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102-08350-CDH/KJG
February 22, 2022

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: **Palo Verde Nuclear Generating Station Units 1, 2, and 3**
Docket Nos. STN 50-528, 50-529, and 50-530
Renewed Operating License Number NPF-41, NPF-51, and NPF-74
Final Supplemental Response to NRC Generic Letter 2004-02

The purpose of this submittal is to provide the Arizona Public Service Company (APS) final supplemental response for Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3 to Generic Letter (GL) 2004-02, dated September 13, 2004, *Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors* [NRC Agencywide Documents Access and Management System (ADAMS) Accession Number ML042360586].

By letter number 102-06701, dated May 16, 2013 (ADAMS Accession Number ML13142A034), which addressed SECY-12-0093, *Closure Options for Generic Safety Issue (GSI) – 191, Assessment of Debris Accumulation on Pressurized-Water Reactor Sump Performance,* APS originally selected closure *Option 2A – Deterministic,* of the SECY recommendations. APS is now electing to pursue closure *Option 1 – Compliance with 10 CFR 50.46 Based on Approved Models*, in accordance with SECY-12-0093.

The remaining issue for PVNGS with respect to GL 2004-02 is the in-vessel downstream effects evaluation, which confirms that long-term core cooling can be maintained for postulated accident scenarios that require sump recirculation. The in-vessel downstream effects evaluation has been completed for PVNGS Units 1, 2, and 3 and is documented in the enclosure to this letter. This submittal satisfies the remaining GSI-191 commitment number 2 identified in the May 16, 2013, closure option letter.

No new commitments are being made to the NRC by this letter. Should you need further information regarding this letter, please contact Matthew S. Cox, Licensing Section Leader, at (623) 393-5753.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: February 22, 2022
(Date)

Sincerely,

CDH/KJG/mg

Enclosure: Final Supplemental Response to GL 2004-02

cc:

	S. A. Morris	NRC Region IV Regional Administrator
	S. P. Lingam	NRC NRR Project Manager for PVNGS
	L. N. Merker	NRC Senior Resident Inspector for PVNGS

ENCLOSURE

FINAL SUPPLEMENTAL RESPONSE TO GL 2004-02

ENCLOSURE
FINAL SUPPLEMENTAL RESPONSE TO GL 2004-02

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1.0 Overall Compliance

NRC Issue:

Provide information requested in GL 2004-02, "Requested Information." Item 2(a) regarding compliance with regulations. That is, provide confirmation that the [Emergency Core Cooling System (ECCS)] *ECCS and* [Containment Spray System (CSS)] *CSS recirculation functions under debris loading conditions are or will be in compliance with the regulatory requirements listed in the Applicable Regulatory Requirements section of this generic letter. This submittal should address the configuration of the plant that will exist once all modifications required for regulatory compliance have been made and this licensing basis has been updated to reflect the results of the analysis described above.*

APS Response:

In accordance with SECY-12-0093 and as identified in APS letter number 102-06701, dated May 16, 2013 [NRC Agencywide Documents Access and Management System (ADAMS) Accession Number ML13142A034] the Palo Verde Nuclear Generating Station (PVNGS) Units 1, 2, and 3 elected to pursue GSI-191 closure *Option 2A – Deterministic,* and identified in-vessel downstream effects as the last outstanding issue. Subsequent to this, additional particulate and fibrous debris was identified in the PVNGS containments and associated evaluations were performed. Various meetings/presentations were held with APS and the NRC in 2015 and 2016 to discuss these additional discoveries and analyses. The results of final evaluations were provided to the NRC in Revision 2 to Supplemental Response to GL 2004-02 dated December 18, 2013 (ADAMS Accession Number ML13357A218) (which superseded earlier submittals), and Addendum to Supplemental Response to GL 2004-02 dated December 1, 2016 (ADAMS Accession Number ML16340A988).

