loss of offsite power which results in the closure of the MSIVs, a coincident iodine spike, and a single failure that results in one ADV on the affected SG being in a failed open position. In this event scenario, after a reactor trip, the operator opens one ADV on each SG to initiate unit cooldown; however, it is assumed that the ADV on the affected SG fails open. The operator then closes the ADV on the unaffected SG to prevent an excessive cooldown rate. In this scenario, as required, the operator reopens the ADV on the unaffected SG to continue the cooldown of the unit to SDC entry conditions. The SGTRLOPSF analysis is considered the bounding licensing basis for a SGTR event, and the maximum radiological consequences from that event remain within the Nuclear Regulatory Commission (NRC) 10 CFR 100 limits. In December 1984, the NRC staff accepted APS's SGTRLOPSF reanalysis for PVNGS that utilized the 10 CFR 100 dose limit guidelines in NUREG-0857, Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1, 2, and 3, (Reference 6.5).

- Forced Shutdown as Result of Loss of Off Site Power and Seismic Event Analysis – Branch Technical Position (BTP) Reactor Systems Branch (RSB) 5-1 (Reference 6.1)

The BTP RSB 5-1 scenario is described in UFSAR Appendix 5C. The functional requirements of BTP RSB 5-1 ensure that the cooldown can be accomplished within a reasonable time after reactor shutdown using only safety-grade systems (described in NRC guidance provided by Table 1 of the BTP RSB 5-1 for Class 2 plants). Following a reactor trip, the plant must have the capability to maintain Hot Standby conditions for at least four hours prior to commencement of a cooldown. The credited systems must function using either onsite electrical power system operation (assuming offsite power is not available) or offsite electrical power system operation (assuming onsite power is not available) and assuming a single failure. Systems must be capable of remote operation from the control room although limited operator action outside of the control room is acceptable to mitigate the effects of postulated single failures.

Identification of a Non-Conservative TS

In July 2006, an APS review of the UFSAR Chapter 15 Steam Generator Tube Rupture with a Loss of Offsite Power (SGTRLOP) analysis identified that this analysis credited the opening of a second ADV on the unaffected SG for cooldown, whereas the current TS 3.7.4 required only one ADV line to be OPERABLE on each SG. Because the

SGTRLOP analysis was contained in UFSAR Chapter 15, it was interpreted that the crediting of the second ADV in the SGTRLOP analysis did not conform to the TS 3.7.4 requirements and this was entered into the PVNGS Corrective Action Program (CAP).

Based on this interpretation APS took immediate corrective actions by issuing a Standing Order for licensed operators to supplement the current TS requirements with administrative controls. These administrative controls prevented indefinite operation of the PVNGS units with inoperable ADV lines, which was otherwise allowed by the current TS 3.7.4.

APS formed an interdisciplinary team to evaluate and identify other corrective actions. The team reviewed the applicable design and licensing bases and obtained additional information from the Nuclear Steam Supply System (NSSS) vendor and industry peers.

As a result, it was determined that the SGTRLOP analysis was not a bounding licensing basis safety analysis and did not utilize assumptions that maximized dose consequences relative to the acceptance criteria in NRC Standard Review Plan Section 15.6.3. The purpose of the SGTRLOP analysis was to confirm that operator actions specified in the emergency operating procedures would prevent SG overfill. Since the SGTRLOP analysis is not a bounding licensing basis safety analysis it has been removed from Chapter 15 of the UFSAR. The interdisciplinary team confirmed that the SGTRLOPSF analysis is the bounding licensing basis analysis and it credited one ADV per SG for mitigating design basis events, supported by the current TS 3.7.4 requirements. However, the APS review team identified a new concern which was that although PVNGS safety analyses had traditionally accounted for single failure of one ADV to either open or close, there was a potential single failure that was not previously identified or considered.

Specifically, a potential single failure involving the ADV control circuits could potentially render two ADVs (i.e., one on each SG) incapable of being opened remotely. This type of single failure could occur because one pair of ADVs (i.e., one on each SG) is provided with direct current (DC) control circuit power from "A" and "C" channels, whereas the other pair of ADVs receives power from "B" and "D" channels. Although the control circuits for the ADVs are redundant, each of the control channels within an associated control set are not separated. As a result, a fault (i.e., short, ground, or open circuit) within a single channel may affect both ADVs in the associated pair and render them incapable of being opened remotely. Pairs of ADVs (i.e., one on each SG) also rely upon alternating current (ac) vital instrument power from "A" and "B" trains, so certain faults within a single train could also render two ADVs incapable of opening on demand. Each of these failed ADVs may still be operated manually using local hand wheels; however, use of that manual capability is not assumed in the PVNGS UFSAR Chapter 15 design basis accident analyses.

To address this single failure vulnerability, APS revised the PVNGS Technical Requirements Manual (TRM) T3.7.200, "Atmospheric Dump Valves (ADV)", on July 12, 2007. The revised TRM requires four OPERABLE ADV lines (two per SG) and provides associated Conditions, RAs, and CTs should one or more ADV lines be inoperable. Operability requirements for the ADVs are still controlled under that TRM

change, pending NRC approval of the proposed revised ADV TS changes. The interim Standing Order was cancelled upon issuance of the revised TRM.

Approval of this LAR by the NRC will effectively supersede the current TRM requirements for the number of operable ADVs, and the TRM will be modified as part of the implementation of the proposed TS change.

