

January 28, 2010

Mr. Randall K. Edington  
Executive Vice President, Nuclear  
Mail Station 7602  
Arizona Public Service Company  
P.O. Box 52034  
Phoenix, AZ 85072-2034

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3,  
LICENSE RENEWAL APPLICATION (TAC NOS. ME0254, ME0255, AND  
ME0256)

Dear Mr. Edington:

By letter dated December 11, 2008, as supplemented by letter dated April 14, 2009, Arizona Public Service Company (APS) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 to renew Operating License Nos. NPF-41, NPF-51, and NPF-74 for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3, respectively. The staff is reviewing the information contained in the license renewal application and has identified in the enclosures areas where additional information is needed to complete the review. Further requests for additional information may be issued in the future.

Items in Enclosure 1 were discussed with APS staff on January 13, 2010, and items in Enclosure 2 were discussed with APS staff on January 14, 2010. A mutually agreeable date for your response was determined to be 30 calendar days from the date of this letter. If you have any questions, please contact me at 301-415-1906 or by e-mail at [Lisa.Regner@nrc.gov](mailto:Lisa.Regner@nrc.gov).

Sincerely,

*/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

cc w/encls: See next page

January 28, 2010

Mr. Randall K. Edington  
Executive Vice President, Nuclear  
Mail Station 7602  
Arizona Public Service Company  
P.O. Box 52034  
Phoenix, AZ 85072-2034

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3,  
LICENSE RENEWAL APPLICATION (TAC NOS. ME0254, ME0255, AND  
ME0256)

Dear Mr. Edington:

By letter dated December 11, 2008, as supplemented by letter dated April 14, 2009, Arizona Public Service Company (APS) submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 to renew Operating License Nos. NPF-41, NPF-51, and NPF-74 for the Palo Verde Nuclear Generating Station, Units 1, 2, and 3, respectively. The staff is reviewing the information contained in the license renewal application and has identified in the enclosures areas where additional information is needed to complete the review. Further requests for additional information may be issued in the future.

Items in Enclosure 1 were discussed with APS staff on January 13, 2010, and items in Enclosure 2 were discussed with APS staff on January 14, 2010. A mutually agreeable date for your response was determined to be 30 calendar days from the date of this letter. If you have any questions, please contact me at 301-415-1906 or by e-mail at [Lisa.Regner@nrc.gov](mailto:Lisa.Regner@nrc.gov).

Sincerely,  
**/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

cc w/encls: See next page

DISTRIBUTION: See next page  
ADAMS Accession No. ML100150378

OFFICE	LA:DLR	PM:RPB2:DLR	BC:RPB2:DLR	PM:RPB2:DLR
NAME	SFigueroa	LRegner	DWrona	LRegner
DATE	01/25/10	01/25/10	01/28/10	01/28/10

OFFICIAL RECORD COPY

Letter to Randal K. Edington from Lisa M. Regner, dated January 28, 2010

**DISTRIBUTION:**

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE PALO VERDE NUCLEAR GENERATING STATION, UNITS 1, 2, AND 3, LICENSE RENEWAL APPLICATION (TAC NOS. ME0254, ME0255, AND ME0256)

**HARD COPY:**

DLR RF

**E-MAIL:**

PUBLIC

RidsNrrDlr Resource  
RidsNrrDlrRpb1 Resource  
RidsNrrDlrRpb2 Resource  
RidsNrrDlrRarb Resource  
RidsNrrDlrRasb Resource  
RidsNrrDlrRapb Resource  
RidsNrrDlrRpob Resource  
RidsNrrDciCvib Resource  
RidsNrrDciCpnb Resource  
RidsNrrDciCsgb Resource  
RidsNrrDraAfpb Resource  
RidsNrrDraApla Resource  
RidsNrrDeEmcb Resource  
RidsNrrDeEeeb Resource  
RidsNrrDssSrxb Resource  
RidsNrrDssSbpb Resource  
RidsNrrDssScvb Resource  
RidsOgcMailCenter Resource  
RidsOpaMail Resource

-----  
L. Regner  
D. Drucker  
R. Hall  
B. Mizuno, OGC  
R. Treadway, RIV  
G. Pick, RIV

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

cc:

Mr. Steve Olea  
Arizona Corporation Commission  
1200 W. Washington Street  
Phoenix, AZ 85007

Mr. Douglas Kent Porter, Senior Counsel  
Southern California Edison Company  
Law Department, Generation Resources  
P.O. Box 800  
Rosemead, CA 91770

Senior Resident Inspector  
U.S. Nuclear Regulatory Commission  
P.O. Box 40  
Buckeye, AZ 85326

Regional Administrator, Region IV  
U.S. Nuclear Regulatory Commission  
612 E. Lamar Blvd., Suite 400  
Arlington, TX 76011-4125