Based on these final evaluations, debris accumulation at the strainer and the resulting head loss, rather than in-vessel downstream effects, is design limiting. As a result, APS is electing to now pursue GSI-191 closure *Option 1 – Compliance with 10 CFR 50.46 Based on Approved Models*, in accordance with SECY-12-0093. By pursuing GSI-191 Closure Option 1, APS has selected to resolve the in-vessel fuel effects utilizing WCAP-16793-NP-A, Revision 2, *Evaluation of Long Term Cooling Considering Particulate, Fibrous, and Chemical Debris in the Recirculating Fluid*, rather than WCAP-17788-P, Revision 1, *Comprehensive Analysis and Test Program for GSI-191 Closure*.

The in-vessel downstream effects analyses for PVNGS as described in the Supplemental Responses previously submitted to the NRC is consistent with the methodology from Revision 2 of WCAP-16793-NP-A and its associated Safety Evaluation. Completion of the analysis demonstrates compliance with 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," (b)(5), "Long-term cooling," as it relates to in-vessel downstream debris effects for PVNGS.

1.1 Overview of PVNGS Resolution to GL 2004-02

On December 18, 2013, and December 1, 2016, APS submitted Supplemental Responses to GL 2004-02 for PVNGS which summarized changes that were implemented to support the resolution of GSI-191. The changes that were

implemented and identified in the PVNGS Supplemental Responses remain valid and no further changes are being made to address in-vessel downstream effects. In-vessel fuel effects may be resolved either with the NRC Safety Evaluation for WCAP-16793-NP-A, Revision 2 (issued April 8, 2013) or with subsequent WCAP-17788-P. The in-vessel downstream effects analysis for PVNGS is consistent with the methodology from Revision 2 of WCAP-16793-NP-A and its associated Safety Evaluation. PVNGS meets the acceptance criteria for fuel cladding temperature (<800°F), crud deposition thickness (<50 mils), and grams of bypassed fiber per fuel assembly (<15 g/assembly) set forth in WCAP-16793-NP-A and its associated Safety Evaluation utilizing the existing debris load and strainer testing. The calculated maximum temperature of the fuel cladding over the 30 days following the loss of coolant accident (LOCA) is less than 368.8°F, and the calculated deposition thickness is 4.9 mils (125.7 microns). The fiber bypass debris amount is 13.8 grams per fuel assembly.

1.2 Correspondence Background

The following provides a summary listing of the primary correspondence issued by the NRC or submitted by APS for PVNGS related to GL 2004-02.

Generic Letter 2004-02 Correspondences[1]		
Document Date	**ADAMS Accession Number**	**Document**
September 13, 2004	ML042360586	NRC GL 2004-02
September 1, 2005	ML052500306	First Response to GL 2004-02
November 21, 2007	ML073110389	NRC Revised Content Guide
February 29, 2008	ML080710546	Supplemental Response to GL 2004-02
June 6, 2008	ML081700281	Request for Extension to Complete the Final Confirmatory Analysis and Validation of Containment Sump Strainers Associated with GL 2004-02
June 30, 2008	ML081820639	NRC Approval of APS Extension Request
November 14, 2008	ML083370162	APS Request for Extension
December 3, 2008	ML083230937	NRC Approval of APS Extension Request
December 16, 2008	ML083430549	NRC Request for Additional Information
March 13, 2009	ML090830334	Revision 1 to Supplemental Response to GL 2004-02
January 7, 2010	ML100070645	NRC Request for Additional Information
May 16, 2013	ML13142A034	Closure Options for Generic Safety Issue (GSI) - 191
December 18, 2013	ML13357A218	Revision 2 to Supplemental Response to GL 2004-02
December 1, 2016	ML16340A988	Addendum to Supplemental Response to GL 2004-02

Note 1: Other supplementary correspondence is available on the PVNGS docket.

