



A subsidiary of Pinnacle West Capital Corporation

Palo Verde Nuclear  
Generating Station

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102-06259-JHH/GAM  
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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  
Arizona Public Service Company Comments on the Safety Evaluation  
Report With Open Items related to the License Renewal of PVNGS  
Units 1, 2, and 3**

By letter dated August 6, 2010, the NRC staff provided to Arizona Public Service Company the Safety Evaluation Report With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3, hereafter referred to as the Safety Evaluation Report (SER). The staff requested that APS review the SER, verify its accuracy, and provide comments within 45 days from the August 6, 2010, letter date. In response to an APS request for additional time to provide comments, Lisa Regner, NRC Senior Project Manager for the PVNGS license renewal safety review, allowed an additional 10 days to provide comments. Enclosed are the APS comments for staff consideration.

APS makes no new commitments in this letter. Should you need further information regarding this submittal, please contact Russell A. Stroud, Licensing Section Leader, at (623) 393-5111.

Sincerely,

*Angela Khamik for John H. Hesser  
per telecon*

JHH/GAM

Enclosure: Arizona Public Service Company Comments on the Safety Evaluation Report With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3

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Arizona Public Service Company Comments on the Safety Evaluation Report With  
Open Items related to the License Renewal of PVNGS Units 1, 2, and 3  
Page 2

cc: E. E. Collins Jr. NRC Region IV Regional Administrator  
J. R. Hall NRC NRR Senior Project Manager  
L. K. Gibson NRC NRR Project Manager  
J. H. Bashore NRC Senior Resident Inspector (acting) for PVNGS  
L. M. Regner NRC License Renewal Project Manager  
G. A. Pick NRC Region IV (electronic)

**ENCLOSURE**

**Arizona Public Service Company Comments on the  
Safety Evaluation Report With Open Items related to the  
License Renewal of PVNGS Units 1, 2, and 3**

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
1	Global Replace	Replace FatiguePro® with FatiguePro. FatiguePro is not a registered trademark.	Global replace FatiguePro® with FatiguePro
2	Page 1-9, Confirmatory Item 2.1.4.2-1	Revise the second sentence of Confirmatory item 2.1.4.2-1 to replace "verified to be dry" with "verified to be drained." A drained system will not have any effects of spatial interactions.	Revise the sentence to read: The associated piping was cut and capped for these tanks, but they had not been verified to be <del>dry</del> <u>drained</u> .
3	Page 2-3, 2.1.3.1.1, last paragraph	Engineering drawings, license renewal position papers, and the plant equipment database are not CLB. The statement following the list of documents in section 2.1.3.1.1 indicates they are part of the CLB.	Revise the statement as follows: The applicant stated it used a variety of CLB documents including those listed above to apply scoping criteria in determining and confirming SSC functions.
4	Page 2-5, 2.1.3.1.2, third paragraph	Correct typographical errors.	Delete a space in "between the three units."  The drawing number should be "...CT-01-M-CTP-001." (Insert missing dash between M and CTP)
5	Page 2-5, 2.1.3.1.2, last paragraph	Replace the double dash with a single dash in the fourth sentence of the last paragraph.	Revise the sentence to read as follows: After in-scope license renewal boundaries were established on a plant system P&ID, each in-scope component on the P&ID was checked off, and scoping and screening information was entered into the LRDMT (component by component).
6	Page 2-6, 2.1.3.1.2, second paragraph	Typographical error – the boundary drawing number needs an additional dash.	The drawing number should be "...LR-PVNGS-CT-01 M-CTP-001." (Insert missing dash between M and CTP).
7	Page 2-8, top of page, second bullet	Replace "staff" with "project personnel" since "staff" is used to mean NRC staff throughout the SER.	Revise bullet to read: License renewal project personnel completed training in general license renewal requirements, license renewal project procedures, and discipline-specific areas. Mentoring was also provided by <del>staff</del> <u>project personnel</u> with license renewal project experience.

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No and SER Section	Comment	Suggested Resolution
8	Page 2-8, Sections 2.1.3.4 and 2.1.4	Be consistent with the reference to 10 CFR 54. Delete the word "Part" from 10 CFR Part 54.4 (a)(1).	Reference 10 CFR 54.4(a)(1) and 10 CFR Part 54.
9	Page 2-8, Section 2.1.4	The reference to "major" systems and structures is not consistent with LRA.	Revise the following portion of the first paragraph to read: LRA Section 2.1 describes the applicant's methodology used to scope SSCs pursuant to the requirements of the 10 CFR 54.4(a) criteria. The LRA states that the scoping process categorized the entire plant in terms of major systems and structures with respect to license renewal. According to the LRA, major systems and structures were evaluated against criteria provided in 10 CFR Part 54.4 (a) (1), (2), and (3) to determine whether the item should be considered within the scope of license renewal.
10	Page 2-16, third paragraph	A list of LRA sections is mentioned without showing the list. Recommend deleting this paragraph. Addition of SSCs within the scope of LR in response to RAI 2.1-2 is addressed in the prior paragraph; therefore the third paragraph can be deleted.	Recommend deleting the third paragraph: <del>As a result of the re-evaluation performed, the LRA sections listed below have been revised [to] include nonsafety-related SSCs in the Auxiliary Building, Control Building, Diesel Generator Building, and Fuel Building within the scope of license renewal in accordance with criterion 10 CFR 54.4(a)(2).</del>
11	Page 2-16, Section 2.1.4.2.2	Revise item (2) on the list at the bottom of the page to identify that the Spray Chemical Addition Tank is in the Auxiliary Building.	Revise item (2) to read: (2) Nonsafety-related, abandoned containment spray chemical addition tanks, located in <del>containment</del> <u>the Auxiliary Building</u> along with safety-related SSCs, for which the associated piping had been cut and capped but the tanks had not been verified to be dry. This applies to PVNGS Units 1 and 3.