BTP RSB 5-1 Scenario Review

In February 2009, APS re-reviewed the BTP RSB 5-1 scenario analysis to further clarify the design and licensing bases of the ADVs and their support systems. The BTP RSB 5-1 natural circulation cooldown analysis credits the opening of two ADVs, one on each SG, to ensure cold shutdown in the analyzed duration. As a result, considering the single failure that renders one ADV on each SG inoperable, two ADVs on each SG would be required operable to satisfy the analysis requirements. This configuration is not supported by the current TS 3.7.4 which requires only one OPERABLE ADV on each SG. This issue was also entered into the PVNGS Corrective Action Program (CAP). The current control of the required ADV configuration is provided by TRM T3.7.200, "Atmospheric Dump Valves (ADV)." The TRM ADV operability requirements are adequate, in the interim, to ensure that the design basis requirements continue to be met and the identified TS inconsistencies are mitigated. Approval and implementation of the proposed amendment request will resolve this issue.

Previous LAR History

In letter no. 102-06241, dated August 25, 2010, APS initially submitted an LAR to revise TS 3.7.4 from requiring one OPERABLE ADV line per SG to require two OPERABLE ADV lines per SG along with corresponding changes to the Conditions, Required Actions and Completion Times. By letter dated October 6, 2010 (ADAMS Accession No. ML102730762), the NRC staff informed APS that additional information was required prior to acceptance of the LAR for NRC review. APS responded by letter dated October 20, 2010 (ADAMS Accession No. ML103010172). A public meeting was held on November 18, 2010, to discuss the NRC concerns with the LAR. Subsequently, by letter dated December 9, 2010, APS withdrew the LAR. The NRC staff acknowledged the withdrawal and asked four questions in a letter dated December 21, 2010 (ADAMS Accession No. ML103440282). On March 29, 2011, a public pre-licensing meeting was held with the NRC at which APS provided their proposed TS changes addressing the previous issues and the four questions asked in the NRC letter dated December 21, 2010. The proposed changes to TS 3.7.4 included in this enclosure are based on the discussions in that pre-licensing meeting. The summary of the meeting on March 29, 2011, was documented in an NRC letter dated April 27, 2011 (ADAMS Accession No. ML110890816).

Proposed Changes to LCO 3.7.4 in this LAR

In this LAR, LCO 3.7.4 is revised to require that four ADV lines shall be OPERABLE. This proposed change is more restrictive than the current PVNGS TS LCO which only requires one OPERABLE ADV line per SG. The current TS LCO did not consider the identified single control system failure that may affect one ADV line on each SG and result in a configuration that does not meet the bounding accident analyses. This is

resolved through the proposed change by ensuring that there would be one OPERABLE ADV line on each SG even with the single failure. This proposed change will ensure that the ADVs continue to perform their safety functions in a design basis event.

In addition to the modification of the TS LCO, the Conditions, RAs and CTs are proposed to be modified as discussed below:

Condition A 7-Day CT

The current Condition A CT is being changed to seven days from 72 hours. This proposed CT is the same as the CT allowed by Condition A of the standard Combustion Engineering (CE) TS in NUREG-1432, Revision 3 (Reference 6.2). The basis provided for both the proposed change and the NUREG-1432, 7-day CT, states that it takes into account the redundant capability afforded by the remaining OPERABLE ADV lines, and a non-safety grade backup in the Steam Bypass System and MSSVs.

The following provides further justification for the proposed Condition A CT:

- Each SG has two main steam lines, each of which has an ADV line, MSIV, and five safety grade MSSVs. There are no cross-tie vulnerabilities and no common failure points between the two main steam lines associated with each SG. The redundancy and reliability provided by this configuration supports a 7-day CT.
- When one ADV line is inoperable, the other ADV line on the associated SG is still available for design basis event mitigation, and any one ADV line has the capacity to safely remove heat from the RCS. In addition, any operable ADV lines on the other SG are also available for design basis event mitigation.
- When MSIVs are open and offsite power is available, the SBCS, although not safety grade, is available as the preferred method of heat removal, to direct steam to the condenser, the atmosphere or both.
- The safety grade MSSVs, located upstream of the MSIVs, would automatically open to provide SG overpressure protection and would remain available for RCS heat removal regardless of the availability of offsite power.
- Although not credited in the UFSAR Chapter 15 accident analyses, operators may utilize a non-safety related local manual hand wheel on the ADV to open and close an inoperable ADV line if the area is habitable. The PVNGS Emergency Operating Procedures (EOPs) provide guidance to operate the ADVs manually.
- There is a low probability of an accident which would require ADV line operation to occur during the proposed 7-day CT.
- Operating experience indicates that the proposed 7-day CT is sufficient to restore inoperable ADV lines to OPERABLE status.

Proposed NOTE for Separate Entry into Condition A for Each SG

A proposed Note is being added to Condition A allowing separate entry into this Condition for each SG and will allow one ADV line to be inoperable on each SG for up

to seven days. Exiting this Condition for each SG requires the inoperable ADV on the associated SG to be restored to OPERABLE status.

Although the CE standard TS does not specifically address separate condition entry per SG, the CE standard TS Condition A basis does allow one inoperable ADV for seven days. With one inoperable ADV line, one SG would have one OPERABLE ADV and the other SG would have two OPERABLE ADVs. During a design basis event, if the faulted SG is the SG with the two OPERABLE ADVs, there would be one OPERABLE ADV available to mitigate the event on the intact SG.

Allowing an inoperable ADV on both of the SGs per the proposed note for separate condition entry for Condition A, does not change that configuration and does not significantly increase the plant risk as discussed below.

