APS

Palo Verde Nuclear Generating Station

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10 CFR 50.90

102-05371-CDM/TNW/RAB
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ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Reference: Letter 102-05351-CDM/TNW/RAB, dated September 29, 2005, from C. D. Mauldin, APS, to U. S. Nuclear Regulatory Commission, "Request to Supercede a License a License Amendment Request Associated With Steam Generator Replacement and Power Uprate"

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3, Docket Nos. STN 50-528/529/530
Revised Pages for License Amendment Request

As a result of questions and discussions with the NRC staff concerning the amendment requested in the referenced letter, Arizona Public Service Company (APS) is providing revised pages to Attachment 3, "Changes to TS Bases." The replacement pages are provided in Enclosure 2 to this letter.

The changes are editorial and do not impact the original No Significant Hazards Consideration, or the reviews of the Plant Review Board and the Offsite Safety Review Committee.

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

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

Sincerely

David D Mauldin

CDM/TNW/RAB/ca

Enclosures:
1. Notarized Affidavit
2. Replacement Pages to Letter 102-05351, Attachment 3

A021

cc:	B.S. Mallett	NRC Region IV Regional Administrator
	M. B. Fields	NRC NRR Project Manager
	G. G. Warnick	NRC Senior Resident Inspector
	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 1st Day Of November, 2005.

Notary Public

Notary Commission Stamp

Revised Pages to APS Letter 102-05351, Attachment 3

BASES

BACKGROUND

Bistable Trip Units (Before CPC Upgrade) (continued)

Some measurement channels provide contact outputs to the PPS. In these cases, there is no bistable card, and opening the contact input directly de-energizes the associated bistable relays. These include the CPC generated DNBR – Low and LPD – High trips. The CPC auxiliary trip functions (e.g., CPC VOPT algorithm) do not have any direct contact outputs to the PPS. The auxiliary trip functions act through the DNBR - Low and LPD - High trip contacts to de-energize the associated CPC initiation relays that provide a channel trip signal to the PPS parameters 3 and 4 bistable relays. Other CPC trip functions may also apply a penalty factor to cause a DNBR or LPD trip.

The trip setpoints used in the bistables are based on analytical limits derived from safety analyses (Ref. 5 and 8). The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those RPS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 6), Allowable Values specified in Table 3.3.1-1, in the accompanying LCO, are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in "Calculation of Trip Setpoint Values" (Ref. 7). The UFSAR Trip Setpoints are based on the calculated total loop uncertainty consistent with the methodology as documented in the UFSAR (RG 1.105, Revision 1, November 1976) (Ref. 14). The general relationship among the PVNGS trip setpoint terms is as follows: The calculated Limiting Setpoint (LSp) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and the Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The Design Setpoint (DSp) is the field installed setting and is equal to or more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety limit is maintained. ~~The nominal trip setpoint entered into the bistable is normally still more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST. One example of such a change in measurement error is drift during the~~

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~~interval between surveillances.~~ A channel is inoperable if its actual setpoint is ~~not within~~non-conservative with respect to its Allowable Value.

To maintain the margins of safety assumed in the safety analyses, the calculations of the trip variables for the DNBR - Low and Local Power Density - High trips include the measurement, calculational, and processor uncertainties and dynamic allowances as defined in the latest applicable revision of CEN-305-P, "Functional Design Requirements for a Core Protection Calculator" (Ref. 10) and CEN-304-P," Functional Design Requirements for a Control Element Assembly Calculator," (Ref. 11). The safety

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BASES

BACKGROUND

Bistable Trip Units (After CPC Upgrade) (continued)

Some measurement channels provide contact outputs to the PPS. In these cases, there is no bistable card, and opening the contact input directly de-energizes the associated bistable relays. These include the CPC generated DNBR - Low and LPD - High trips. The CPC auxiliary trip functions (e.g., CPC VOPT algorithm) do not have any direct contact outputs to the PPS. The auxiliary trip functions act through the DNBR - Low and LPD - High trip contacts to de-energize the associated CPC initiation relays that provide a channel trip signal to the PPS parameters 3 and 4 bistable relays. Other CPC trip functions may also apply a penalty factor to cause a DNBR or LPD trip.

The trip setpoints used in the bistables are based on the analytical limits derived from the accident analysis (Ref. 5). The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment errors for those RPS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 6). Allowable Values specified in Table 3.3.1-1, in the accompanying LCO are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in "Calculation of Trip Setpoint Values" (Ref. 7). The UFSAR Trip Setpoints are based on the calculated total loop uncertainty consistent with the methodology as documented in the UFSAR (RG 1.105, Revision 1, November 1976) (Ref. 14). The general relationship among the PVNGS trip setpoint terms is as follows: The calculated Limiting Setpoint (LSp) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and the Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The Design Setpoint (DSp) is the field installed setting and is equal to or more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety limit is maintained. ~~The nominal trip setpoint entered into the bistable is normally still more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST. One example of such a change in measurement error is drift during the~~

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~~interval between surveillances.~~ ~~—~~A channel is inoperable if its actual setpoint is ~~not within~~non-conservative with respect to its Allowable Value.