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

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12	Page 2-20, Section 2.1.4.3.1, EQ section LRA Quote	<u>Environmental Qualification</u> section - the quote from LRA Section 2.1.2.3.2 is not complete. Revise the last two sentences of the quote to indicate information is missing.	Revise the last two sentences to read as follows: The safety-related systems and components required to mitigate the consequences of a design basis accident (DBA), or to attain a safe shutdown of the reactor, are designed to remain functional during and after exposure to normal operation environmental conditions and following the specific DBA which they are intended to mitigate. ... All components within the scope of the PVNGS EQ program which demonstrate compliance with 10 CFR 50.49 and the systems containing those components were classified as satisfying criterion 10 CFR 54.4(a)(3) and were identified as within the scope of license renewal.
13	Page 2-21, Section 2.1.4.3.1, ATWS section	<u>Anticipated Transient Without Scram</u> section – The title quoted for LRA Section 2.1.2.3.4 would indicate the acronym “(ATWS)” is a part of the LRA Section Title when it is not.	Revise the first sentence of the ATWS to read: LRA Section 2.1.2.3.4, “Anticipated Transients Without Scram (ATWS),” (ATWS) describes the scoping of systems and structures relied on in safety analyses or plant evaluations to perform a function in compliance with the ATWS criterion.
14	Page 2-21, Section 2.1.4.3.1, ATWS Section	<u>Anticipated Transient Without Scram</u> section – the quote from LRA Section 2.1.2.3.4 is not complete. Revise the last two sentences of the quote to indicate information is missing.	Revise the last two sentences to read as follows: The ATWS Rule required improvements in the design to reduce the probability of failure to shutdown the reactor following anticipated transients, and to mitigate the consequences of an ATWS event. ... The following equipment is required by the ATWS Rule for reduction of risk from an ATWS event at PVNGS:.
15	Page 2-21, Section 2.1.4.3.1	<u>Station Blackout</u> section - The title quoted for LRA Section 2.1.2.3.5 would indicate the acronym “(SBO)” is a part of the LRA Section Title when it is not.	Revise the first sentence of the ATWS to read: LRA Section 2.1.2.3, Subsection 2.1.2.3.5, “Station Blackout (SBO),” (SBO) describes the scoping of systems and structures relied on in safety analyses or plant evaluations to perform a function in compliance with the SBO criterion.

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

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16	Page 2-22, Section 2.1.4.3.2, third paragraph, second sentence.	Fire Protection Design Basis and Fire Protection Design Basis Manual are not CLB documents. Delete the reference to CLB.	Revise the sentence as follows: The applicant used CLB documents, such as the UFSAR, the Fire Protection Design Basis <u>Calculations</u> , and the Fire Protection Design Basis Manual, to identify the SSCs within the scope of license renewal for Fire Protection.
17	Page 2-23, second paragraph, first sentence	The title of 10 CFR 50.61 is quoted as "PTS Rule." It should be "Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events."	Revise the first sentence to read: The staff confirmed that the applicant's PTS scoping document included the scoping methodology used to review the CLB information to identify SSCs within the scope of license renewal to meet 10 CFR 50.61, " <u>PTS Rule Fracture Toughness Requirements for Protection Against Pressurized Thermal Shock Events.</u> "
18	Page 2-32, first paragraph, first sentence	The word "In" is missing when quoting from the LRA.	Revise the sentence to read: <u>In</u> Mechanical systems, component screening was a continuation of the component scoping activity.
19	Page 2-32, The first and second paragraphs	The first and second paragraphs are quoted from LRA. However, the separation of paragraphs is not consistent with that of LRA.	Revise the paragraph as follows: .....The active/passive component determinations documented in NEI 95-10, revision 6, Appendix B, provided guidance for this activity. In-scope components that were determined to be passive and long-lived were identified in the license renewal database as subject to aging management review.  Each component that was identified as subject to an aging management review was evaluated to determine its component intended function(s)...

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

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20	Page 2-35, Section 2.1.5.4.1	Delete the second AMR in the last sentence of first paragraph at the top of the page.	Revise the last sentence to read: The LRA states that component-level intended function(s) were determined for each in-scope passive electrical component type, identified in the license renewal database as being subject to AMRAMR and recorded in the license renewal database.
21	Page 2-35, Section 2.1.5.4.2	In the list of long-lived passive components the eighth bullet should be "Penetrations Electrical."	Revise the eighth bullet to read: ▪ <del>Penetration</del> <u>Penetrations</u> Electrical
22	Page 2-39, Section 2.3.1.1.1 and page 40, first paragraph, first sentence	The SER technical information introduces the information as "stated" in LRA 2.3.1.1 and it is not formatted consistent with technical information sections that reference an LRA statement. The SER technical information summary is based on LRA 2.3.1.1 and details extracted from PVNGS UFSAR Section 3.9.5.	Revise the first sentence to read: LRA Section 2.3.1.1 <del>states that</del> <u>describes</u> the reactor <del>is as a</del> PWR <u>reactor</u> with two reactor coolant loops.
23	Page 2-63, Section 2.3.3.10.3	Typographical error in the first sentence – delete the period after UFSAR Section 9.3.4.	Revise the sentence to read: The staff reviewed the LRA Section 2.3.3.10, UFSAR Sections 1.2.10.2, 3.11, 6.2.4, 8.3.1.1.10, and 9.3.4, RAI responses, and original and revised boundary drawings to determine whether the applicant failed to identify any components within the scope of license renewal.
24	Page 2-80, Section 2.3.3.21.3	Typographical error in the first sentence – delete the period after UFSAR section 9.5.8.	Revise the sentence to read: The staff reviewed the LRA Section 2.3.3.21, UFSAR Sections 7.4.1.1.1, 8.3.1.1.4, 9.5.4, 9.5.5, 9.5.6, 9.5.7, and 9.5.8, RAI responses, and original and revised boundary drawings to determine whether the applicant failed to identify any components within the scope of license renewal.