The plant configuration allowed by the proposed separate condition entry ensures one OPERABLE ADV line per SG and continues to support the analytical assumptions for limiting faults [ANSI N18.2-1973, Condition IV - LOCA, SGTR, main steam line break (MSLB), and feedwater line break (FWLB)], and other design basis events with a coincident LOP or actuation of a MSIS, and assuming no single failure as provided in Generic Letter 80-30, Clarification Of The Term "Operable" As It Applies To Single Failure Criterion For Safety Systems Required By TS, dated April 10, 1980 (Reference 6.4).

The control circuitry for the ADVs is the identified area of single failure vulnerability and is powered by the 125V DC and 120V AC Class 1E power sources. These power sources have either more restrictive or equivalent to the TS 3.7.4 controls (i. e., DC power distribution subsystem inoperable – restore within two hours, AC vital instrument bus power distribution subsystem inoperable – restore within two hours, inverter inoperable – restore within seven days.) Under these supporting TSs, the CT for returning those components to OPERABLE status would also apply. As a result, dependency on the entry into separate conditions under TS 3.7.4, Condition A would be limited to types of component outages or failures that are not caused by these supporting systems.

Probabilistic Risk Assessment (PRA) for a Separate Entry to Condition A

As discussed in the pre-licensing meeting on March 29, 2011, APS is providing a summary of the results of a PRA evaluation that looked at the risk of removing one ADV on one SG from service for seven days. This evaluation then determined the increase in risk of coincidental removal from service of an ADV on the other SG. This risk evaluation was based on all four ADVs being symmetrically modeled in the PVNGS PRA model. The failure modes of each ADV included failure to open and plant-specific unavailability due to maintenance or testing. In addition, manual local recovery of an ADV was not credited in the PRA model which would reduce the importance of ADV outages if it were credited. The current PVNGS PRA model Revision 20, was used to quantify the risk increases from taking one ADV out of service and one ADV per SG out of service. The results shown below are more than 100 times lower than the acceptable limits in Regulatory Guide (RG) 1.177, An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications, dated August 1998 (Reference 6.3).

Three PRA cases were generated as follows:

1. ADV HV-178 (B train) on SG #1 out of service.

The core damage frequency (CDF) increase above normal/baseline plant CDF is $1.3E-08$ per year and the corresponding incremental conditional core damage probability (ICCDP) over a seven day period is $2.6E-10$. The large, early release frequency (LERF) increase above normal/baseline plant LERF is $1.3E-09$ and the corresponding incremental conditional large, early release probability (ICLERP) over the requested seven day period is $2.6E-11$.

2. ADV HV-178 (B train) on SG #1 and ADV HV-185 (B train) on SG #2 out of service.

The CDF increase above normal/baseline plant CDF is $1.7E-07$ and the corresponding ICCDP over a seven day period is $3.4E-09$. The LERF increased above normal/baseline plant LERF is $8.8E-09$ and the ICLERP over the requested seven day period is $1.7E-10$.

3. ADVs HV-178 and HV-185 out of service and the failure-to-open probabilities of the remaining two ADVs increased to their 95th percentiles values (i.e., mean demand failure probability increased from $1.0E-03$ to $2.4E-03$). Case 3 was generated to estimate the uncertainties in the risk increase in case 2. For case 3, the PRA model quantification resulted in a larger number of "cutsets" with very low values and did not show any significant increase over the results of case 2.

Proposed Condition B

Proposed Condition B would be entered when; "Two or more ADV lines are inoperable with both ADV lines inoperable on one or more SGs," with a corresponding RA of "Restore one ADV line to OPERABLE status on each SG," within 24 hours. The current TS Condition B allowed both of the required ADV lines inoperable which could result in no OPERABLE ADV lines on both SGs for 24 hours. The proposed Condition B does not change the configuration allowed by the current TS Condition B.

The current TS Condition B requires restoring one ADV line to OPERABLE status within 24 hours. This would ensure one OPERABLE ADV on one SG. The proposed Condition B requires restoring one ADV line to OPERABLE status on each of the SGs within a CT of 24 hours. Restoring one ADV line on each SG ensures that there is one OPERABLE ADV line on each SG. This RA returns the plant to a configuration that is controlled under the proposed Condition A. The 24-hour CT of proposed Condition B is consistent with the CT of the PVNGS current licensing basis and the CT of the CE Standard TS in NUREG-1432, Revision 3, for the condition when all required ADV lines are inoperable.

The proposed Condition B TS Bases, provided in Attachment 3 to this enclosure, states the 24-hour CT as reasonable to repair inoperable ADV lines, based on the availability of the Steam Bypass Control System and MSSVs, and the low probability of an event occurring during this period that requires the ADV lines. Under proposed Condition B there would be a loss of heat removal function through the ADVs on any SG that had no OPERABLE ADV lines. To mitigate the loss of this ADV function, there are other

means of performing this heat removal including, use of the SBCS and the MSSVs, as available. If there were an accident during the 24-hour CT, the EOPs would direct the operators to use the SBCS to perform the heat removal function, if available. If the SBCS was not available the EOPs direct the operators to operate an ADV from the control room or manually open an ADV using a local handwheel to cool the plant down. Although it may be possible that all four ADVs could be declared inoperable from the control room, it is not considered likely that at least one ADV cannot be opened manually to provide plant cooldown capabilities.

In support of this proposed change a PRA case was generated to determine the increase in risk of having as many as four ADVs inoperable for the 24-hour CT. As a result, the CDF increase above normal/baseline plant CDF is $3.8E-06$ per year and the corresponding ICCDP over a 24 hour period is $1.9E-09$. The LERF increase above normal/baseline plant LERF is $5.8E-08$ and the corresponding ICLERP over the requested 24 hour period is $1.6E-10$. These results are more than 100 times lower than the acceptable limits in RG 1.177 (Reference 6.3).