To maintain the margins of safety assumed in the safety analyses, the calculations of the trip variables for the DNBR - Low and Local Power Density - High trips include the measurement, calculational, and processor uncertainties and dynamic allowances as defined in the latest applicable revision of CEN-305-P, "Functional Design Requirements for a Core Protection Calculator" (Ref. 10) and CEN-304-P, "Functional Design Requirements for a Control Element Assembly Calculator," (Ref. 11). The safety analyses

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BASES

LCO

The LCO requires all instrumentation performing an RPS Function to be OPERABLE. Failure of any required portion of the instrument channel renders the affected channel(s) inoperable and reduces the reliability of the affected Functions.

Actions allow maintenance (trip channel) bypass of individual channels, but the bypass activates interlocks that prevent operation with a second channel in the same Function bypassed. With one channel in each Function trip channel bypassed, this effectively places the plant in a two-out-of-three logic configuration in those Functions.

The general relationship among the PVNGS trip setpoint terms is as follows: The calculated limiting setpoint (LSp) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and the Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR (Ref. 8). The Design Setpoint (DSp) is the field installed setting and is equal to or more conservative than the UFSAR Trip Setpoint. This relationship will ensure that sufficient margin to the safety and/or analytical limit is maintained.

Only the Allowable Values (AVs) are specified for each RPS trip Function in the LCO. The AV is considered an operability limit for the channel. Nominal trip setpoints are specified in the plant specific setpoint calculations. The nominal setpoints are selected to ensure the setpoints measured by CHANNEL FUNCTIONAL TESTS do not exceed the Allowable Value if the bistable is performing as required. Operation with a trip setpoint less conservative than the nominal trip setpoint, but within its Allowable Value, is acceptable, provided that operation and testing are consistent with the assumptions of the plant specific setpoint calculations. If the as-found instrument setting is found to be non-conservative with respect to the AV, or the as-left instrument setting cannot be returned to a setting within As-Left Tolerance (ALT), or the instrument is not functioning as required; then the instrument channel shall be declared inoperable. A channel is inoperable if its actual trip setpoint is not within its required Allowable Value. Each Allowable Value specified is more conservative than the analytical limit assumed in the safety analysis in order to account for instrument uncertainties

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BASES

LCO (continued)

5. Containment Pressure – High

The LCO requires four channels of Containment Pressure – High to be OPERABLE in MODES 1 and 2.

The Allowable Value is set high enough to allow for small pressure increases in containment expected during normal operation (i.e., plant heatup) and is not indicative of an abnormal condition. It is set low enough to initiate a reactor trip when an abnormal condition is indicated.

6, 7. Steam Generator Pressure – Low

This LCO requires four channels of Steam Generator #1 Pressure – Low and Steam Generator #2 Pressure – Low to be OPERABLE in MODES 1 and 2.

This ~~Allowable Value~~UFSAR Trip Setpoint is sufficiently below the full load operating value for steam pressure so as not to interfere with normal plant operation, but still high enough to provide the required protection in the event of excessive steam demand. Since excessive steam demand causes the RCS to cool down, resulting in positive reactivity addition to the core. If the moderator temperature coefficient is negative a reactor trip is required to offset that effect.

The trip setpoint may be manually decreased as steam generator pressure is reduced during controlled plant cooldown, provided the margin between steam generator pressure and the setpoint is maintained ≤ 200 psia. This allows for controlled depressurization of the secondary system while still maintaining an active reactor trip setpoint and MSIS setpoint, until the time is reached when the setpoints are no longer needed to protect the plant. The setpoint increases automatically as steam generator pressure increases until the specified trip setpoint is reached.

Footnote (aa), which is divided into two parts, will ensure compliance with 10 CFR 50.36 in the event that the instrument set points are found not to be conservative with respect to the as-found acceptance criteria. Part 1 requires evaluation of instrument performance for the condition where the as-found setting for these instruments is outside its As-Found

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Allowable Value. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. Initial evaluation will be performed by the technician performing the surveillance who will evaluate the instrument's ability to maintain a stable trip setpoint within the As-Left Tolerance (ALT). The technician's evaluation will be reviewed by on shift personnel both during the approval of the surveillance data and as a result of entry of the deviation in the site's corrective action program. In accordance with procedures, entry into the corrective action program will require review and documentation of the condition for operability. Additional evaluation and potential corrective actions as necessary will ensure that any as-found setting found outside the AFT is evaluated for long-term operability trends.

