Enclosure to Meeting Summary for March 15, 2016,
Public Teleconference between
PSEG LLC and the Nuclear Regulatory Commission

Hope Creek Generating Station (HCGS)
Power Range Neutron Monitoring (PRNM) System Digital Upgrade
License Amendment Request

HCGS NUMAC Upgrade – Open Items
DOC-0006-2118 R1

a HCGS NUMAC Upgrade – Open Items

No.	Resp.	Issue Description	Status	RAI No.	PSEG Response
1.	EICB	System Description Appendix R provides responses to plant specific responses to the NUMAC LTR. The response to LTR 2.3.4 identifies the configuration for HCGS to be 4 APRM channels with one APRM chassis and one LPRM chassis. However the LTR and Appendix A system architecture do not describe this. Appendix A describes a master/slave APRM instrument, but the LTR describes a LPRM unit not clear how these two concepts relate, if they do. Provide a figure showing the system architecture for the HCGS PRNMS.	Close	No	LTR 5.3.1 first bullet discusses APRM chassis and (for large cores) LPRM chassis. NEDC-33864P Appendix A refers to these two chassis as APRM-Master and Slave. Master refers to the APRM chassis and Slave refers to the LPRM chassis. These terms are used interchangeably. NEDC-33864P Appendix A page A-11 shows the system level architecture.
2.	EICB	System Description Appendix A seems to describe the generic PRNM system architecture and not the architecture for HCGS. What is different between this description and the one provided in the LTR? Also there are system differences, which are described in Appendix J. How do these modules work and fit in the system architecture for HCGS?	Close	No	The LTR describes variants of PRNM system architecture, depending on whether the target application (plant) has a large or small core, and whether it is BWR6 or non-BWR6. Appendix A provides additional details about large core, non-BWR6, such as Hope Creek. The differences described in Appendix J are not architectural differences.
3.	EICB	System Description Appendix J identifies Hope Creek deviations from the approved generic	Close	No	NRC update 03022016: NRC will identify the documents to be placed in the portal. a)

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		NUMAC PRNM system. This is required in ISG-06 Section D.8. a) Table 1 lists these deviations and provide justifications for such. Please provide additional information for the following items: • Column Reference Document – what are these documents? • Item 2 – Why the modification for time to calculate flow-biased trip setpoint is a clarification? It seems that the total time for the Hope Creek Design has changed. • Item 5 – What higher level of security was applied and to what activities? b) Section 4.2 describes the relay logic for HCGS. Please clarify how the improved relay logic module relates to the new relay logic card to be included in the Hope Creek PRNM system.			• These are GEH references pointing to where the support for the justification is stored in the GEH document system. The following two referenced documents can be placed in reading room upon request. • Item 2 - 001N5637 PRNM Time to Calculate Flow-biased Trip Setpoint • Item 5 - 001N5640 PRNM Increased Instrument Security b) "Relay Logic Module" and "Relay Logic Card" refer to the same thing. Hope Creek will receive the new design.
4.	EICB	Software Development Plans The plans submitted describe GEH processes, but they do not include the activities to be performed by the licensee, such as oversight. Please describe the activities and processes for which PSEG is responsible.	Close	No	NRC update 03022016: NRC will identify the documents to be placed in the portal. PSEG is required to create or acquire a number of documents from vendors providing safety related equipment per IT-AA-101. The purpose of many of these documents is to ensure the vendor has a quality process in place for software and

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					product design and that the process and design are accurately documented and tested. The required documents include a configuration management plan, a problem management and reporting process, a disaster recovery process, documented functional requirements, a documented technical design, a verification and validation plan, testing reports, user documentation, code review process and documentation and a traceability matrix to ensure all requirements are tested. In addition, CC-AA-103-1007 responsibilities state: Lead Responsible Engineers (LREs) are responsible for ensuring DCPs with digital devices are provided to DTS Design Engineer for review. DTS Design Engineers are responsible for reviewing Design Change Packages (DCP) with digital devices ensuring an adequate Critical Digital Review (CDR) is performed and documented. The DTS Engineer determines the scope and breadth of the CDR for the particular application. A critical digital review is a review of a vendor's software QA processes and a technical review (EMI/RFI, failure analysis) of the design, documentation, and testing of a digital device determining the software/hardware's suitability for purchase and installation at PSEG Nuclear facilities.