TS Basis Condition B Note

Although the proposed Condition B will allow continued operation for up to 24 hours with all four ADVs inoperable, a note is being provided in the PVNGS TS Bases that limits entry for that configuration. The note states that entry into Condition B with four ADV lines simultaneously inoperable is not intended for voluntary removal of redundant systems or components from service in lieu of other alternatives that would not result in redundant systems or components being inoperable. This note is to assure that entry into Condition B for all four ADVs inoperable is not to be used for operational convenience. The proposed TS Condition B change and the note added to the TS Basis do not alter the regulations for notifications and reports required under 10 CFR 50 involving the loss of safety function and do not obviate the requirement for APS to provide such notifications and reports, if necessary.

Additional Technical Specification Bases Changes

As discussed above, the Bases for TS 3.7.4 will also be changed to reflect the proposed changes and a proposed markup is included "For Information Only" in Attachment 3.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

In accordance with 10 CFR Part 50, Appendix A, the PVNGS design basis and accident analyses account for credible single failures of active components. With respect to the ADV lines, this includes failure of as many as two ADVs (i.e., one per SG) to open on demand, and failure of one ADV to close on demand after it has been opened by plant operators. The first of these single failure mechanisms may adversely affect the capability of the SGs to provide RCS heat removal, whereas the failure of a single ADV to close is postulated to maximize the potential for design basis accident radiological consequences. Failure of two ADVs in the opened position is not postulated as the ADVs are "powered components" which fail closed on loss of control or power. Therefore, no single failure exists that could fail multiple ADVs in an open position.

Four ADV lines (i.e., two per SG) are provided to ensure that at least one ADV line on at least one SG will remain available for heat removal following all potential design basis events and limiting single failures, including those accidents that may render one SG unavailable for heat removal. This is consistent with the PVNGS design and licensing bases. Additionally, for postulated SGTR accidents, at least one ADV line would remain available for heat removal on each SG, thereby assuring that plant operators may prevent SG overfill conditions by selectively delivering auxiliary feedwater to, and selectively steaming from, the affected SG. BTP RSB 5-1 scenarios, including seismic events, can also be mitigated with two ADVs, one per SG.

The applicable General Design Criteria (GDC) are:

- GDC 2, "Design Bases for Protection Against Natural Phenomena," requires that the safety-related portion of the Main Steam Supply System be protected from the effects of natural phenomena, such as earthquakes, tornadoes, hurricanes, floods, and external missiles.
- GDC 4, "Environmental and Dynamic Effects Design Bases," requires that the safety-related portion of the Main Steam Supply System be designed to remain functional after a safe shutdown earthquake and to perform its intended functions following postulated hazards such as internal missiles or pipe breaks.
- GDC 34, "Residual Heat Removal," requires that suitable redundancy be provided to assure that for onsite electrical power system operation (assuming offsite power is not available), and for offsite electrical power system operation (assuming onsite power is not available), Main Steam Supply System safety functions can be performed, assuming a single failure.
- GDC 57, "Closed System Isolation Valves," requires that ADVs be located as close to the containment as practical and be capable of remote manual operation.

The proposed changes to TS 3.7.4 do not alter the SG ADV line design, nor do they affect compliance with the applicable regulatory requirements and criteria.

4.2 Precedent

The Combustion Engineering (CE) Improved Technical Specifications (ITS) in NUREG-1432, Revision 3 (Reference 6.2), provides guidance for LCO and Action requirements, along with their associated TS Bases discussions.

4.3 No Significant Hazards Consideration Determination

The proposed change would revise technical specification (TS) 3.7.4, "Atmospheric Dump Valves (ADV)," to require four ADV lines be OPERABLE in MODES 1, 2, and 3, as well as in MODE 4 when a steam generator (SG) is relied upon for heat removal. The proposed change provides for separate entry for each SG into an Action Condition that allows continued operation with one inoperable ADV line on a SG for 7 days. In addition, the proposed change would allow two or more ADV lines to be inoperable with both ADV lines inoperable on one or more SGs, for 24 hours. This proposed

amendment will ensure that the Palo Verde Nuclear Generating Station (PVNGS) licensing and design bases are maintained.

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 amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed amendment will revise TS 3.7.4, to require four ADV lines be OPERABLE in MODES 1, 2, and 3, as well as in MODE 4, when a SG is relied upon for heat removal. The proposed change to TS 3.7.4 is consistent with the PVNGS UFSAR Chapters 6 and 15 safety analyses. The proposed change does not involve any design or physical changes to the facility, including the ADV lines and their associated ADVs, block valves, pneumatic controllers, instrument power circuits, or control circuits. The design and functional performance requirements, operational characteristics, and reliability of the ADV lines remain unchanged. Therefore, there is no impact on the design safety function of the ADVs to open (which mitigates certain postulated accidents by providing Reactor Coolant System heat removal) nor on the design safety function of the ADVs to close (which mitigates certain postulated accidents by providing containment isolation). Furthermore, there is no change with respect to an inadvertent opening of an ADV (as a potential transient initiator).

With regard to the consequences of postulated design basis accidents and the equipment required for mitigation of those accidents, the proposed TS changes involve no design or physical changes to the ADV lines or any other equipment required for accident mitigation. The proposed ADV TS change does not affect any design basis analysis or the results of those analyses. The change provides additional assurance that ADVs will be available as required.

