

June 2, 2010

LICENSEE: Arizona Public Service Company
FACILITY: Palo Verde Nuclear Generating Station, Units 1, 2, and 3
SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON
APRIL 23, 2010, BETWEEN THE U.S. NUCLEAR REGULATORY
COMMISSION AND ARIZONA PUBLIC SERVICE COMPANY, CONCERNING
THE PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3,
LICENSE RENEWAL APPLICATION

The U.S. Nuclear Regulatory Commission (the staff) and representatives of Arizona Public Service Company (the applicant) held a telephone conference call on April 23, 2010, to discuss and clarify the staff's follow-up request for additional information (RAI). This follow-up draft RAI questioned the applicant's March 1, 2010, response to a RAI dated January 28, 2010, concerning the Palo Verde Nuclear Generating Station, Units 1, 2, and 3, license renewal application. The telephone conference call was useful in clarifying the intent of the staff's draft RAI.

Enclosure 1 provides a listing of the participants and Enclosure 2 contains a listing of the items discussed with the applicant, including a brief description on the status of the items.

The applicant had an opportunity to comment on this summary.

/RA/

Lisa M. Regner, Sr. Project Manager
Projects Branch 2
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket Nos. 50-528, 50-529, and 50-530

Enclosures:
As stated

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June 2, 2010

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FACILITY: Palo Verde Nuclear Generating Station, Units 1, 2, and 3

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| DATE | 05/14/10 | 05/24/10 | 0526/10 | 06/02/10 |

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Memorandum to Arizona Public Service Company from Lisa M. Regner dated June 2, 2010

SUBJECT: SUMMARY OF TELEPHONE CONFERENCE CALL HELD ON
APRIL 23, 2010, BETWEEN THE U.S. NUCLEAR REGULATORY
COMMISSION AND ARIZONA PUBLIC SERVICE COMPANY, CONCERNING
THE PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3,
LICENSE RENEWAL APPLICATION

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**TELEPHONE CONFERENCE CALL
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3
LICENSE RENEWAL APPLICATION**

**LIST OF PARTICIPANTS
APRIL 23, 2010**

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Arizona Public Service Company (APS)
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APS
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Strategic Teaming and Resource Sharing (STARS) Alliance
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**DRAFT REQUESTS FOR ADDITIONAL INFORMATION
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3
LICENSE RENEWAL APPLICATION**

APRIL 23, 2010

The U.S. Nuclear Regulatory Commission (NRC or the staff) and representatives of Arizona Public Service Company (APS or the applicant) held a telephone conference call on April 23, 2010, to discuss and clarify the following draft follow-up request for additional information (RAI) concerning the Palo Verde Nuclear Generating Station (Palo Verde), Units 1, 2, and 3, license renewal application (LRA).

Background:

By letter dated March 1, 2010, the applicant responded to RAI 4.7.5-1 regarding pressurizer nozzle corrosion analysis.

NRC Request Item 1. *Calculate the minimum acceptable wall thinning thickness for the ferritic vessel or piping that will adjoin to the MNSA repair or half-nozzle replacement.*

Applicant's Response to Item 1

For CE plants, including Palo Verde, Section 2.4 of WCAP-15973-P-A, Rev. 0, calculated a maximum permissible heater bore diameter that will maintain structural integrity, and then calculated the duration to reach this maximum bore diameter given the original bore diameter and the anticipated corrosion rate. The minimum, bounding calculated allowed increase was used in the calculated design life, Items 4 and 5 below.

The Staff's Comment

The response is incomplete. WCAP-15973-P-A, Rev. 0, did not calculate a maximum permissible heater bore diameter that will maintain structural integrity. Please confirm that this calculation documented in Reference xx of this WCAP is based on the Palo Verde pressurizer heater sleeves.