1.3 General Plant System Description

PVNGS Units 1, 2, and 3 are the Combustion Engineering two loop Pressurized Water Reactor (PWR) design. The High Pressure Safety Injection (HPSI), Low Pressure Safety Injection (LPSI), and Containment Spray System (CSS) pumps are automatically started by a Safety Injection Actuation Signal (SIAS) following a LOCA. Initially, both HPSI pumps, both LPSI pumps, and both CSS pumps take suction from the Refueling Water Tank (RWT). When the RWT level drops to the Recirculation

Actuation Signal (RAS) setpoint, the LPSI pumps automatically stop; the HPSI, LPSI, and CSS pump miniflow recirculation valves to the RWT automatically close; and the Recirculation Sump outlet valves to the suction of the pumps automatically open. The switchover to recirculation is completed when the RWT outlet valves to the suction of the pumps are manually closed, leaving the HPSI and CSS pumps taking suction from the Recirculation Sump.

The PVNGS Nuclear Steam Supply System (NSSS) consists of one reactor pressure vessel (RPV), two steam generators (SGs), four reactor coolant pumps (RCPs), one pressurizer (PZR), and the Reactor Coolant System (RCS) piping. The NSSS is located inside the reactor cavity and two bio-shield enclosures (D-rings), one to the north and one to the south of the reactor cavity, and each housing one SG and two RCPs. Each D-ring opens to the general area of Containment at the 80' level via a stairway and walkway. The PZR is located in its own enclosure on the 100' level that is open to the 80' level below via a 2' by 16'-6" opening in the floor (which is above the west side opening to the north D-ring). There are two Recirculation Sumps located in Containment, one on the southeast side and one on the southwest side.

1.4 General Description of Containment Sump Strainers

As stated in APS Supplemental Response dated March 13, 2009 (ADAMS Accession Number ML090830334), PVNGS has installed new containment sump strainers for each ECCS sump to increase the effective screen area from 210 ft^2 to 3,142 ft^2 per sump. To accomplish this, the existing screens and steel "roof" were removed. The vertical W6x25 columns of the frame for the original strainers were shortened and circumscribing beams were removed.

A new stainless steel floor was attached to the existing structural steel base frame to cover the sumps at the 80'-7" level. This floor is supported by new stainless steel floor joists. The floor has eight large-flow slots to accept flow from eight new strainer modules mounted on the new floor. Each module has flow coming from two of four sides but not from the top of the module. Both sides resemble arrays of rectangular "pigeon holes" or "mail boxes."

Each rectangular pocket is approximately 3" wide by 5" high by 16" deep. Flow enters each 3" by 5" opening and is filtered through perforated plate with a hole diameter of 0.083" (nominal) on the other five sides of the pocket and the bottom of the module. Stainless steel sheet metal is used to form the modules. The flows from the two arrays of pockets meet in a plenum in the middle of the module and then move down through the slot in the floor to the sump and then to the pumps located in the Auxiliary Building. Based on the curb configuration at the edge of the sump, the bottom of the lowest pocket in the sump strainer is approximately 9" above the containment floor.

The surface areas for the containment sump strainers are summarized below.

Containment Sump Strainer Surface Area	
Strainer (two strainers per Unit)	**Surface Area per strainer (ft^2)**
Unit 1 Strainers	3,142
Unit 2 Strainers	3,142
Unit 3 Strainers	3,142

2.0 General Description and Schedule for Corrective Actions

NRC Issue:

Provide a general description of actions taken or planned, and dates for each. For actions planned beyond December 31, 2007, reference approved extension requests or explain how regulatory requirements will be met as per "Requested Information" Item 2(b). That is provide a general description of and implementation schedule for all corrective actions, including any plant modifications, that you identified while responding to this generic letter. Efforts to implement the identified actions should be initiated no later than the first refueling outage starting after April 1, 2006. All actions should be completed by December 31, 2007. Provide justification for not implementing the identified actions during the first refueling outage starting after April 1, 2006. If all corrective actions will not be completed by December 31, 2007, describe how the regulatory requirements discussed in the Applicable Regulatory Requirements section will be met until the corrective actions are completed.