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

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25	Page 2-84, Section 2.3.3.25.3	Delete the second LRA in the first sentence of the 2.3.3.25.3 Conclusion paragraph.	Revise the sentence to read: The staff reviewed the LRA Section 2.3.3.25, UFSAR Sections 6.2.4, 9.3.6, and Table 6.4.2-1, RAI response, and original and revised boundary drawings to determine whether the applicant failed to identify any components within the scope of license renewal.
26	Page 2-104, Section 2.4.7.2	In the fourth sentence, revise the name of the main steam support structure to provide consistency in describing structures and to be consistent with the LRA.	Revise the sentence to read: On the basis of its review, the staff concludes the applicant has appropriately identified the main steam support structure <del>building</del> structural components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).
27	Page 2-105, Section 2.4.8.2	In the fourth sentence, revise the name of the SBO generator structures to provide consistency in describing structures and to be consistent with the LRA.	Revise the sentence to read: On the basis of its review, the staff concludes the applicant has appropriately identified the SBO generator structures <del>building</del> structural components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).
28	Page 2-106, Section 2.4.9.3	In the fourth sentence, revise the name of the fuel building to provide consistency in describing structures and to be consistent with the LRA.	Revise the sentence to read: On the basis of its review, the staff concludes the applicant has appropriately identified the fuel <del>structure</del> building structural components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

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29	Page 2-107, Section 2.4.10.2	In the fourth sentence, revise the name of the water control structures to provide consistency in describing structures and to be consistent with the LRA.	Revise the sentence to read: On the basis of its review, the staff concludes the applicant has appropriately identified the spray pond and associated water control structures <del>building-structural</del> components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a) (1).
30	Page 2-107, Section 2.4.11.1, second paragraph	Revise the first sentence to be consistent with the LRA.	Revise the sentence to read: The applicant stated that <u>the tank foundations and shells provide support, shelter and protection for the CST and the RWT. The CST is safety-related and provides the required water storage for the auxiliary feedwater pumps, and the RWT is safety-related and provides the required volume of borated water for safety injection following a LOCA; therefore, they the tank foundations and shells are within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1).</u>
31	Page 2-109, Section 2.4.12.3	In the fourth sentence, revise the name of the transformer foundations and electrical structures to provide consistency in describing structures and to be consistent with the LRA.	Revise the sentence to read: On the basis of its review, the staff concludes the applicant has appropriately identified the transformer foundations and electrical <u>structures</u> structural components ( <del>structural</del> ) within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a) (1).
32	Page 2-110, Section 2.4.13.3	In the fourth sentence, revise the name of the yard structures to provide consistency in describing structures and to be consistent with the LRA.	Revise the sentence to read: On the basis of its review, the staff concludes the applicant has appropriately identified yard structures <u>structural</u> components within the scope of license renewal, as required by 10 CFR 54.4(a), and that the applicant has adequately identified the structural components subject to an AMR in accordance with the requirements stated in 10 CFR 54.21(a)(1).

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
33	Page 2-111, Section 2.4.14.1, second paragraph	In the last sentence revise the name of the steam generator supports to provide consistency in describing structures and to be consistent with the LRA.	Revise the sentence to read: The applicant further stated that the following RCS component supports are included with the ASME Class 1 piping and component commodity group: reactor vessel supports, pressurizer supports, steam <del>generators</del> <u>generator supports</u> , and RCP supports.
34	Page 2-113, Section 2.4.15.2, seventh paragraph	In the sixth bullet, revise the name of the SBO generator structure to provide consistency in describing structures and to be consistent with the LRA.	Revise the bullet to read: <ul style="list-style-type: none"> <li>concrete elements, concrete blocks (masonry walls), doors, seals, and coatings or wraps in the SBO generator <del>turbine</del>-structures (LRA Table 2.4-8);</li> </ul>
35	Page 2-113, Section 2.4.15.2, last paragraph	Editorial suggestion in the last sentence for clarity.	Revise the sentence to read: The applicant noted that <del>only</del> fire barrier coatings/wraps in the main steam support structure are within the scope of license renewal and subject to an AMR.
36	Page 2-114, Section 2.5.1.1, second paragraph, first sentence	Correct typographic error.	Revise the first sentence to read: The electrical and I&C components that were identified by the applicant to be within the scope of license renewal have been grouped by the licensee <del>in to</del> <u>into</u> component groups regardless of their system association.

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

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37	Page 2-115, Section 2.5.1.1	The list of component groups at the top of the page is consistent with the paragraph titles for electrical component groups in 2.5.1 of the LRA with exception of the component type "Terminal Blocks" described in 2.5.1.9 which is missing.	<p>Add component group "Terminal Blocks – electrical continuity" between the bullets for Switchyard Bus and Transmission Conductors and Connections.</p> <ul style="list-style-type: none"> <li>▪ Bus bar and connections - electrical continuity</li> <li>▪ Bus enclosure – expansion, separation, and structural support</li> <li>▪ Bus insulation and insulators - insulation</li> <li>▪ Penetrations Electrical - electrical continuity and insulation</li> <li>▪ Switchyard Bus and Connections - electrical continuity</li> <li>▪ <u>Terminal Blocks – electrical continuity</u></li> <li>▪ Transmission Conductors and Connections - electrical continuity</li> <li>▪ Electrical Equipment Subject to 10 CFR 50.49 EQ Requirements (TLAA)</li> <li>▪ Grounding Conductors – ground metal structures and equipment</li> <li>▪ Cable Tie Wraps – installation aid and cable spacing</li> </ul>
38	Page 3-9, last line of Table 3.0.3-1	For "Reactor Coolant System Supplement," delete the reference to the GALL Report AMP XI.M11A from the GALL Report Aging Management Programs column, because there are no GALL Report AMPs applicable to the Reactor Coolant System Supplement.	<p>Revise the GALL Report Aging Management Programs column to read:  <del>XI.M11A, "Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads of Pressurized Water Reactors" and XI.M16 "PWR Vessel Internals"</del>  <u>Not applicable</u></p>
39	Page 3-18, Section 3.0.3.1.3, first paragraph, second sentence	Revise "of components and materials" to "in components with materials."	<p>Revise the sentence to read:  The applicant stated that this program manages loss of material of <u>in</u> components and <u>with</u> materials susceptible to boric acid corrosion.</p>