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

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

Response: No

The proposed amendment will revise TS 3.7.4, to require four ADV lines be OPERABLE in MODES 1, 2, and 3, as well as in MODE 4, when a SG is relied upon for heat removal. The proposed change to TS 3.7.4 is consistent with the PVNGS UFSAR Chapters 6 and 15 safety analyses. The proposed change does not involve any design or physical changes to the facility, including the ADV lines and their associated ADVs, block valves, pneumatic controllers, instrument power circuits, or control circuits. No physical alteration of the plant is involved. The proposed change does not involve or introduce any changes to plant

procedures that could cause a new or different kind of accident from any previously evaluated. The proposed change ensures that the ADVs perform their intended functions during all design basis accidents for which they are credited. The proposed change does not involve the creation of any new or different kind of accident initiator. The proposed change does not create any new failure modes for the ADVs and does not affect the interaction between the ADVs and any other system.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

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

Response: No.

The proposed amendment will revise TS 3.7.4, to require four ADV lines be OPERABLE in MODES 1, 2, and 3, as well as in MODE 4, when a SG is relied upon for heat removal. The proposed change to TS 3.7.4 is consistent with the PVNGS UFSAR Chapters 6 and 15 safety analyses. The proposed change does not alter the manner in which safety limits or limiting safety system settings are determined. No changes to instrument and/or system actuation setpoints are involved. Safety and Branch Technical Position (BTP) RSB 5-1 analysis acceptance criteria are not impacted by this change and the proposed change will not permit plant operation in a configuration outside the design basis.

Therefore, the proposed change does not involve a significant reduction in the margin of safety.

Based on the above, APS concludes that the proposed amendment does not involve a 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.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined the proposed amendment would change a requirement with respect to use of a facility component located within the restricted area, as defined in 10 CFR 20. The proposed amendment revises TS 3.7.4 to require four ADV lines operable, which is more restrictive than the current TS requirements, and ensures that the PVNGS Units 1, 2, and 3, design and licensing bases continue to be met. The proposed amendment does not modify any physical barriers or any accident dose consequences, and it ensures the current accident analyzed dose consequences remain bounding.

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or a significant increase in the amounts of any effluents 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 environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

- 6.1. NUREG-0800, Standard Review Plan, Branch Technical Position (BTP) Reactor Systems Branch (RSB) 5-1
- 6.2. NUREG-1432, Standard Technical Specifications Combustion Engineering Plants, Volume 1, Revision 3.0, June 2004
- 6.3. Regulatory Guide (RG) 1.177, An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications, August 1998
- 6.4. Generic Letter 80-30, Clarification Of The Term "Operable" As It Applies To Single Failure Criterion For Safety Systems Required By TS, April 20, 1980
- 6.5. NUREG-0857, Safety Evaluation Report Related to the Operation of Palo Verde Nuclear Generating Station Units 1, 2, and 3, Supplement No. 7, Section 15.4.5, Steam Generator Tube Rupture Accident, December 1984

ATTACHMENT 1

Technical Specification Page Markups

Pages:

3.7.4-1

3.7 PLANT SYSTEMS

3.7.4 Atmospheric Dump Valves (ADVs)

LCO 3.7.4 One ~~Four~~ **ADV lines** per steam generator shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is being relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. -----NOTE----- <u>Separate Condition entry is allowed for each SG</u> -----</p> <p>A. One required ADV line inoperable.</p>	<p>A.1 Restore ADV line to OPERABLE status.</p>	<p>72 hours 7 days</p>
<p>B. Two or more ADV lines inoperable with both ADV lines inoperable on one or more SGs.</p>	<p>B.1 Restore one ADV line to OPERABLE status on each SG.</p>	<p>24 hours</p>
<p>C. Required Action and associated Completion Time not met.</p>	<p>C.1 Be in MODE 3. AND C.2 Be in MODE 4 without reliance on steam generator for heat removal.</p>	<p>6 hours 24 hours</p>

ATTACHMENT 2

Retyped Technical Specification Pages

**Pages:
3.7.4-1**

3.7 PLANT SYSTEMS

3.7.4 Atmospheric Dump Valves (ADVs)

LCO 3.7.4 Four ADV lines shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
MODE 4 when steam generator is being relied upon for heat removal.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>A. -----NOTE----- Separate Condition entry is allowed for each SG. ----- One required ADV line inoperable.</p>	<p>A.1 Restore ADV line to OPERABLE status.</p>	<p>7 days</p>
<p>B. Two or more ADV lines inoperable with both ADV lines inoperable on one or more SGs.</p>	<p>B.1 Restore one ADV line to OPERABLE status on each SG.</p>	<p>24 hours</p>
<p>C. Required Action and associated Completion Time not met.</p>	<p>C.1 Be in MODE 3. <u>AND</u> C.2 Be in MODE 4 without reliance on steam generator for heat removal.</p>	<p>6 hours 24 hours</p>

ATTACHMENT 3

Technical Specification Bases Page Markups

(For Information Only)

Pages:

B 3.7.4-1

B 3.7.4-2

B 3.7.4-3

B 3.7.4-4

B 3.7.4-5

B 3.7.4-6

B 3.7.4-7

B 3.7.4-8

B 3.7 PLANT SYSTEMS

B 3.7.4 Atmospheric Dump Valves (ADV)

BASES

BACKGROUND

The ADVs provide a safety grade method for cooling the unit to Shutdown Cooling (SDC) System entry conditions, should the preferred heat sink via the Steam Bypass Control System (SBCS) to the condenser and/or atmosphere not be available, as discussed in the UFSAR, Section 10.3 (Ref. 1). **The ADVs have the capacity to achieve and maintain safe shutdown conditions following design basis accidents involving a loss of offsite power and/or closure of the Main Steam Isolation Valves (MSIVs) following receipt of a Main Steam Isolation Signal (MSIS).** This is done in conjunction with the Auxiliary Feedwater System providing cooling water from the Condensate Storage Tank (CST). The ADVs may also be required to meet the design cooldown rate during a normal cooldown.