APS Response:

APS has performed analyses to determine the susceptibility of the ECCS and CSS recirculation functions for PVNGS to the adverse effects of post-accident debris blockage and operation with debris-laden fluids. These analyses conform, to the greatest extent practical, to the NEI 04-07 methodology (Reference 2) as approved by the NRC safety evaluation dated December 6, 2004 (Reference 3). As of December 1, 2016, APS has completed the following GL 2004-02 actions, analyses and modifications (reference APS letter dated December 18, 2013):

- ECCS Sump Strainer Modification Package
- Reactor Head Replacement Modification Package
- Debris Generation Calculation
- Debris Transport Calculation
- Minimum Containment Flood Level Calculation
- Latent Debris Walkdown and Calculations
- Strainer Structural / Seismic Analysis
- Pump Net Positive Suction Head (NPSH) Evaluation
- Post-LOCA Chemical Effects Analysis
- Post-LOCA Fuel Deposition Analysis
- Pump Seal Evaluation
- Pump Seal Cyclone Separator Evaluation
- Downstream Effects Debris Ingestion Evaluation
- Downstream Effects Evaluation for ECCS Equipment
- Downstream Effects Fuel Blockage Evaluation (Fiber Bypass)
- Chemical Effects Head Loss Test Report
- Bypass and Debris Transport Test Report
- Strainer Head Loss Calculation
- Strainer Head Loss Bump-Up Calculation
- Containment Coatings Assessment Procedure
- Minimum Air Pressure in Containment
- Post-LOCA Temperature and Pressure Profile
- Determination of Minimum ECCS Strainer Margin for GSI-191

The following are GL 2004-02 actions and analyses made by APS following December 1, 2016:

- Final resolution of In-vessel Downstream Effects
- For PVNGS Unit 1 – Inspected a representative sample of RCS piping, including hot and cold legs, pressurizer surge and main spray lines, and removed discrepant (i.e., not evaluated) fibrous insulation.
- For PVNGS Unit 2 – Inspected a representative sample of RCS piping, including hot and cold legs, pressurizer surge and main spray lines, and removed discrepant (i.e., not evaluated) fibrous insulation.
- For PVNGS Unit 3 – Inspected a representative sample of RCS piping, including hot and cold legs, pressurizer surge and main spray lines, and removed discrepant (i.e., not evaluated) fibrous insulation.

APS has no outstanding corrective actions associated with GL 2004-02 for PVNGS.

3.0 Specific Information for Review Areas

As stated in APS *Revision 2 to Supplemental Response* dated December 18, 2013 (which superseded earlier submittals), and *Addendum to Supplemental Response* dated December 1, 2016, APS has addressed review areas 3.a through 3.m, 3.o, and 3.p. However, information provided in Table 4-1 of the 2016 *Addendum to Supplemental Response* is being revised to update non-bounding limits for strainer hydraulic head loss. Table 4-1 is found in Section 4.2.2 of the 2016 *Addendum to Supplemental Response*, which revised information provided in Section 3.f.10 of the 2013 *Supplemental Response* based on the Microtherm analysis. In addition, the response to review area 3.p, *Licensing Basis*, is being updated.

The update to non-bounding limits for strainer hydraulic head loss (review area 3.f.10), outstanding review area 3.n, and updated review area 3.p are addressed in this submittal.

3.f Head Loss and Vortexing (Table 4-1 in 2016 Addendum to Supplemental Response)

NRC Issue:

The objectives of the head loss and vortexing evaluations are to calculate head loss across the sump strainer and to evaluate the susceptibility of the strainer to vortex formation.

10. Provide a summary of the methodology, assumptions, bases for the assumptions, and results for the debris head loss analysis.

APS Response:

The update in this response is to Table 4-1 in Section 4.2.2 of the *Addendum to Supplemental Response,* dated December 1, 2016, which provided the strainer structural and hydraulic capacity as a function of sump fluid temperature. The overall strainer limit at each temperature is the governing limit based on structural and NPSH limits.