**Arizona Public Service Company Comments on the Safety Evaluation Report  
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40	Page 3-29, Section 3.0.3.1.8, last paragraph, first sentence	Penetrations Electrical are evaluated in Table 3.6.2-1. Change the reference from Table 3.6.1 to Table 3.6.2-1.	Revise the first sentence as follows: In their response dated February 19, 2010, the applicant stated that LRA Table <del>3.6.1</del> <u>3.6.2-1</u> shows the Penetrations Electrical line being managed using the AMP Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements.
41	Page 3-31, Section 3.0.3.1.9, first paragraph	The first sentence of the summary describes the <u>new</u> Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 EQ Requirements Program as a <u>new</u> program. The use of "new" is redundant. Delete the first new.	Revise the first sentence to read as follows: LRA Section B2.1.26 describes the <del>new</del> Inaccessible Medium Voltage Cables Not Subject to 10 CFR 50.49 EQ Requirements Program as a new program that is consistent with the GALL Report AMP XI.E3, "Inaccessible Medium Voltage Cables Not Subject To 10 CFR 50.49 Environmental Qualification Requirements."
42	Page 3-78, Section 3.0.3.2.9, Exception 3 paragraph	The first sentence of the Exception 3 paragraph should refer to the monitoring and trending program element instead of the preventative actions program element.	Revise the sentence to read: <u>Exception 3</u> . LRA Section B2.1.14 identifies an exception to the " <del>preventative actions</del> <u>monitoring and trending</u> " program element.

**Enclosure**

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With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

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43	Page 3-104, Section 3.0.3.2.17	Revise the enhancements quoted at the bottom of the page to match the enhancements listed in LRA A1.25, Commitment 27 in Table A4-1, and B2.1.25 (Amendment 9) and Commitment 27 in SER Appendix A, the Electrical Cables and Connections Not Subject to 10 CFR 50.49 Environmental Qualification Requirements Used in Instrumentation Circuits Program.	<p>Revise the enhancements to read as follows:  <u>Enhancements</u>. In the LRA Electrical Cables and Connections Not Subject to 10 CFR 50.49 EQ Requirements Used in Instrumentation Circuits Program, the applicant stated that, prior to the period of extended operation, the following enhancement will be implemented in the following program elements:</p> <p style="padding-left: 40px;"><u>Scope of Program – Element 1, Parameters Monitored or Inspected – Element 3, Detection of Aging Effects – Element 4, Acceptance Criteria – Element 6, and Corrective Actions – Element 7</u></p> <p>Procedures will be enhanced to identify license renewal scope, <u>require cable testing of ex-core neutron monitoring cables, and require an engineering evaluation of the calibration results for non-EQ area radiation monitors and to require that an action request be written when the loop cannot be calibrated to meet acceptance criteria for cable testing be established based on the type of cable and type of test performed.</u></p>
44	Page 3-106, Section 3.0.3.2.18, second paragraph	Editorial suggestion in the first sentence.	<p>Revise the sentence to read:            In order to obtain the information necessary to verify whether the LRA program element <del>number</del> “scope of program” is consistent with the corresponding element of the GALL Report AMP, the staff issued RAI B2.1.27-2 in a letter dated December 29, 2009.</p>
45	Page 3-108, Section 3.0.3.2.18, Staff Evaluation section	To be consistent with other AMP evaluations in the SER, revise the Staff Evaluation section to include the staff's evaluation of the exceptions for the ASME Section XI, Subsection IWE Program.	Provide the staff's evaluation of the exceptions for the ASME Section XI, Subsection IWE Program in the staff evaluation section of SER section 3.0.3.2.18.

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
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46	Page 3-107, Section 3.0.3.2.18, fifth paragraph	Editorial suggestion in the first sentence.	Revise the sentence to read: The staff finds the applicant's response to B2.1.27-2 acceptable because the applicant has revised the AMP to add pressure retaining bolts to the ASME Section XI, Subsection IWE AMP to the list of in-scope components.
47	Page 3-109, Section 3.0.3.2.18, UFSAR Supplement paragraph	Revise the third sentence to be consistent with the LRA and identify the structural components whose aging is managed by the IWE AMP.	Revise the sentence to read: The staff also notes that the applicant committed (Commitment No. 29) to ongoing implementation of the existing ASME Section XI, Subsection IWE Program for managing aging of <u>the steel liner of the concrete containment building concrete containment and post-tensioning system</u> during the period of extended operation.
48	Page 3-113, Section 3.0.3.2.20, last paragraph on page	Clarify the first sentence to indicate that non-safety related structures are included in Commitment No. 34.	Revise the sentence to read: By letter dated May 21, 2010, the applicant supplemented its response to RAI B2.1.32-1 to align the inspection frequencies of <del>safety-related structures (structures within primary containment)</del> with the guidance in ACI 349.3R, <u>except for the exterior surfaces of non-safety-related structures, for which the applicant maintained a ten-year inspection interval.</u> (Commitment No. 34) <del>For non-safety-related structures the applicant maintained a ten-year inspection interval for exterior surfaces.</del>

Enclosure

**Arizona Public Service Company Comments on the Safety Evaluation Report  
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Comment No.	Page No. and SER Section	Comment	Suggested Resolution
49	Page 3-115, Section 3.0.3.2.20, Enhancement paragraph	Expand the description of the Enhancement paragraph to incorporate Commitment No. 34 in LRA Amendment 15 and SER Appendix A for the enhancement to the Structures Monitoring Program for inspection frequencies.	<p>Revise the paragraph to read:            LRA Section B2.1.32 identifies an enhancement to “detection of aging effects” to specify ACI 349.3R-96 as the reference for qualification of personnel to inspect structures under the Structures Monitoring Program. The staff found this enhancement acceptable because when implemented the LRA Structures Monitoring Program will be consistent with the GALL Report Structures Monitoring Program relative to inspector qualifications being commensurate with industry codes, standards and guidelines to help provide assurance that the effects of aging will be adequately managed. <u>The applicant also committed to align inspection frequencies with the guidance in ACI 349.3R, except for the exterior surfaces of non-safety-related structures, for which the applicant maintained a ten-year inspection interval. The staff reviewed the applicant’s supplemental responses and found them acceptable because for safety-related structures the applicant has aligned the inspection frequency with the recommended guidance in ACI 349.3R. Further, the staff finds the ten-year inspection frequency acceptable for the non-safety-related structures exposed to an external environment, because the site has a relatively benign environment. The applicant also committed to quantify the acceptance criteria and critical parameters for monitoring degradation, and to provide guidance for identifying unacceptable conditions requiring further technical evaluation or corrective action. Procedures will also be enhanced to incorporate applicable industry codes, standards and guidelines for acceptance criteria. The staff reviewed the applicant’s supplemental response and found it acceptable because the applicant committed to enhance the Structures Monitoring Program to include the acceptance criteria discussed in the GALL Report Structures Monitoring Program.</u></p>