Chairman  
Maricopa County Board of Supervisors  
301 W. Jefferson, 10th Floor  
Phoenix, AZ 85003

Mr. Aubrey V. Godwin, Director  
Arizona Radiation Regulatory Agency  
4814 S. 40th Street  
Phoenix, AZ 85040

Mr. Scott Bauer, Director  
Regulatory Affairs  
Palo Verde Nuclear Generating Station  
Mail Station 7636  
P.O. Box 52034  
Phoenix, AZ 85072-2034

Mr. Dwight C. Mims, Vice President  
Regulatory Affairs and Plant Improvement  
Palo Verde Nuclear Generating Station  
Mail Station 7605  
P.O. Box 52034  
Phoenix, AZ 85072-2034

Mr. John C. Taylor, Director, Nuclear  
Generation  
El Paso Electric Company  
340 E. Palm Lane, Suite 310  
Phoenix, AZ 85004

Mr. James Ray  
Public Service Company of New Mexico  
2401 Aztec NE, MS Z110  
Albuquerque, NM 87107-4224

Mr. Geoffrey M. Cook  
Southern California Edison Company  
5000 Pacific Coast Highway, Bldg. D21  
San Clemente, CA 92672

Mr. Robert Henry  
Salt River Project  
6504 E. Thomas Road  
Scottsdale, AZ 85251

Mr. Jeffrey T. Weikert  
Assistant General Counsel  
El Paso Electric Company  
Mail Location 167  
123 W. Mills  
El Paso, TX 79901

Mr. Eric Tharp  
Los Angeles Department of Water & Power  
Southern California Public Power Authority  
P.O. Box 51111, Room 1255-C  
Los Angeles, CA 90051-0100

Mr. Brian Almon  
Public Utility Commission  
William B. Travis Building  
P.O. Box 13326  
1701 N. Congress Avenue  
Austin, TX 78701-3326

PALO VERDE NUCLEAR GENERATING STATION  
LICENSE RENEWAL APPLICATION  
REQUEST FOR ADDITIONAL INFORMATION

**RAI 3.1.2.2.6-1**

License renewal application (LRA) Table 3.1.2-1 lists the affected reactor pressure vessel (RPV) internals with the aging effect of loss of fracture toughness due to neutron irradiation embrittlement and void swelling (an aging effect discussed in LRA Section 3.1.2.2.6). These RPV internals are presented in the following with their corresponding Generic Aging Lessons Learned (GALL) Report Table IV.B3 line items: Reactor Vessel and Internals Core Support Structure (RVI CSS) Core Shroud Assembly (item IV.B3-12); RVI CSS Core Support Barrel Assembly (item IV.B3-16); and Core Support Barrel Snubber Assembly (nickel and stainless steel), RVI CSS Lower Support Structure Assembly, and RVI In-Core Instrumentation (ICI) Support Structure (item IV.B3-20). However, the LRA table did not specifically list core shroud assembly bolts (item IV.B3-10) and tie rods (item IV.B3-12) under this aging effect. Confirm that the unit core shroud assemblies are welded structures that do not have bolts and tie rods. Further, clarify why the LRA table did not specifically list the core support plate, fuel alignment pins, and core support column bolts as part of the GALL Report Table Item IV.B3-20 under this aging effect.

**RAI 3.1.2.2.12-1**

LRA Table 3.1.2-1 identified the following GALL Report Table IV.B3 items under cracking due to stress corrosion cracking (SCC) and irradiation-assisted SCC (IASCC): IV.B3-2, IV.B3-11, IV.B3-15, IV.B3-21, and IV.B3-28. However, for this aging mechanism, the LRA table does not cover all RPV internals listed under the GALL Report Table IV.B3 items listed above. Clarify the disposition of the core support plate and core support column of the lower internal assembly (IV.B3-21) and the fuel alignment plate, the fuel alignment plate guide lugs, and guide lug inserts of the upper internals assembly (IV.B3-28).

**RAI 3.1.2.2.15-1**

LRA Table 3.1.2-1 identified the following GALL Report Table IV.B3 items under changes in dimension due to void swelling for stainless steel and nickel alloy RPV internals exposed to reactor coolant: IV.B3-4, IV.B3-13, IV.B3-14, IV.B3-19, and IV.B3-27. However, for this aging mechanism, the LRA table does not cover all RPV internals listed under the GALL Table IV.B3 items listed above. Clarify the disposition of the core support plate, fuel alignment pins, and core support column bolts of the lower internal assembly (IV.B3-19) and the fuel alignment plate, the fuel alignment plate guide lugs, and guide lug inserts of the upper internals assembly (IV.B3-27). Further, discuss the relationship between RVI ICI Support Structures (identified in LRA Table 3.1.2-1) and the core support plate, fuel alignment pins, and core support column bolts of the lower internal assembly (listed in the GALL Table IV.B3).