Table 4-1 is being updated to reflect the revised NPSH calculation results based on the design basis strainer head loss values presented in Table 4-18 of the 2016 *Addendum to Supplemental Response* and the associated calculated void fractions.

The revised NPSH calculation documents lower minimum hydraulic limits than what was reported for some sump fluid temperatures; however, for the affected sump temperatures, the structural limit is bounding, so the overall strainer limit that was reported is unchanged. The updated Table 4-1 is as follows (cells with changed values are shaded):

Table 4-1: Strainer Structural and Hydraulic Capacity

Temp [5] (°F)	Original Structural Limit [1] (ft-Water)	Revised Structural Limit (ft-Water)	Original Minimum Hydraulic Limit [3] (ft-Water)	Revised Minimum Hydraulic Limit (ft-Water)	Overall Strainer Limit (ft-Water)
77	10.40	12.00 [2]	27.25	27.02 [6]	12.00 [2]
86	10.40	12.00 [2]	27.30	26.91 [6]	12.00 [2]
104	10.32	12.00 [2]	27.09	26.38 [6]	12.00 [2]
122	9.98	12.00 [2]	26.16	25.17 [6]	12.00 [2]
140	9.74	12.00 [2]	23.90	22.72 [6]	12.00 [2]
158	9.48	12.00 [2]	20.35	19.74 [6]	12.00 [2]
160	9.45 [4]	12.00 [2]	19.77 [4]	19.23 [4, 6]	12.00 [2]
170	9.31 [4]	12.00 [2]	16.88 [4]	16.69 [4, 6]	12.00 [2]
174.9	9.25 [4]	9.25 [1, 4]	15.47	15.47	9.25 [1, 4]
175	9.25 [4]	9.25 [1, 4]	15.42	15.42	9.25 [1, 4]
176	9.23	9.23 [1]	15.03 [4]	15.03 [4]	9.23 [1]
179.78	9.18 [4]	9.18 [1, 4]	13.71 [4]	13.71 [4]	9.18 [1, 4]
180	9.17 [4]	9.17 [1, 4]	13.63	13.63	9.17 [1, 4]
193.8	8.98	8.98 [1]	7.71	7.71	7.71
252	8.39	8.39 [1]	7.93	7.93	7.93

Notes:
Reference numbers in [brackets] correspond to reference numbers in the Addendum to Supplemental Response, dated December 1, 2016.
1. N001-1106-00228 [26]
2. N001-1106-00176 [17]
3. Summary of CCI Strainer Head Loss Testing [27]
4. Value is based on linear interpolation between published values
5. Temperature value decimal places are intentionally different, designed to be exactly the same as used in associated reference documents
6. 13-MC-SI-0250 (Reference 4)

3.n Downstream Effects – Fuel and Vessel

NRC Issue:

The objective of the downstream effects, fuel and vessel section is to evaluate the effects that debris carried downstream of the containment sump screen and into the reactor vessel has on core cooling.

- *Show that the in-vessel effects evaluation is consistent with, or bounded by, the industry generic guidance (WCAP-16793), as modified by NRC staff comments on that document. Briefly summarize the application of the methods. Indicate where the WCAP methods were not used or exceptions were taken, and summarize the evaluation of those areas.*

APS Response:

1. Reactor Vessel Internals

   The smallest flow clearance found in the reactor vessel internals evaluation is 0.75", which means that any sump screen hole diameter smaller than 0.37" will not result in plugging by either deformable or non-deformable debris (Reference 5). Since the existing sump screen, with 0.09" mesh openings, is smaller than the maximum acceptable hole size, there is no concern for plugging of reactor vessel internals flow paths with the existing sump screen.