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
50	Page 3-117, Section 3.0.3.2.20	Expand the description in the UFSAR supplement paragraph to incorporate Commitment No. 34 in LRA Amendment 15 and SER Appendix A for the enhancement to the Structures Monitoring Program for inspection frequencies.	Revise the paragraph to read: <i>In LRA Section A1.32, the applicant provided the UFSAR supplement for the Structures Monitoring Program. The staff reviewed this UFSAR supplement section and notes that it conforms to the recommended description for this type of program as described in SRP-LR Table 3.5-2. The staff also notes that the applicant committed (Commitment No. 34) to enhance the Structures Monitoring Program prior to entering the period of extended operation. Specifically, the applicant committed to specify ACI 349.3R-96 as the reference for qualification of personnel to inspect structures under the Structures Monitoring Program. <u>The applicant also committed to align inspection frequencies with the guidance in ACI 349.3R, except for the exterior surfaces of non-safety-related structures, for which the applicant maintained a ten-year inspection interval. The Structures Monitoring Program will be enhanced to quantify the acceptance criteria and critical parameters for monitoring degradation, and to provide guidance for identifying unacceptable conditions requiring further technical evaluation or corrective action. Procedures will also be enhanced to incorporate applicable industry codes, standards and guidelines for acceptance criteria.</u></i>
51	Page 3-121, Section 3.0.3.2.21, UFSAR Supplement paragraph	Revise wording of the fifth sentence to be consistent with Commitment No. 56.	Revise the sentence to read: <i>The applicant further committed (Commitment No. 56) to develop a repair plan for the spray pond wall degradation and to implement the repairs beginning in 2011 and ending <u>expected to be completed</u> by 2015.</i>

Enclosure

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
52	Page 3-125, Section 3.0.3.2.22 third paragraph	Revise the first sentence to delete the reference to Green's function to be consistent with the following text from page two of RIS 2008-30: "The Green's (or influence) function methodology is not in question. The concern involves an input in which only one value of stress is used for the evaluation of the actual plant transients".	Revise the sentence to read: During its audit, the staff reviewed the applicant's program basis document and noted that the <u>FatiguePro® FatiguePro</u> software, utilizes a <u>Green's one dimensional stress-intensity</u> transfer function to calculate the fatigue effects of transient cycles used by the Metal Fatigue of Reactor Coolant Pressure Boundary Program.
53	Page 3-138, Section 3.0.3.3.1, first paragraph of "Preventive Actions"	(1) Replace SCC with PWSCC to be consistent with the LRA and GALL. (2) As noted in the LRA; add a paragraph to identify water chemistry AMP as a "preventive action."	Revise the first paragraph and add a second paragraph as follows: <u>Preventive Actions.</u> LRA Section B2.1.34 states that several techniques are available to mitigate cracking due to <u>SGC PWSCC</u> . These techniques remove one or more of the conditions necessary to cause cracking (i.e., susceptible material, tensile stress, specific environment). A specific list of components and potential preventive actions is provided.  <u>LRA Section B2.1.34 also states that the Water Chemistry program (B2.1.2) provides preventative actions for monitoring and control of the supporting environment for PWSCC.</u>
54	Page 3-138, Section 3.0.3.3.1, first paragraph of "Parameter Monitored..."	Replace "stress corrosion cracking" with "PWSCC" to be consistent with LRA and GALL.	<u>Parameters Monitored or Inspected.</u> LRA Section B2.1.34 states that the program monitors for cracking due to <u>stress corrosion cracking PWSCC</u> through a combination of visual, surface, and volumetric exams. These exams directly detect cracking or detect the presence of boric acid which may be deposited on visible surfaces as a result of a through-wall crack.

Enclosure

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
55	Page 3-139, Section 3.0.3.3.1, first paragraph of "Detection of Aging Effect..."	Replace "stress corrosion cracking" with "PWSCC" to be consistent with the LRA and GALL.	<u>Detection of Aging Effects</u> . LRA Section B2.1.34 states that visual, surface, and volumetric exams are used to detect cracking due to <del>stress corrosion cracking</del> <u>PWSCC</u> in alloy 600 components. In this element the applicant also provides a list of components to be inspected, the inspection methods to be used and reference to the document containing the inspection requirement (CFR, ASME Code, ASME Code Case). These documents contain procedures for conducting the inspection as well as allowable inspection intervals.
56	Page 3-145, Section 3.1.1, first paragraph, second sentence	Revise the title of LRA Table 3.1.1 to be "Summary of Aging Management Evaluations in Chapter IV of NUREG-1801 for Reactor Vessel, Internals, and Reactor Coolant System" to be consistent with the LRA.	Revise the sentence to read: LRA Table 3.1.1, " <u>Summary of Aging Management Programs Evaluations for the Reactor Coolant System Evaluated in Chapter IV of NUREG-1801 [GALL Report] for the Reactor Vessel, Internals, and Reactor Coolant System</u> " is a summary comparison of the applicant's AMRs with those evaluated in the GALL Report for the reactor vessel, reactor vessel internals, and reactor coolant system components and component groups.
57	Page 3-155, Table 3.1.1-36	Revise the "AMP in LRA, Supplements, or Amendments" column for item 3.1.1-36 to read: "Water Chemistry, One-Time Inspection and Reactor Coolant Supplement" to be consistent with the amended Reactor Coolant Supplement in the LRA Amendment 13 and Commitment 23 Amendment 15 in SER Appendix A, Table A, Item 23.	Revise the "AMP in LRA, Supplements, or Amendments" column for item 3.1.1-36 to read as follows: <u>"Water Chemistry, One-Time Inspection and Reactor Coolant Supplement."</u>