Part 2 requires that the as-left setting for the instrument be returned to within the ALT of the specified trip setpoint. The specified field installed trip setpoint is termed as the Design Setpoint (DSp) and is equal to or more conservative than the UFSAR Trip Setpoint. The general relationship among the PVNGS trip setpoint terms is as follows: The calculated limiting setpoint (LSP) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The DSp is the field installed setting and is equal to or more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety and/or analytical limit is maintained. If the as-found instrument setting is found to be non-conservative with respect to the AV specified in the technical specifications, or the as-left instrument setting cannot be returned to a setting within the ALT, or the instrument is not functioning as required: then the instrument channel shall be declared inoperable.

8. 9. Steam Generator Level – Low

This LCO requires four channels of Steam Generator #1 Level – Low and Steam Generator #2 Level – Low for each

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BASES

LCO (continued)

that removes power from the CEDMs may be used. The CEAs are still capable of withdrawal if the CEDMCS withdrawal circuits are disabled with power applied to the CEDMs because failures in the CEDMCS could result in CEA withdrawal.

This LCO requires all four channels of Steam Generator #1 Pressure-Low, and Steam Generator #2 Pressure-Low, to be OPERABLE in MODE 3, when the RTCBs are closed and the CEA Drive System is capable of CEA withdrawal. These RPS functions are not required in MODES 4 and 5 because the Steam Generator temperature is low, therefore the energy release and resulting cooldown following a large MSLB in MODES 4 and 5 is not significant.

Footnote (e), which is divided into two parts, will ensure compliance with 10 CFR 50.36 in the event that the instrument set points are found not to be conservative with respect to the as-found acceptance criteria. Part 1 requires evaluation of instrument performance for the condition where the as-found setting for these instruments is outside its As-Found Tolerance (AFT) but conservative with respect to the Allowable Value. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. Initial evaluation will be performed by the technician performing the surveillance who will evaluate the instrument's ability to maintain a stable trip setpoint within the As-Left Tolerance (ALT). The technician's evaluation will be reviewed by on shift personnel both during the approval of the surveillance data and as a result of entry of the deviation in the site's corrective action program. In accordance with procedures, entry into the corrective action program will require review and documentation of the condition for operability. Additional evaluation and potential corrective actions as necessary will ensure that any as-found setting found outside the AFT is evaluated for long-term operability trends.

Part 2 requires that the as-left setting for the instrument be returned to within the ALT of the specified trip setpoint. The specified field installed trip setpoint is termed as the Design Setpoint (DSp) and is equal to or more conservative than the UFSAR Trip Setpoint. The general relationship among the PVNGS trip setpoint terms is as follows: The calculated limiting setpoint (LSP) is determined within the plant specific setpoint analysis and

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is based on the Analytical Limit and Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The DSp is the field installed setting and is equal to or more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety and/or analytical limit is maintained. If the as-found instrument setting is found to be non-conservative with respect to the AV specified in the technical specifications, or the as-left instrument setting cannot be returned to a setting within the ALT, or the instrument is not functioning as required; then the instrument channel shall be declared inoperable.

The Allowable Values are high enough to provide an operating envelope that prevents unnecessary Logarithmic Power Level – High reactor trips during normal plant operations. The Allowable Values are low enough for the system to maintain a safety margin for unacceptable fuel cladding damage should a CEA withdrawal or MSLB event occur.

The Logarithmic Power Level – High trip may be bypassed when logarithmic power is above 1E-4% NRTP to allow the reactor to be brought to power during a reactor startup. This bypass is automatically removed when logarithmic power decreases below 1E-4% NRTP. Above 1E-4% NRTP, the Variable Over Power – High and Pressurizer Pressure – High trips provide protection for reactivity transients.

The automatic bypass removal channel is INOPERABLE when the associated Log power channel has failed. The bypass function is manually controlled via station operating procedures and the bypass removal circuitry itself is fully capable of responding to a change in the associated input bistable. Footnotes (a) and (b) in Table 3.3.1-1 and (d) in Table 3.3.2-1 clearly require an "automatic" removal of trip bypasses. A failed Log channel may prevent, depending on the failure mode, the associated input bistable from changing state as power transitions through the automatic bypass removal setpoint. Specifically, when the indicated Log power channel is failed high (above 1E-4%), the automatic Hi-Log power trip bypass removal feature in that channel cannot function. Similarly, when the indicated Log power channel is failed low (below 1E-4%), the automatic DNBR-LPD trip bypass removal feature in that channel cannot function. Although one bypass removal feature is applicable above 1E-4% NRTP and the other is applicable below 1E-4% NRTP, both are affected by a failed Log power channel and should therefore be considered INOPERABLE.