2. Nuclear Fuel

   In-vessel fuel effects may be resolved either with the NRC safety evaluation for WCAP-16793-NP-A, Revision 2, (issued on April 8, 2013) or upon completion of the PWROG in-vessel fuel effects program found in PA-SEE-1090 (Reference 6). APS initially elected to resolve the in-vessel fuel effects as an Option 2A (Deterministic) plant using the testing being performed as part of PA-SEE-1090. Use of the information from the PWROG testing efforts was expected to provide additional fiber margin above the current limit of 15 grams per fuel assembly. However, additional debris was subsequently identified in the PVNGS containments and associated evaluations were performed.

   The results of these evaluations were provided to the NRC in supplemental responses dated December 18, 2013 (which superseded earlier submittals) and December 1, 2016. Based on these subsequent evaluations, debris accumulation at the strainer and the resulting head loss, rather than in-vessel downstream effects, is design limiting. As a result, APS is electing to now pursue GSI-191 *Closure Option 1 – Compliance with 10 CFR 50.46 Based on Approved Models*, in accordance with SECY-12-0093.

   The in-vessel fuel effects evaluations as provided in the December 18, 2013, *Revision 2 to Supplemental Response to GL 2004-02* and the December 1, 2016, *Addendum to Supplemental Response to GL 2004-02* are unchanged and as follows:

   > Calculation 2007-19863 evaluates the deposition of debris material on the fuel rods and the quantity of debris per fuel assembly, which may potentially interfere with the transfer of heat to the coolant and result in potentially excessive fuel cladding temperatures. The calculation uses plant specific conditions and methodology recommended in WCAP-16793-NP-A and its associated SE, OG-07-534, and OG-08-64. The primary mode of deposition is by boiling in the core. The plate-out of the chemicals that are introduced into the ECCS sump as a result of a LOCA in the Containment was analyzed.
   >
   > These chemicals are from materials present in the reactor coolant (boric acid and lithium hydroxide), that dissolve in the Containment (e.g., aluminum, insulation, and concrete), and that are added to the recirculating water in the sump (i.e., boric acid and trisodium phosphate).
   >
   > The maximum fuel cladding temperature and deposit thickness determined from the analysis were compared to the maximum acceptable temperature of 800°F and the conservative maximum deposition thickness of 50 mils (1,270 microns) as indicated in WCAP-16793-NP-A, Section 2.4.2 and

Appendix A, page A-5. The final calculated deposition thickness is 4.9 mils (125.7 microns), which is less than the recommended upper limit of 50 mils.

The calculated maximum temperature of the fuel cladding over the 30 days following the LOCA is less than 368.8°F, which is less than the recommended maximum cladding temperature of 800°F. The fiber bypass debris amount is 13.8 grams per fuel assembly, which is less than the acceptance criterion of 15 grams per fuel assembly provided in Limitation 1 of the SE for WCAP-16793-NP-A. The fiber mass per fuel assembly is based on the total fiber mass at the strainer, the fiber bypass fraction (12.3%), and the total number of fuel assemblies (241). Section 4.0 of the SE for WCAP-16793-NP-A lists fourteen limitations and conditions that are to be addressed by licensees as part of their response to in vessel long term cooling concerns; PVNGS meets each limitation. Based on the results of Calculation 2007-19863, the effects of dissolved chemicals plating out on the fuel cladding and bypassed debris on the fuel assemblies are acceptable.

As stated in Section 4.1 of PWROG-16073-P (Reference 1), although WCAP-16793-NP-A, Revision 2, does not explicitly address the potential for boric acid precipitation, the NRC staff has determined that plants that meet the hot leg fiber limit in WCAP-16793-NP-A, Revision 2 (15 grams per fuel assembly) can address boric acid precipitation concerns by maintaining their existing licensing basis and hot leg switchover timing. As stated above, PVNGS meets the 15 grams per fuel assembly hot leg fiber limit in WCAP-16793-NP-A, Revision 2. Further, the existing licensing basis and hot leg switchover timing described in the PVNGS UFSAR is maintained. Based on this, boric acid precipitation concerns are addressed for PVNGS Units 1, 2, and 3.