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
58	Page 3-166, Section 3.1.2.1.1, first and second paragraph	The style of "3.1.1.1," "3.1.1.2," and "3.1.1.4" is not consistent with the Table 3.1.1 item numbers in LRA.	Replace "3.1.1.1," "3.1.1.2," and "3.1.1.4" with "3.1.1.01," "3.1.1.02," and "3.1.1.04." Similarly, replace "3.1.1.5" in page 171 with "3.1.1.05."
59	Page 3-182, Section 3.1.2.2.13, second paragraph	LRA Section 3.1.2.2.13 does not address components with low alloy steel with nickel alloy cladding as indicated in SER Draft. Delete this item – SRP & GALL table 3.1.1.31 addresses steel with nickel alloy cladding.	Delete "and low alloy steel with nickel alloy cladding" following "nickel alloy."
60	Page 3-193, above the title of 3.2.1.	Delete the line above the title of Section 3.2.1 it is not applicable to Palo Verde.	Delete the following line: <del>5. Reactor Building Isolation System (Subsection 2.3.2.5).</del>
61	Page 3-208, bottom of the page	Delete "steel encapsulation components exposed to" following "no in-scope" to be consistent with the LRA and Palo Verde UFSAR.	Revise the last sentence to read: The staff reviewed the applicant's UFSAR and confirmed that no in-scope <del>steel encapsulation components exposed to</del> cast austenitic stainless steel piping, piping components, and piping elements exposed to treated borated greater than 250 degrees C (greater than 482 degrees F) are present in these systems and, therefore, finds the applicant's determination acceptable.

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
62	Page 3-221, fourth paragraph, Section 3.2.2.3.4	<p>Page 3-221, fourth paragraph "By letter dated July 21, 2010, the applicant submitted confirmatory information that the affected piping is jacketed with overlapping seams such the moisture intrusion is not a concern."</p> <p>The confirmatory information was submitted by letter dated July 30, 2010.</p>	<p>Revise the sentence to read: "By letter dated July 24 <del>21</del> 30, 2010, the applicant submitted confirmatory information that the affected piping is jacketed with overlapping seams such the moisture intrusion is not a concern."</p>
63	Page 3-336, Section 3.5.2.2.1, Last paragraph	<p>Revise the first sentence to delete the reference to the moisture barrier. There is no moisture barrier in the Palo Verde Containment.</p>	<p>Revise the sentence to read: The staff verified that the containment concrete is monitored for cracks by the IWL AMP, <del>the moisture barrier is subject to inspection in accordance with IWE requirements,</del> and that water ponding is not common on the containment floor.</p>
64	Page 3-336, Section 3.5.2.2.1, Element (4), last paragraph on page	<p>Revise the third sentence to include references to other applicable SER sections.</p>	<p>Revise the sentence to read: The staff's reviews of the applicant's Structures Monitoring Program, ASME Section XI, Subsection IWE Program, and Appendix J Program <del>is</del> <u>are</u> documented in SER Sections <u>3.0.3.2.20, 3.0.3.2.18, and 3.0.3.1.12, respectively.</u></p>
65	Page 3-347, Section 3.5.2.2.2, Element (4)(c)	<p>Correct the typographical error in the second sentence (incorrect quotation mark).</p>	<p>Revise sentence to read: The staff noted that inspections of Group 6 structures are performed under the Structures Monitoring Program that is consistent with and integrates the elements of RG 1.127," "Inspection of Water-Control Structures Associated with Nuclear Power Plants Program."</p>

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
66	Page 3-347, Section 3.5.2.2.2, Element (4)(c)	Correct the typographical error in the second sentence (incorrect quotation mark).	Revise the sentence to read: The staff noted that inspections of Group 6 structures are performed under the Structures Monitoring Program that is consistent with and integrates the elements of RG 1.127, "Inspection of Water-Control Structures Associated with Nuclear Power Plants Program."
67	Page 3-350, Section 3.5.2.3.1, first and second paragraphs	Delete first and second paragraphs. They refer to cementitious fire barriers, which are not credited in the containment building. Move this discussion to 3.5.2.3.2.	<p>Section 3.5.2.3.1, first and second paragraphs:  <del>In LRA Tables 3.5.2-1, 3.5.2-2, and 3.5.2-5, the applicant stated that cementitious fire barrier coatings and wraps exposed to air—indoor uncontrolled (external) are being managed for loss of material and cracking by the Fire Protection Program. The AMR items cite generic note J, indicating that neither the component nor the material and environment combination is evaluated in the GALL Report. The staff reviewed all AMR result lines in the GALL Report where the component and material is cementitious coating fire barriers or wraps and confirmed that there are no entries for this component or material where the aging effect is loss of material due to cracking.</del></p> <p>The staff reviewed the applicant's Fire Protection Program and its evaluation is documented in SER Section 3.0.3.2.7. The staff noted that the applicant's Fire Protection Program provides for visual inspection of fire barriers once every 18 months for detection of cracking and loss of material. The staff also noted that the Fire Protection Program is used for other fire barriers including concrete walls, floors, and ceilings, and that cementitious fire barrier coatings have similar aging effects to concrete. The staff finds the applicant's proposal to manage aging using the Fire Protection Program acceptable because the program performs visual inspections of fire barriers that are capable of detecting loss of material for cementitious fire barrier coatings and wraps.</p>

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
68	Page 3-350, Section 3.5.2.3.1, third paragraph	Revise the first sentence to add a reference to LRA Table 3.5.2-7 for discussion of ceramic fiber and thermo-lag fire barriers.	Revise the sentence to read: In LRA Tables 3.5.2-1, <del>and</del> 3.5.2-2, <u>and 3.5.2-7</u> , the applicant stated that ceramic fiber and thermo-lag fire barrier seals exposed to air – indoor uncontrolled (external) are being managed for loss of material and cracking by the Fire Protection Program.

