UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 27, 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 enclosure areas where additional information is needed to complete the review. Further requests for additional information may be issued in the future.

A mutually agreeable date for your response, as discussed with Angela Krainik of APS staff, 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.

Sincerely,

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

Enclosure:
As stated

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PALO VERDE NUCLEAR GENERATING STATION (PVNGS)
LICENSE RENEWAL APPLICATION (LRA)
REQUEST FOR ADDITIONAL INFORMATION (RAI)

RAI B2.1.26-3

Background:
NUREG-1801, Revision 1, "Generic Aging Lessons Learned," (the GALL Report) addresses inaccessible medium voltage cables in aging management program (AMP) XI.E3, "Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 Environmental Qualification Requirements." The purpose of this program is to provide reasonable assurance that the intended functions of inaccessible medium voltage cables (2 kV to 35 kV), that are not subject to environmental qualification requirements of 10 CFR 50.49 and are exposed to adverse localized environments caused by moisture while energized, will be maintained consistent with the current licensing basis. The scope of the program applies to inaccessible (in conduits, cable trenches, cable troughs, duct banks, underground vaults or direct buried installations) medium-voltage cables within the scope of license renewal that are subject to significant moisture simultaneously with significant voltage.

The application of the GALL Report AMP to medium voltage cables was based on the operating experience available at the time Revision 1 of the GALL Report was developed; however, recently identified industry operating experience indicates that the presence of water or moisture can be a contributing factor to inaccessible power cable failures at lower service voltages (480 V to 2 kV). Applicable operating experience was identified in licensee responses to Generic Letter (GL) 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," which included failures of power cables operating at service voltages of less than 2 kV where water was considered a contributing factor.

The industry operating experience provided by licensees in response to GL 2007-01, has shown that there is an increasing trend of cable failures with length in service beginning in the 6th through 10th years of operation and also that moisture intrusion is the predominant factor contributing to cable failure. The staff has determined, based on the review of the cable failure distribution, that annual inspection of manholes and cable testing frequency of at least every six years is a conservative approach to ensuring the operability of power cables and, therefore, should be considered.

In addition, the recent operating experience has shown that some licensees may experience events, such as flooding or heavy rain, that subject cables within the scope of the GALL Report AMP to significant moisture. The staff has determined that event driven inspections of manholes, in addition to a 1-year periodic inspection frequency, is a conservative approach and, therefore, should be considered.

PVNGS has experienced cases where medium voltage cable splices have been subjected to water intrusion resulting in low megger readings. The applicant stated that during manhole walkdowns in 2009, one was found to contain water with submerged cables. Subsequent

inspections of connected manholes found additional water. The applicant also stated that a review of these manholes and the connected manholes found recurring instances of water intrusion.

Issue:
Based on recently identified industry operating experience concerning the failure of inaccessible low voltage power cables in the presence of significant moisture, the staff concludes that these cables can potentially experience age related degradation. The staff noted that the applicant's Inaccessible Medium-Voltage Cables Program does not address inaccessible low voltage power cables [400 V (nominally 480 V) to 2 kV inclusive]. In addition, increased cable testing and manhole inspection frequencies should be evaluated to ensure that the Inaccessible Medium Voltage Program test and inspection frequencies reflect industry and plant-specific operating experience.

Request:

1. Provide a summary of your evaluation of recently identified industry operating experience and any plant-specific operating experience concerning inaccessible low voltage power cable failures within the scope of license renewal (not subject to 10 CFR 50.49 environmental qualification requirements), and how this operating experience applies to the need for additional aging management activities at PVNGS.

2. Discuss how PVNGS will manage the effects of aging on inaccessible low voltage power cables within the scope of license renewal and subject to an aging management review with consideration of recently identified industry operating experience and any plant-specific operating experience. The discussion should include assessment of your AMP description, program elements (i.e., scope of program, parameters monitored or inspected, detection of aging effects, and corrective actions), and Updated Final Safety Analysis Report (UFSAR) summary description to demonstrate reasonable assurance that the intended functions of inaccessible low voltage power cables subject to adverse localized environments will be maintained consistent with the current licensing basis through the period of extended operation.

3. Evaluate whether the Inaccessible Medium Voltage Program test and inspection frequencies, including event driven inspections, incorporate recent industry and plant-specific operating experience for both inaccessible low- and medium-voltage cables. Discuss how the Inaccessible Medium Voltage Cable Program will ensure that future industry and plant-specific operating experience will be incorporated into the program.

Follow-up RAI B2.1.18-1

Background:
In supplemental responses to RAI B2.1.18-1 dated June 21, 2010, and July 21, 2010, the applicant stated that, in addition to risk ranking of piping required by their commitment to the Nuclear Energy Institute initiative on buried piping, they will excavate and visually inspect at least ten feet of piping at the following locations: a) two inspections of stainless steel piping per unit, b) two inspections of cathodically protected steel piping per unit, and c) three inspections of

fire protection piping with potentially degraded cathodic bonding straps during the period prior to extended operation and again during each ten year period in the period of extended operation.

Issue:
The staff notes that buried steel piping is present in the essential spray pond, diesel fuel oil, domestic water, and fire protection systems. The staff also notes that buried fuel oil piping contains hazardous material (i.e., material that if released could be detrimental to the environment, including concentration of radioisotopes within the piping during normal operation which exceeds the Environmental Protection Agency drinking water standard) whereas the other systems typically contain non-hazardous water.

The quality of backfill is a significant contributor to damage to coatings and piping without coatings. The staff also notes that the applicant found coating damage on the external surfaces of underground fire protection piping caused by abrasion from the bedding rock material which exposed the piping to corrosive attack. The staff further notes that there is no docketed information on the quality of the backfill used during installation of the buried essential spray pond, diesel fuel oil, domestic water, and fire protection systems piping.

Request:
1. State whether the essential spray pond contains hazardous material.

2. State whether inspections of in-scope buried piping containing diesel fuel oil will be conducted within the six inspections of carbon steel piping being conducted on site. Also, if the essential spray pond contains hazardous material, state whether inspections of piping will be conducted.

3. Justify why backfill quality is adequate such that piping and piping coatings will not be damaged for the following systems: essential spray pond, diesel fuel oil and fire protection.

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Lisa M. Regner, Sr. Project Manager
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NAME	LRegner	IKing	DWrona	LRegner
DATE	9/22/10	9/16/10	9/27/10	9/27/10

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Letter to R. Edington from L. Regner dated September 27, 2010

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)

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