**RAI 4.7.5-1**

LRA Section 4.7.5 references WCAP-15973-P, "Low Alloy Steel Component Analysis Supporting Small Diameter Alloy 600/690 Nozzle Repair/Replacement Program," and concludes, "[t]he bounding case for general corrosion in pressurizer heater sleeves in WCAP-15973-P gives an estimated repair life of 194 years; therefore the analysis is not a time-limited aging analysis (TLAA), and is valid for the period of extended operation."

The staff's evaluation of the general corrosion analysis supporting half-nozzle repairs of small-diameter Alloy 600/690 nozzles was documented in the safety evaluation (SE) dated January 12, 2005, for the WCAP-15973-P report. Please identify the plant-specific submittal addressing the general corrosion in support of the half-nozzle repairs installed in the pressurizer heater sleeves. Since the corrosion results are time dependent, unless they were evaluated and approved in an SE for a period of time covering the period of extended operation, they should be evaluated now as a TLAA. Please also provide the Updated Final Safety Analyses Report Supplement for this TLAA.

PALO VERDE NUCLEAR GENERATING STATION  
LICENSE RENEWAL APPLICATION  
REQUEST FOR ADDITIONAL INFORMATION

**RAI 3.1.2-1**

Background

The Generic Aging Lessons Learned (GALL) Report, Section X.M1, recommends the Metal Fatigue of Reactor Coolant Pressure Boundary Aging Management Program (AMP) for managing the aging of selected reactor coolant system components.

Issue

In the license renewal application (LRA), Section 3.1.2.2.1, the applicant states that the pressurizer relief tank is not an ASME Section III Class 1 component, nor is it designated to other fatigue or cycle design rules, and therefore has no fatigue time-limited aging analysis. However, the GALL Report, Section IV, Subsection C2, item IV.C2-23 states that a time-limited aging analysis is needed to evaluate metal fatigue of the pressurizer relief tank for the period of extended operation.

Request

Provide additional information how metal fatigue of the pressurizer relief tank will be evaluated and managed for the period of extended operation.

**RAI 3.2.2-1**

Background

The GALL Report, Table V.C, item V.C-4, indicates that stainless steel containment isolation piping and component internal surfaces exposed to treated water are subject to loss of material/pitting and crevice corrosion as an aging effect/mechanism. The GALL Report states that the aging effect/mechanism can be managed by the Water Chemistry and One-time Inspection Programs. The GALL Report further states that a further evaluation should be conducted on these components.

Issue

Section 3.2.2.2.8 of the LRA indicates that the further evaluation associated with this component is not applicable because the containment isolation components were “evaluated in the systems in which the components were found to have the function of containment integrity.” Staff is unclear why the applicant indicates that this further evaluation for steel containment isolation piping is not applicable.

### Request

Provide additional information what is meant by the containment isolation components were evaluated in the system in which the components were found to have the function of containment integrity. In addition, if a further evaluation is conducted for these components in a different system, provide the location of the further evaluation. If further evaluations were not conducted for these components, provide additional justification.

### **RAI 3.3.2-1**

### Background

The GALL Report, Table VIII, item VIII.A-5 is for copper piping exposed to treated water in the steam turbine system. The GALL Report suggests the use of the Water Chemistry Program augmented with the One-Time Inspection Program to manage loss of material and selective leaching in this system. However, the GALL Report in Table VII, item VII.C2-7 is for copper piping (zinc > 15 percent) exposed to treated water in the Closed-Cycle Cooling Water System. The GALL Report suggests that loss of material and selective leaching for this component and system be managed by the Selective Leaching of Materials Program. One of the main differences between these two programs as described in the GALL Report is that hardness measurements are incorporated into the Selective Leaching of Materials Program, not in the Water Chemistry Program.

### Issue

The LRA indicates in Table 3.3.2-4 that a copper alloy (zinc > 15 percent) piping exposed to demineralized water is consistent with GALL Report item VIII.A-5. However, LRA Table 3.3.2-4 is a closed-cycle cooling water system. As such it seems that the GALL Report item VII.C2-7 may be more appropriate for this material. It is not clear to the staff how the Water Chemistry Program augmented with the One-Time Inspection Program is sufficient to manage the loss of material for the LRA closed-cycle cooling water component since these programs do not require hardness testing.

### Request

Provide additional explanation on how the Water Chemistry Program (B2.1.2) and the One-Time Inspection (B2.1.16) will address the aging effect for loss of material for the copper alloy piping exposed to demineralized water in a Closed-Cycle Cooling Water System.