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BASES

BACKGROUND

Bistable Trip Units (continued)

The trip setpoints and Allowable Values used in the bistables are based on the analytical limits stated in Reference 5. The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, instrument drift, and severe environment effects, for those ESFAS channels that must function in harsh environments as defined by 10 CFR 50.49 (Ref. 6), Allowable Values specified in Table 3.3.5-1, in the accompanying LCO, are conservatively adjusted with respect to the analytical limits. The UFSAR Trip Setpoints are based on the calculated total loop uncertainty consistent with the methodology as documented in the UFSAR (RG 1.105, Revision 1, November 1976) (Ref. 11). The general relationship among the PVNGS trip setpoint terms is as follows: The calculated Limiting Setpoint (LSp) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and the Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The Design Setpoint (DSp) is the field installed setting and is equal to or more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety limit is maintained. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in the "Plant Protection System Selection of Trip Setpoint Values" (Ref. 7). ~~The actual nominal trip setpoint entered into the bistable is normally still more conservative than that specified by the Allowable Value to account for changes in random measurement errors detectable by a CHANNEL FUNCTIONAL TEST.~~ A channel is inoperable if its actual trip setpoint is ~~not within~~non-conservative with respect to its required Allowable Value.

Setpoints in accordance with the Allowable Value will ensure that Safety Limits of LCO Section 2.0, "Safety Limits," are not violated during AOOs and the consequences of Design Basis Accidents (DBAs) will be acceptable, providing the plant is operated from within the LCOs at the onset of the AOO or DBA and the equipment functions as designed.

Functional testing of the ESFAS, from the bistable input through the opening of initiation relay contacts in the ESFAS Actuation Logic, can be performed either at power or

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BASES

LCO

a. Steam Generator Pressure – Low (continued)

The Steam Generator Pressure – Low trip setpoint may be manually decreased as steam generator pressure is reduced. This prevents an RPS trip or MSIS actuation during controlled plant cooldown. The margin between actual steam generator pressure and the trip setpoint must be maintained less than or equal to the specified value of 200 psia to ensure a reactor trip and MSIS will occur when required.

Footnote (d), which is divided into two parts, will ensure compliance with 10 CFR 50.36 in the event that the instrument set points are found not to be conservative with respect to the as-found acceptance criteria. Part 1 requires evaluation of instrument performance for the condition where the as-found setting for these instruments is outside its As-Found Tolerance (AFT) but conservative with respect to the Allowable Value. Evaluation of instrument performance will verify that the instrument will continue to behave in accordance with design-basis assumptions. The purpose of the assessment is to ensure confidence in the instrument performance prior to returning the instrument to service. Initial evaluation will be performed by the technician performing the surveillance who will evaluate the instrument's ability to maintain a stable trip setpoint within the As-Left Tolerance (ALT). The technician's evaluation will be reviewed by on shift personnel both during the approval of the surveillance data and as a result of entry of the deviation in the site's corrective action program. In accordance with procedures, entry into the corrective action program will require review and documentation of the condition for operability. Additional evaluation and potential corrective actions as necessary will ensure that any as-found setting found outside the AFT is evaluated for long-term operability trends.

Part 2 requires that the as-left setting for the instrument be returned to within the ALT of the specified trip setpoint. The specified field installed trip setpoint is termed as the Design

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Setpoint (DSp) and is equal to or more conservative than the UFSAR Trip Setpoint. The general relationship among the PVNGS trip setpoint terms is as follows: The calculated limiting setpoint (LSP) is determined within the plant specific setpoint analysis and is based on the Analytical Limit and Total Loop Uncertainty. The UFSAR Trip Setpoint is equal to or more conservative than the LSp and is specified in the UFSAR. The DSp is the field installed setting and is equal to or more conservative than the UFSAR Trip Setpoint. This relationship ensures that sufficient margin to the safety and/or analytical limit is maintained. If the as-found instrument setting is found to be non-conservative with respect to the AV specified in the technical specifications, or the as-left instrument setting cannot be returned to a setting within the ALT, or the instrument is not functioning as required; then the instrument channel shall be declared inoperable.

b. Containment Pressure – High

This LCO requires four channels of Containment Pressure – High to be OPERABLE in MODES 1, 2 and 3. The Containment Pressure – High signal is shared among the SIAS (Function 1), CIAS (Function 3), and MSIS (Function 4).

The Allowable Value for this trip is set high enough to allow for small pressure increases in containment expected during normal operation (i.e., plant heatup) and is not indicative of an abnormal condition. The setting is low enough to initiate the ESF Functions when an abnormal condition is indicated. This allows the ESF systems to perform as expected in the accident analyses to mitigate the consequences of the analyzed accidents.

c. Steam Generator Level-High

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