Enclosure

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
69	Page 3-351, Section 3.5.2.3.2, first paragraph	Replace first paragraph with discussion of cementitious fire barriers. (See comment for page 3-350, Section 3.5.2.3.1 above).	<p>Revise the first paragraph to read:  <del>The staff's evaluation for cementitious coating fire barrier coatings and wraps exposed to air – indoor uncontrolled (external) with aging effects of loss of material and cracking managed by the Fire Protection Program, with generic note J, is documented in SER Section 3.5.2.3.1.</del>  <u>In LRA Tables 3.5.2-2, 3.5.2-4, and 3.5.2-5, the applicant stated that cementitious fire barrier coatings and wraps exposed to air – indoor uncontrolled (external) are being managed for loss of material and cracking by the Fire Protection Program. The AMR items cite generic note J, indicating that neither the component nor the material and environment combination is evaluated in the GALL Report. The staff reviewed all AMR result lines in the GALL Report where the component and material is cementitious coating fire barriers or wraps and confirmed that there are no entries for this component or material where the aging effect is loss of material due to cracking.</u></p> <p><u>The staff reviewed the applicant's Fire Protection Program and its evaluation is documented in SER Section 3.0.3.2.7. The staff noted that the applicant's Fire Protection Program provides for visual inspection of fire barriers once every 18 months for detection of cracking and loss of material. The staff also noted that the Fire Protection Program is used for other fire barriers including concrete walls, floors, and ceilings, and that cementitious fire barrier coatings have similar aging effects to concrete. The staff finds the applicant's proposal to manage aging using the Fire Protection Program acceptable because the program performs visual inspections of fire barriers that are capable of detecting loss of material for cementitious fire barrier coatings and wraps.</u></p>

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
70	Page 3-352, Section 3.5.2.3.4	Change reference from 3.5.2.3.1 to 3.5.2.3.2. (See comment for page 3-350 section 3.5.2.3.1 above)	Revise the paragraph to read as follows: The staff's evaluation for cementitious coating fire barrier coatings and wraps exposed to air – indoor uncontrolled (external) with aging effects of loss of material and cracking managed by the Fire Protection Program, with generic note J, is documented in SER Section <del>3.5.2.3.1</del> <u>3.5.2.3.2</u> .
71	Page 3-352, Section 3.5.2.3.5, first paragraph	Change reference from 3.5.2.3.1 to 3.5.2.3.2. (See comment for page 3-350 section 3.5.2.3.1 above)	Revise the paragraph to read as follows: The staff's evaluation for cementitious coating fire barrier coatings and wraps exposed to air – indoor uncontrolled (external) with aging effects of loss of material and cracking managed by the Fire Protection Program, with generic note J, is documented in SER Section <del>3.5.2.3.1</del> <u>3.5.2.3.2</u> .
72	Page 3-352, Section 3.5.2.3.7, first paragraph	Replace first paragraph with reference to 3.5.2.3.1 for discussion of ceramic fiber and thermo-lag barriers.	Revise the paragraph to read: <del>In LRA Table 3.5.2.7, the applicant stated that thermo-lag fire barrier seals externally exposed to plant indoor air are being managed for loss of material and cracking by the Fire Protection Program. The staff's evaluation can be found in Section 3.0.3.2.7. The staff's evaluation for ceramic fiber and thermo-lag fire barrier seals exposed to air – indoor uncontrolled (external) with aging effects of loss of material and cracking managed by the Fire Protection Program with generic note J, is documented in SER Section 3.5.2.3.1.</del>
73	Page 3-354, Section 3.5.2.3.11	SER section 3.5.2.3.11 was truncated and combined with 3.5.2.3.12. Insert text to complete 3.5.2.3.11.	Revise section 3.5.2.3.11 to read: The staff reviewed LRA Tables 3.5.2-11, which summarize the results of AMR evaluations for the tank foundations and shells component groups. <u>The staff's review did not identify any items with notes F through J, indicating that the combinations of component type, material, environment, and AERM for this system are consistent with the GALL Report.</u>  <u>SER Section 3.0.2.2 documents the staff's evaluation of the items with Notes A through E.</u>

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
74	Page 3-354, Section 3.5.2.3.12	Insert paragraph break before 3.5.2.3.12 and the introduction for the first sentence. (See comment for page 3-354 section 3.5.2.3.11).	<p>Revise section 3.5.2.3.12 as follows:</p> <p><u>3.5.2.3.12 Transformer Foundations and Electrical Structures - Summary of Aging Management Review – LRA Table 3.5.2-12</u></p> <p>The staff reviewed LRA Tables 3.5.2-12, which summarize the results of AMR evaluations for the transformer foundations and electrical structures component groups. The staff's review did not identify any items with notes F through J, indicating that the combinations of component type, material, environment, and AERM for this system are consistent with the GALL Report.</p>
75	Page 3-359, Table 3.6-1, line 3.6.1-10	Revise the "staff evaluation" column to read: a different AMP is credited.	Revise the "staff evaluation" column to read: Consistent with GALL for material, environment, aging effect, but a different AMP is <del>credit</del> <u>credited</u> (See Section 3.6.2.1.2).
76	Page 3-365, Section 3.6.2.2.3	Revise the last sentence of the second paragraph of the quotation from LRA Section 3.6.2.2.3 to read "...withstand under medium load requirements..." to be consistent with the LRA.	<p>Revise the last sentence of the second paragraph of the quotation to read:</p> <p>The NESC also sets the maximum tension a conductor must be designed to withstand <del>heavy</del> <u>medium</u> load requirements, which includes consideration of ice, wind, and temperature.</p>
77	Page 4-28, Section 4.3.1.2.2, last paragraph	Revise the first sentence to delete the reference to Green's function to be consistent with the following text from page two of RIS 2008-30: "The Green's (or influence) function methodology is not in question. The concern involves an input in which only one value of stress is used for the evaluation of the actual plant transients".	<p>Revise the sentence to read:</p> <p>In Regulatory Information Summary (RIS) 2008-30, the staff raised technical concerns related to the conservatism of using one-dimensional stress (<del>Green's function</del>) models for the evaluation of environmentally-assisted fatigue in limiting environmentally-assisted fatigue locations.</p>