Four ADV lines are provided. Each ADV line consists of one **normally closed** ADV and an associated, **normally open** block valve. ~~One~~**Two** ADV lines per steam generator ~~is~~**are** required to meet the **single failure assumptions following a design basis accident that may render one steam generator (SG) unavailable for heat removal. The ADV block valves permit testing of the ADVs while a unit is at power. The safety analyses, however, do not credit block valve operation as a means of isolation of a failed open ADV.** ~~assumptions in the safety analyses. The ADV block valves are not required to be closed in the event of a stuck open ADV.~~

The ADVs are equipped with pneumatic controllers to permit control of the cooldown rate.

The ADVs are provided with a pressurized gas supply of bottled nitrogen that, on a loss of pressure in the normal instrument air supply, automatically supplies nitrogen to operate the ADVs. The nitrogen supply is sized to provide sufficient pressurized gas to operate the ADVs for the time required for **Reactor Coolant System (RCS) cooldown to the Shutdown Cooling (SDC) System entry conditions,** as described in UFSAR Appendix 5C, "Natural Circulation Cooldown Analysis." The Appendix 5C analysis is based on the assumptions and conditions in the NRC's Branch Technical Position (BTP) RSB 5-1, "Design Requirements of the Residual Heat Removal System." RSB 5-1 is an attachment

(continued)

BASES

BACKGROUND

(continued)

to Standard Review Plan (SRP) 5.4.7, "Residual Heat Removal (RHR) System," and identifies RHR System requirements that ensure conformance with General Design Criteria (GDC) 34, "Residual Heat Removal."

The PVNGS RSB 5-1 cooldown scenario described in UFSAR Appendix 5C is based on a natural circulation cooldown with both steam generators (SGs) available, using safety-grade equipment, assuming a loss of offsite power, a limiting single failure (assumed to be a diesel generator failure), and with minimal operator actions outside the control room, as approved by the NRC. The RSB 5-1 cooldown duration was

(continued)

BASES

BACKGROUND
(continued)

established during actual testing performed in January 1986, and was confirmed through subsequent analyses to address steam generator replacement and power uprates.

A description of the ADVs is found in Reference 1. The ADVs require both **Direct Current (DC)** sources and class **Alternating Current (AC)** instrument power to be considered OPERABLE. In addition, **non-safety related** hand wheels are provided for local manual operation, **although hand wheels are not required for ADV OPERABILITY or credited in the accident analyses.**

APPLICABLE
SAFETY ANALYSES

The design basis of the ADVs is established by the capability to cool the unit to SDC System entry conditions. **The design must also accommodate credible single failures that may render as many as two ADVs (i.e., one on each steam generator) incapable of opening on demand.** A cooldown rate of 75°F per hour is obtainable by one or both **SGs** steam generators. This design is adequate to cool the unit to SDC System entry conditions with only one ADV and one **SG** steam generator, utilizing the cooling water supply available in the CST. Cooldown scenarios using a single ADV may require a combination of the available nitrogen supply and local manual operation or other actions.

Alternatives for cooldown and for ADV operation beyond the RSB 5-1 scenario have been evaluated using probabilistic risk analysis (PRA) as part of the resolution of Unresolved Safety Issue (USI) A-45, "Shutdown Decay Heat Removal Requirements." USI A-45 was subsumed into the Individual Plant Examination (IPE) which used PRA techniques and was submitted to the NRC in response to Generic Letter 88-20. The IPE considered various operator actions and the use of non-safety related equipment, and concluded that there are no significant heat removal vulnerabilities at PVNGS. Operator actions to locally operate the ADVs are not credited in the UFSAR Chapter 15 accident analyses but are described in the EOPs; non-safety related equipment such as the supplemental nitrogen supply could also be used during extended cooldown situations.

~~In the accident analysis presented in the UFSAR, the ADVs are assumed to be used by the operator to cool down the unit to SDC System entry conditions for accidents accompanied by a loss of offsite power. Prior to the~~

(continued)

BASES

~~operator action, the Main Steam Safety Valves (MSSVs) are used to maintain steam generator pressure and temperature at the MSSV setpoint. This is typically 30 minutes following the initiation of an event. (This is less for Steam Generator Tube Rupture (SGTR) events as detailed below). The limiting events are those that render one steam generator unavailable for RCS heat removal, with a~~

(continued)

BASES

APPLICABLE
SAFETY ANALYSES

(continued)

~~coincident loss of offsite power; this results from a turbine trip. Typical initiating events falling into this category are a main steam line break upstream of the main steam isolation valves, and a feedwater line break. For the SGTR and SGTRLOP events, ADV's are assumed to be opened two minutes post trip to prevent cycling of Main Steam Safety Valves (MSSVs) and they remain open until the affected SG is isolated. From then on, the ADVs on the unaffected SG is used till shutdown cooling entry conditions are reached.~~

The design basis accident analyses also account for a single failure that may render one ADV incapable of being closed remotely, after it is opened by control room operators. This type of postulated failure yields more adverse radiological consequences for certain analyses, because it creates a pathway for radioisotope discharges to the environment. For accident mitigation the safety analyses do not credit isolation of a failed open ADV by either local manual hand wheel operation or closure of its associated block valve.