NRC Request Item 2. *Calculate the overall general corrosion rate for the ferritic materials based on the calculational methods in the TR using the general corrosion rates listed in the TR for normal operations, startup conditions (including hot standby conditions), and cold shutdown conditions, and the respective plant-specific times (in-percentage of total plant life) at each of the operating modes.*

Applicant's Response to Item 2

For CE plants, including Palo Verde, Section 2.3.4 of WCAP-15973-P-A, Rev. 0 calculated a single set of corrosion rates in the pressurizer lower head heater sleeve bores that is bounding (maximum expected). The rate varies among normal operating, intermediate temperature startup, and cold shutdown conditions, of which the cold shutdown condition is the most significant contributor. The calculated rate therefore depends on the percentage of time at cold

ENCLOSURE 2

shutdown. The percentage of time at cold shutdown assumed by this calculated rate is therefore confirmed during the operating life as described in the response to Item 3 below.

The staff's Comment

The response is incomplete. Please provide the plant-specific corrosion rate using times (in percentage of total plant life) at normal operating, intermediate temperature startup, and cold shutdown conditions based on the plant-specific operating experience and the assumed conditions for the extended period of operation.

NRC Request Item 3. *Track the time at cold shutdown conditions to determine whether this time exceeds the assumptions made in the analysis. If these assumptions are exceeded, the licensees shall provide a revised analysis to the NRC, and provide a discussion on whether volumetric inspection of the area is required.*

Response to Item 3

As stated in the APS response to RAI 4.7.4-1 in APS Letter 102-06139, dated March 1, 2010, LRA Appendix A, Table A4-1, Commitment 46 documents the APS commitment to continue to monitor the cold shutdown conditions via the current tracking method for the period of extended operation, that is, for the fifth and sixth inspection intervals.

The Staff's Comment

The response is satisfactory.

NRC Request Item 4. *Calculate the amount of general corrosion-based thinning for the vessels or piping over the life of the plant, as based on the overall general corrosion rate calculated in Step 2 and the thickness of the ferritic vessel or piping that will adjoin to the MNSA repair or half-nozzle replacement.*

NRC Request Item 5. *Determine whether the vessel or piping is acceptable over the remaining life of the plant by comparing the worst case remaining wall thickness to the minimum acceptable wall thickness for the vessel or pipe.*

Applicant's Response to Items 4 and 5

For CE plants, including Palo Verde, WCAP-15973-P-A Rev. 0 Section 2.4 calculated a single, bounding (minimum expected) estimated lifetime of 194 years by dividing the minimum allowed increase in lower head heater sleeve bore diameter (Item 1 above) by the maximum expected diametral increase per year (Item 2 above).

Plant-specific engineering evaluations that have been calculated in accordance with these methods and that demonstrate that the ferritic materials will not be thinned by general corrosion to a size less than the minimum allowable wall thickness for the component are sufficient to satisfy the acceptability by analysis provisions of Section XI for defects induced by general corrosion or crevice corrosion.

Since the period of extended operation is limited to a 60-year life, corrosion in the heater sleeve bores will therefore remain within an acceptable range, provided that the time-at-temperature assumption of the corrosion rate calculation continues to remain valid, as confirmed by Item 3, above.

Since the corrosion analyses will not change with a change in the licensed operating period and are therefore not supported by a TLAA, no revision to the Updated Final Safety Analysis Report Supplement is required.

The Staff's Comment

- (1) The applicant's response is not clear. The applicant did not elaborate on its "plant-specific engineering evaluations" stated above. What the staff wants is a plant-specific engineering evaluation using the information that the staff requests in the comments on the applicant's responses to Item 1 and Item 2. This plant-specific engineering evaluation should give an estimated lifetime for Palo Verde pressurizer heater sleeves. Without this plant-specific engineering evaluation, the staff does not know whether the 194 years of lifetime in the WCAP apply to Palo Verde.
- (2) The corrosion analysis using a constant rate is analogous to a fatigue crack growth analysis using a bounding rate for intergranular stress corrosion cracking (IGSCC) flaws in BWR piping. In the latter case, no one would argue that the fatigue crack growth analysis is a TLAA. Similarly, we can't say that the corrosion analysis is not a TLAA simply because the analysis is simple and uses a constant corrosion rate.

Discussion: Following discussion with APS staff, NRC staff agreed to allow the applicant to provide a supplemental response to RAI 4.7.5-1 addressing the above concerns.

Palo Verde Nuclear Generating Station,
Units 1, 2, and 3

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Palo Verde Nuclear Generating Station, - 2 -
Units 1, 2, and 3

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