Enclosure

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No and SER Section	Comment	Suggested Resolution
78	Page 4-29, Section 4.3.1.2.2, second item in list at bottom of page	As written the second item could be construed as precluding use of future versions of FatiguePro. Future versions of FatiguePro may incorporate six-element stress tensor software modeling. Revise the second item to reference the current version of FatiguePro.	Revise the second item to read: The amended basis does not credit <del>FatiguePro</del> <u>FatiguePro Version 3.0 (which uses a one-dimensional stress-intensity term in lieu of a 6-element stress tensor)</u> as the software basis for SBF monitoring and instead addresses the need to implement a SBF monitoring software program and methodology that complies with the requirements in the ASME Code Section III, and conforms to the technical recommendations in RIS 2008-30
79	Page 4-30, Section 4.3.1.3.1, second paragraph	Revise the first sentence of the second paragraph to identify the OBE is 0.10g to be consistent with LRA section 4.3.1.3 and Palo Verde UFSAR section 3.7.	Revise the sentence to read: The applicant states that for design purposes, the safe-shutdown earthquake (SSE) is based on a 0.20 gravity (g) ground-motion stress, and the operating-basis earthquake (OBE) is based on a <del>0.15g</del> <u>0.10g</u> ground motion stress.
80	Page 4-43, Section 4.3.2.4.2, fourth paragraph	Revise the last sentence delete the reference to Table 4.3-7 footnote 4 and change the disposition for the pressurizer support skirt to 10 CFR 54.21(c)(1)(iii). Footnote 4 has never been applied to Table 4.3-7 item 1. LRA section 4.3.2.4 notes that the enhanced metal fatigue AMP will monitor the transient cycles for the pressurizer support skirt. Also revise the typographical error in the second sentence (delete extra 7)	Revise the sentences to read: The fatigue analysis of the bottom head support skirt is, therefore, a TLAA, <del>contrary to footnote 4 of LRA Table 4.3-7,</del> and is managed in accordance with <del>40 CFR 54.21(e)(1)(ii)</del> <u>10 CFR 54.21(c)(1)(iii)</u> . The applicant states that for the purposes of evaluating actual earthquake events, an SSE is defined as an earthquake that results in a categorization of 8 on a Mercalli intensity scale 7 (i.e., that results in ground-motion ranging stresses ranging from 0.15g to 0.33g) and that an OBE is defined as an earthquake that results in a categorization of 7 on a Mercalli intensity scale (i.e., that results in ground-motion stresses ranging from 0.072g to 0.15g).

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
81	Page 4-53 thru 54, Section 4.3.2.7.2, Charging Lines and Nozzles Section	Replace the SBF monitoring discussion with a CBF-EP monitoring discussion. Charging lines and nozzles usage monitoring was revised in LRA Amendment 16 to use CBF-EP monitoring.	In the Charging lines and nozzles section starting on page 4-53, replace the SBF monitoring discussion with a CBF-EP monitoring discussion.
82	Page 4-64, Section 4.3.2.9.2, Power Uprate Section, second paragraph	Revise the second paragraph to be consistent with LRA Amendment 16.	Revise the second paragraph to read: The applicant stated that the surge line <del>elbow will be</del> is subject to stress-based fatigue monitoring under the <u>enhanced</u> Metal Fatigue of Reactor Coolant Pressure Boundary program (B3.1). The program <del>maintains</del> <u>will maintain</u> a record of the <del>worst case CUFs</del> <u>cumulative usage factor</u> . This record will be reviewed and evaluated at intervals specified by the program, at a frequency sufficient to ensure that appropriate corrective action <del>is</del> <u>will be</u> initiated if an action limit is reached. Action limits <del>will</del> <u>be established</u> to permit completion of corrective actions before the code limit is exceeded. The effects of fatigue in the Class 1 surge line will thereby be managed for the period of extended operation, in accordance with 10 CFR 54.21(c)(1)(iii).
83	Page 4-68, Section 4.3.4.2, first paragraph	Revise the second sentence to reference LRA section 4.3.4 (Effects of the Reactor Coolant System Environment on Fatigue Life of Piping and Components) to be consistent with staff evaluation provided in this section.	Revise the sentence to read: In this LRA Amendment, the applicant submitted its conforming changes to LRA Section 4.3-3 <u>4.3.4</u> to address staff concerns regarding these sections that were discussed with the applicant in a public meeting dated May 6, 2010.

**Enclosure**

**Arizona Public Service Company Comments on the Safety Evaluation Report  
With Open Items related to the License Renewal of PVNGS Units 1, 2, and 3**

Comment No.	Page No. and SER Section	Comment	Suggested Resolution
84	Page 4-71, Section 4.3.5.1, second paragraph	Correct typographical errors in the first and second sentence.	<p>Revise the sentences to read:            For the implicit fatigue analyses for the reactor coolant hot leg sampling lines and the SG downcomer and feedwater recirculation lines, the applicant states that the analyses have been projected through the end of the period of extended <u>operation</u> in accordance with the TLAA acceptance criteria in 10 CFR 54.21(c)(1)(ii). For these implicit fatigue analyses, the applicant states that the total number of full thermal range <del>transient</del> <u>transients</u> that are applicable to the lines are projected to be in excess of 7000 cycle occurrences, and that for these components that applicable stress reduction factors were applied to maximum allowable stress limit criteria for the analyses in order to demonstrate that the existing stress loadings on the components would still be acceptable for the period of extended operation even under the reduced acceptance limit criteria for the analyses.</p>
85	Page 4-72, Section 4.3.5.2, paragraph at the top of the page.	Correct typographical errors in the first and second sentence.	<p>Revise the sentences to read:            ...Count for Allowable Secondary Stress Range Reduction <del>Facto</del> <u>Factor</u> in ANSI B31.1 and AMSE III Class 2 and 3 Piping. The applicant identified all implicit fatigue analyses for ANSI B31.1 and ASME Class 2 and 3 piping components will <del>be</del> remain valid for the period of extended operation except for the implicit fatigue analysis of reactor coolant system hot leg sampling lines and the recirculating SG downcomer and feedwater recirculation lines.</p>