The safety analyses in the UFSAR assume that plant operators will use the ADVs to cool down an affected unit to SDC System entry conditions, following accidents accompanied by a loss of offsite power and/or closure of the MSIVs. Initiation of operator action is typically assumed to occur 30 minutes following the initiation of an event; however, to conservatively bound maximum potential dose consequences for Steam Generator Tube Rupture (SGTR) events, initiation of this operator action is assumed to occur two minutes following reactor trip. Prior to the operator action, the Main Steam Safety Valves (MSSVs) are credited in the analyses to maintain SG pressure and temperature near the MSSV setpoints.

The limiting design basis event for nitrogen supply capacity is the RSB 5-1 natural circulation cooldown scenario described above. This scenario includes an initial period of 4 hours at hot standby conditions followed by natural circulation cooldown for 9.3 hours until SDC entry conditions are achieved. Each ADV is required to have a nitrogen supply that supports ADV operation for a total of 13.3 hours.

Limiting design basis accidents with respect to RCS heat removal and ADV steam flow capacity include those that may

(continued)

BASES

render one SG unavailable, with a coincident loss of offsite power and a single active component failure (i.e., main steam line breaks upstream of the MSIVs, and feedwaterline breaks).

The limiting design basis event with respect to offsite radiological consequences is a SGTR with a coincident loss of offsite power, a coincident RCS iodine spike, and a single failed open ADV on the affected SG (SGTRLOPSF). To determine bounding radiological consequences, an ADV is assumed to stick open during operator action that occurs two minutes after trip, and remains open for the duration of the cooldown. For this SGTRLOPSF case, plant operators will direct auxiliary feedwater flow to the affected SG after the accident has occurred. The steam released through the ADVs is contaminated, however, because of primary-to-secondary leakage that transports radioisotopes from the RCS to the SG.

~~The Steam Generator with a Loss of Offsite Power and a Single Failure (SGTRLOPSF) event, assumes an ADV on the affected SG sticks open 2 minutes post trip for the duration. The credited operator action of directing auxiliary feedwater to the affected SG keeps the tubes covered. Thus the majority of the heat removal during this event is conducted through the affected SG ADV.~~

The ADVs satisfy Criterion 3 of 10 CFR 50.36 (c)(2)(ii).

LCO

Four -ADV lines are required to be OPERABLE, two on each SG to ensure a design basis accident that renders one SG unavailable for heat removal (in combination with a coincident loss of offsite power and a single active component failure) would not prevent control room operators from remotely opening an ADV on the unaffected SG. Failure to meet the LCO can result in an inability to cool the affected unit to SDC System entry conditions when the SBCS is unavailable.~~One ADV line is required to be OPERABLE on each steam generator to conduct a unit cooldown following an event in which one steam generator becomes unavailable. Failure to meet the LCO can result in the inability to cool the unit to SDC System entry conditions following an event in which the condenser is unavailable for use with the Steam Bypass Control System.~~

(continued)

BASES

LOC
(continued) An ADV is considered OPERABLE when it is capable of providing a controlled relief of the main steam flow, and is capable of fully opening and closing on demand.

APPLICABILITY In MODES 1, 2, and 3, and in MODE 4, when ~~steam generator~~ **a SG** is being relied upon for heat removal, the ADVs are required to be OPERABLE.

In MODES 5 and 6, **there is insufficient heat available to produce steam that could be released through the ADVs, and design basis accidents such as main steam line breaks, feedwater line breaks, and SGTRs are not credible events**^{aa}
~~SGTR is not a credible event.~~

ACTIONS

A.1

The condition for this ACTION is modified by a Note that states separate Condition entry is allowed for each SG. This is acceptable because only one SG is required for RCS heat removal after a design basis accident, and because this Condition provides the appropriate Required Action and Completion Time for one inoperable ADV line on each SG.

With one ADV line on a SG inoperable, action must be taken to restore that ADV line to OPERABLE status within 7 days to meet the LCO for each SG that has entered this Condition. The 7-day Completion Time takes into consideration the redundant capability afforded by the remaining OPERABLE ADV lines, the safety grade MSSVs, and the non-safety grade backup of the SBCS.

~~With one required ADV line inoperable, action must be taken to restore the OPERABLE status within 72 hours. The 72 hour Completion Time takes into account the availability of a nonsafety grade backup in the Steam Bypass Control System and MSSVs.~~

B.1

With two or more ADV lines on SG inoperable with both ADV lines inoperable on one or more SGs, action must be taken to restore one of the two ADV lines on each that SG to OPERABLE status within 24 hours.~~With two required ADV lines inoperable (one in each steam generator), action must be taken to restore one of the ADV lines to OPERABLE status. As the block valve can be closed to isolate an~~

BASES

~~ADV, some repairs may be possible with the unit at power.~~
The 24 hour Completion Time is reasonable to repair inoperable ADV lines, based on the availability of the Steam Bypass Control System and MSSVs, and the low probability of an event occurring during this period that requires the ADV lines.