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					PSEG personnel participated in critical digital review that was led by ProDesCon on the GEH Power Range Neutron Monitoring System (also refer to LAR Attachment 1 Section 3). The CDR report pointed out that GEH has an established regulatory approved Appendix B quality program and that they're processes are suitable to ensure the quality of the design, configuration control, Part 21 reportability and the system maintenance throughout the life cycle. The CDR included a high-level review of the overall system design, focusing on the safety functions of the system and how digital design principles indicative of highly reliable digital systems were applied to the PRNM system. PSEG has reviewed and commented on software lifecycle documentation produced by GEH throughout the project. In addition PSEG has performed two audits (reference Survey numbers NOV2116-014 and NOD-15-038) thus far on GEH to help ensure product reliability. These audits focused on GEH audits performed on subcontractor Gavial, the GEH actions and process to correct identified issues, QA hold points placed on the purchase order, overall test plans and completed testing, restrictions placed on the Gavial subcontractor, cyber security aspects of the project and the GEH engineering change

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					process. PSEG also plans to witness continued factory testing with the quality assurance department.
5.	EICB	Software Development Plans The proprietary markings in the appendices are inconsistent. For example, information in Sections 4.2 and 4.3 in Appendix B is not marked proprietary, but this same information is also provided in Sections 4.2 and 4.3 of Appendix D, where is marked as proprietary.	Open		Appendix B Sections 4.2 and 4.3 should be marked proprietary to match Appendix D. Updated copies of Appendix B proprietary and non-proprietary can be provided.
6.	EICB	Appendix E, PRNM System Management Plan	open	yes	
		a) Section 2.3 describes how project management will be performed. This section refers to critical-to-quality features to be part of the management process. However, this plan does no define these features. Since these features are part of project oversight, please describe these features and in which document will they be recorded?			A Project Work Plan (PWP) is required by GEH policies and procedures. As stated in Appendix B Section 3.1.1.5, the PWP contains personnel and commercial information, including project budgetary information that is classified as GEH Proprietary Class III (confidential). The PWP is created and maintained by the Project Manager to manage the commercial aspects of the project. Critical to quality features are project specific and are listed in the PWP. For Hope Creek, these are listed in Appendix C3 of the Hope Creek PRNM Upgrade PWP.

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		b) Section 2.4.1 describes the secure development environment. This section states the control employs in the system development should be in accordance with GEH established procedures, consistent with guidance provided in RG 1.152. Please describe the GEH procedures to be followed for secure development environment.			A collection of administrative procedures covers specific topics related to the secure development environment: • Asset Identification • Secure Development Network • Physical Security • Malicious Code Protection • Patch Management • Server and Computer Hardening • Threat Analysis • Software Usage • Electronic Access Control • Log Management • Personnel Security and Segregation of Duties • Production Deployment • Product Handling and Delivery • Incident Response • Contingency Planning • Security Control Review • Changes to Physical, Logical, or Programmatic Controls
		c) Section 3.1 describes the need to establish project quality metrics. However, this section does not identify the project quality metrics.			3/15/2016 Supplemental Response NRC Clarification BTP 7-14 requires the applicant identify the metrics to track progress and determine appropriateness of its software development process. The NRC staff needs a clear description on how the licensee is using configuration reviews and technical reviews to measure success or failure of the software development process. This item is identified in open items: 6c, 7g,

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					8a, and 11e Response The software development process includes a series of technical design reviews and baseline reviews. At the end of each of these reviews, a review report and a scorecard will be issued by the review chair. The review report summarizes the results of the review. The scorecard evaluates the content of the review material and the performance of the design team based on pre-established criteria also known as metrics, e.g., "Did the design team resolve action items assigned at previous reviews, or are acceptable plans in place?" A successful review will require a passing grade of 75%. However, any grade below 90% would result in action items to correct the deficiency in the design or in the compliance with the design process. Condition reports will be issued in accordance with GEH problem reporting procedure should a design fail any of the reviews. 2/16/2016 The Design Review Summary Report and Design Review Scorecard provide a record of quality metrics applied by the Chief Engineer's Office. A copy of a scorecard can be placed in the Reading Room upon request.