By Safety Evaluation (SE) dated January 23, 2018 (Reference 7), the NRC approved installation of Next Generation Fuel (NGF) in the PVNGS cores via Amendment No. 205 to Renewed Facility Operating Licenses No. NPF-41, NPF-51, and NPF-74. As stated in Section 3.5.8.5 of this SE, final resolution of GSI-191 issues is necessary to obtain adequate confidence in the licensee's long-term cooling plan in the presence of post-LOCA debris, and the NRC staff expected APS to reflect the change in fuel design as part of its final resolution of GSI-191 issues. The in-vessel fuel effects evaluations described above apply to all fuel designs used in the PVNGS cores, including NGF.

By SE dated March 4, 2020 (Reference 8), the NRC approved installation of Framatome HTP™ fuel in the PVNGS cores via Amendment No. 212 to Renewed Facility Operating Licenses No. NPF-41, NPF-51, and NPF-74. Per Section 3.5.6.2 of the SE, the NRC staff review found that the loading of Framatome HTP™ fuel would not be expected to exacerbate the potential for post-LOCA debris blockage in the reactor vessel. The NRC staff conclusion was based upon the limited quantity of fibrous debris expected at PVNGS following a LOCA event, as well as conservatisms inherent in the WCAP-16793-NP-A methodology. The in-vessel effects evaluation methods and results upon which this NRC conclusion was based are unchanged.

3.p Licensing Basis

NRC Issue:

The objective of the licensing basis section is to provide information regarding any changes to the plant licensing basis due to the sump evaluation or plant modifications.

1) Provide the information requested in GL 04-02 Requested Information Item 2(e) regarding changes to the plant licensing basis. The effective date for changes to the licensing basis should be specified. This date should correspond to that specified in the 10 CFR 50.59 evaluation for the change to the licensing basis.

APS Response:

The PVNGS licensing basis will be changed in accordance with the requirements of 10 CFR 50.71(e) to incorporate the GL 2004-02 response, including the values of analyzed debris limits needed for TSTF-567, *Add Containment Sump TS to Address GSI-191 Issues*, Revision 1, within 6 months of receiving NRC acceptance of the updated final supplemental response to the GL. No licensing actions or exemption requests were needed to support changes to the plant licensing basis.

4.0 References

1. PWROG-16073-P, Revision 0; TSTF-567 Implementation Guidance, Evaluation of In-Vessel Debris Effects, Submittal Template for Final Response to Generic Letter 2004-02 and FSAR Changes (Licensing Committee PA-LSC-1447)
2. NEI 04-07, Revision 0; Volume 1 – Pressurized Water Reactor Sump Performance Evaluation Methodology
3. NEI 04-07, Revision 0; Volume 2 – Safety Evaluation by the Office of Nuclear Reactor Regulation Related to NRC Generic Letter 2004-02, Revision 0, December 6, 2004
4. PVNGS Calculation 13-MC-SI-0250, Revision 3; Safety Injection, Containment Spray, and Shutdown Cooling System Pump NPSH Evaluation
5. PVNGS Document N001-1106-00015, Revision 0; Palo Verde GSI-191 Downstream Vessel Blockage Evaluation
6. WCAP-17788-P, Revision 1; Comprehensive Analysis and Test Program for GSI-191 Closure (PA-SEE-1090); December 2019
7. NRC Safety Evaluation Related to Next Generation Fuel License Amendment Request, Arizona Public Service Company, Palo Verde Nuclear Generating Station Units 1, 2, and 3; dated January 23, 2018 (ADAMS Accession No. ML17319A107)
8. Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment Nos. 212, 212, and 212 to Renewed Facility Operating License Nos. NPF-41, NPF-51, and NPF-74, Arizona Public Service Company, et al., Palo Verde Nuclear Generating Station Units 1, 2, and 3; dated March 4, 2020 (ADAMS Accession No. ML20031C947)