NOTE:

Entry into Condition B for all four ADV lines simultaneously inoperable is not intended for voluntary removal of redundant systems or components from service in lieu of other alternatives that would not result in redundant systems or components being inoperable

ACTIONS

C.1 and C.2

If the ADV lines cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 4, without reliance on the ~~steam generator~~ **SG** for heat removal, within 24 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE
REQUIREMENTS

SR 3.7.4.1

To perform a controlled cooldown of the RCS, the ADVs must be able to be opened and throttled through their full range. This SR ensures the ADVs are tested through a full control cycle at least once per fuel cycle. Performance of inservice testing or use of an ADV during a unit cooldown may satisfy this requirement. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

REFERENCES

1. UFSAR, Section 10.3.

ATTACHMENT 4

Response to Four Questions Contained in NRC Letter dated December 21, 2010,
Acknowledging APS Withdrawal of the ADV LAR

**Response to Four Questions Contained in NRC Letter dated
December 21, 2010, Acknowledging APS Withdrawal of the ADV LAR**

In a letter dated December 21, 2010, [Agencywide Documents Access and Management System (ADAMS) Accession No. ML103440282], the NRC acknowledged the Arizona Public Service (APS) withdrawal of the license amendment request (LAR) submitted on August 25, 2010 (ADAMS Accession No. ML102450051). In that acknowledgement the NRC indicated that based on the November 18, 2010, public meeting, if the August 25, 2010, submittal had been accepted for review additional information would be needed. This attachment provides the four NRC questions and the APS responses to those questions. The responses to these NRC questions were discussed with the NRC in the public pre-licensing meeting held on March 29, 2011.

NRC Request 1

The licensee is requesting "A separate condition entry for each SG" for Condition "A" for one ADV inoperable for a 7-day completion time (CT). Standard Technical Specifications (STS) do not permit separate condition entry. Please justify why separate entry condition would be acceptable.

APS Response

A proposed note is being added to Condition A allowing separate condition entry for each steam generator (SG). This will allow one atmospheric dump valve (ADV) on each SG to be inoperable for up to 7 days while being tracked separately for each SG. The inoperable ADV must be restored to OPERABLE status prior to exiting the condition for each respective SG. The basis for separate condition entry for 7 days of allowed outage time is the redundant capability afforded by the remaining OPERABLE ADV on the same SG. In addition to the redundant ADV, there is the availability of the main steam safety valves and the non-safety grade backup steam bypass control system. For an initial condition where one of the two ADVs per SG is inoperable, the remaining OPERABLE ADV on each SG is capable to mitigate accident conditions even during design basis accidents that render a SG unavailable (i.e., main steam line break, main feedwater line break and steam generator tube rupture events). It is true that the CE Standard TS do not address separate condition entry. However, APS believes that this provision could be justified for addition to the CE Standard TS. It is very possible that "separate condition entry" is not in the CE Standard TS because it has not been considered prior to the APS LAR. Additional information and justification for the use of a separate condition entry is provided in the enclosure under the heading, "Proposed NOTE for Separate Condition Entry into Condition A for Each SG."

NRC Request 2

The licensee is requesting a 72-hour completion time for two ADVs inoperable on one SG for Condition "B." STS Condition "B" does not allow two inoperable ADVs on one SG for more than 24 hours. Please explain how a design-basis event could be mitigated if an accident on the SG with the operable ADV results in no ADVs available for accident mitigation.

APS Response

The APS LAR that was submitted in August of 2010 contained a 72-hour completion time for the condition with two ADVs inoperable on one SG and one or two ADVs OPERABLE on the other SG. Based upon discussions with the NRC staff in the November 18, 2010 and March 29, 2011 public meetings, APS decided not to pursue this provision. The plant configuration with two ADVs inoperable on one or more SGs would now be addressed by the revised Condition B, with a completion time of 24 hours.

NRC Request 3

STS does not permit separate entry conditions on multiple SGs, and the limiting condition for operation is written to address only one SG at a time; therefore, only one SG is permitted to have two ADVs inoperable. In its LAR, the licensee assumes that STS Condition "B" allows two ADVs to be inoperable on two SGs for 24 hours, and uses this logic on page 9 of its LAR to help justify that the proposed 72-hour CT is more conservative than STS. Please justify the assumption and provide additional information to show that the design basis can be met.

APS Response

APS has restructured the requirement in the limited condition for operation (LCO) to make it clear that all four ADVs are required to be OPERABLE. Condition B has also been restructured to ensure it is clear that the condition is applicable to both SGs and all four ADVs. To address the NRC comment on loss of function, APS has added a clarifying note to the technical specification (TS) Bases stating that entry into Condition B for all four ADVs simultaneously inoperable is not intended for voluntary removal of redundant systems or components being inoperable. This note is provided to assure that entry into Condition B with all four ADV's simultaneously inoperable is not to be used for operational convenience. The proposed Condition B and the note added to the TS Bases do not alter the regulations for notifications and reports required under 10 CFR 50 involving a loss of safety function and do not obviate the requirement for APS to provide such notifications and reports, as necessary. The 24-hour completion time in Condition B for all four ADV's being simultaneously inoperable is consistent with the CE Standard TS as well as the Palo Verde current licensing bases. Additional information in support of the 24-hour Completion time is provided in the enclosure under the heading, "Proposed Condition B."

NRC Request 4

The NRC staff understands that the licensee is requesting a CT in order to perform maintenance and testing of the ADVs while the units are on-line. Please provide information to show the testing is a mandatory or a self-imposed requirement based upon plant-specific equipment reliability.

APS Response

The testing mentioned by the NRC above is for the nitrogen system valves as required by the ASME OM code. Although the current practice is to test the nitrogen system valves on two ADV's at the same time (one ADV per SG), changes to the test practices and procedure are possible to test the nitrogen system valves on only one ADV at a time.