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7.	EICB	Appendix B, PRNM Systems Engineering Development Plan	open	yes	
		a) Section 2.4.1 of Appendix K states the verification of the design documents is performed by the design team prior to IVV activities. But section 2.3 seems to imply that these reviews are performed by a team independent of the design team. In addition, section 4.2 of Appendix B also describes an independent review team who perform the technical design review. Please clarify what group (in the GEH organization) performs these independent reviews.			When the design team prepares and releases design artifacts, GEH procedures require the Design team to perform verification of documents prior to the document release. The released document is then provided to the IVV team who conducts the independent verification in accordance with the SyIVVP. Conducting the IVV activities defined in the SyIVVP (Section 3.0) constitutes the Technical Design Review, which is performed by the IVV team and is supervised by the Chief Engineers Office.
		b) Section 2.4.1 describes the technical design reviews. This section states the design team is responsible for resolving issues identified during these reviews. How are these issues being recorded and tracked? Section 4.5 of this appendix describes how deficiencies or discrepancies could be tracked, and Section 7.0 states they could use engineering change order to handle problems encountered during product development. But these statements are not specific. In addition, it			3/15/2016 Supplemental Response NRC Clarification BTP 7-14 requires the applicant identify how anomalies are identified, documented, tracked and resolved. The staff needs a clear description on how PSEG and GEH are performing these activities during the design and development, V&V, and testing, and then after the system is installed in HCGS. This item is identified in open items: 7b, 8a, 8b, and 11f GEH Response During design & development of the PRNM

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		seems that these options are used after delivery of the NUMAC system. Please explain what method will be used to identify and track problems identified during the technical design reviews. Also, explain the process to approve the resolution of these problems.			system for PSEG, the IVV Team would review and provide comments about design artifacts at each phase. The comments and resolutions are archived in the design records in accordance with GEH procedures. The comments, resolutions and any open items are also reported and tracked in Appendix A of the SyVV Task Report or SySA Task Report for each phase as discussed in Section 4.4 of the SyEDP, SyIVVP and SyQAP. During IVV team testing, when anomalies are observed, they are recorded in the control copy of the test datasheets. The anomalies and the resolutions, which may include changes or corrections to the design, are discussed in the test reports. An independent engineer is responsible to verify that the content of test report is consistent with the test data sheets. The technical design reviews and baseline reviews will confirm that the acceptance of the resolution and the closure of the anomalies or open items. Resolution of all anomalies and closure of all open items are required before the system can be delivered to PSEG. After GEH delivers the system to PSEG, if an anomaly is discovered it would be tracked in the GEH Corrective Action Program.

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					PSEG Response As discussed in the response to Open Item (OI) #4, PSEG will continue oversight and audit activities during the design, development, V&V, and testing of the PRNM system. The processes discussed in OI#4 will disposition any anomalies identified. This will include, as appropriate, resolution in the PSEG Corrective Action Program (CAP) -LS-AA-125 - and in the Engineer of Choice (EOC) corrective action program (for the vendor performing the design change package for the PRNM upgrade – Sargent and Lundy). During installation and acceptance testing, and after installation, both the PSEG CAP and EOC CAP will be used to identify, document, track and resolve anomalies. 2/16/2016 Project specific issues that remain open across project phases are tracked in the task reports. See Section 4.4.2 of the NUMAC Systems Engineering Development Plan. Closure of open items is reviewed as part of subsequent Baseline reviews; open items are resolved and closed prior to completion of the final Baseline review.
		c) Section 4.3 states the baseline review team would also review and approve development tools. Was			The SyQA Functional Configuration Audit Checklist (NUMAC System Quality Assurance Plan Section 4.4.1) lists tools

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		this necessary for the HCGS PRNM system?			that were approved for the associated baseline. A SyQA Functional Configuration Audit Checklist is developed for each Baseline. Tools are approved for use via the Baseline review process for application to a specific project. Tools were used for the HCGS PRNM system development.
		d) Section 5.0 describes the use of development tools. BTP 7-14, Section B.3.1.2.3 requires licensee to provide a description of software tools to be used. Please identify the software development tools.			3/15/2016 Supplemental Response NRC Clarification BTP 7-14 requires the applicant identify the software tools used for the development of the system. The NRC staff needs a list and reference of the software tools being used for the development of the HCS NUMAC. During the call, the licensee noted these tools were described in previous license amendments, if this is the case, then the staff needs the references or ML numbers for the documents that described the software tools. This item is identified in open items: 7d and 9b Response The Hope Creek PRNM system has similar hardware and software designs as previously approved PRNM projects, e.g., Grand Gulf and Columbia. Therefore, the software tools for the HCGS PRNM are the same as those previously described for Columbia in NEDC-33685P Revision 2 (ML12040A074) Section 4.4.6.

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					2/16/2016 Tools are selected and approved for use throughout the various phases of project. The approved tools are documented in the SyQA Functional Configuration Audit Checklists (NUMAC System Quality Assurance Plan Section 4.4.1). GEH provided details on software tools during previous (Grand Gulf and Columbia) projects. See RAI #3 in GNRO-2011/00038 (ML111370259) and Section 4.4.6 in NEDC-33685 (ML12040A074).
		e) Section 6.0 describes the secure development and operational environment. This section states access to the NUMAC lab is controlled and monitored. But it does not provide details on how these are perform. Please provide detail explanation.			GEH has a procedure for controlling access to the NUMAC lab; see response to Open Item 6.b.
		f) Section 6.0 describes the secure development and operational environment. This section states the code is maintained in the secure server. How is access granted to this server?			GEH has a procedure for access control of the secure server, see response to Open Item 6.b.
		g) Section B.3.1.2.2 of BTP 7-14 requires licensee to identify the indicators to determine the success or failure of the development processes. This information was not provided in the engineering			3/15/2016 Supplemental Response See open item 6.c. 2/16/2016 Success or failure is indicated by the Design Review Summary Report and

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		development plan. In addition, Appendix A in Appendix K identifies the alignment to NUMAC documents. This table identifies that this information in SyMP (See open item 6.c). Please provide this information.			Design Review Scorecard.
8.	EICB	Appendix C, NUMAC Systems Quality Assurance Plan	Open	yes	
		a) General comment: This plan does not cover all the activities identified in section B.3.1.3 of the BTP 7-14. Specifically, this plan does not describe the corrective action program, description of QA procedures, and indicators to determine software quality.			3/15/2016 Supplemental Response See open item 6.c and open item 7.b. 2/16/2016 The NUMAC plans augment and supplement the GEH QA Program. As stated in Section 1.0 of the NUMAC Systems Quality Assurance Plan, the GEH Quality Assurance Program encompasses quality assurance related activities such as audits, supplier control, and archiving of quality records. Although not explicitly mentioned, the corrective action program is a component of the GEH Quality Assurance Program.
		b) Section 3.0 states unresolved configuration items is grounds for failure. How are these issues identified, recorded and tracked? Who is responsible for approving resolution of these issues? (see open item 7.b)			3/15/2016 Supplemental Response See open item 7.b. 2/16/2016 Open items are listed in the System Quality Assurance Configuration Audit Checklist and tracked in the System Configuration Management Task report (SyEDP 4.4.2).

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					The checklist and task report are part of the Baseline Review Records. These records are approved by the baseline review team, which is chaired by the Chief Consulting Engineer.
		c) Section 4.4.1 describes the oversight activity associated with quality assurance. Is the activity described in this section the only oversight activity to be performed? (This section is marked proprietary so the specific activity is not identified in the question). What happens if problems are identified during this oversight activity?			As discussed in response to Question 8.a, the GEH Quality Assurance Program has other activities. Problems are tracked in accordance with GEH procedures.
9.	EICB	Software Integration Plan (SIntP) GEH did not submit a separate plan for this. However, GEH (Appendix K) identified the NUMAC documents that cover the requirements for this plan (BTP 7-14, Section B.3.1.4). Based on this information, the staff identified the following questions:	open	yes	
		a) Section B.3.1.4.2 identifies the implementation characteristics of the SIntP. His section requires description of the software integration activities. GEH references SyEDp for this, but SyEDP does not provide enough information about the software integration process. Please provide this information.			GEH does not have a separate software integration team, rather software integration is performed by the design team. Therefore, the characteristics described in the SyEDP for design team activities apply to integration activities as well. For explanation of how measurement is performed, see response to 6.c.

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		b) Section B.3.1.4.3 identifies software tools. As mentioned in open item 7.d, these GEH document do not identify the software tools to be used. Please provide this information.			3/15/2016 Supplemental Response See open item 7.d. 2/16/2016 See response to open item 7.d.
10.	EICB	Software Safety Plan (SSP) GEH did to submit a separate plan for this. However, GEH (Appendix K) identified the NUMAC documents that cover the requirements for this plan (BTP 7-14, Section B.3.1.9). Based on this information, the staff identified the following question: Appendix K refers to the IVVP and SyMP for the information required in BTP 7-14. However, the information identified in these sources seem to address the hazard analysis required by IEEE 102, and not what is required in BTP 7-14. The SSP should provide a general description of the software safety effort, and the intended interactions between the software safety organization and the general system safety organization.	open	yes	The PRNM upgrade is a retrofit system. As a retrofit system, the GEH approach to software safety planning for PRNM is to ensure that the safety significance of the PRNM retrofit is consistent with the design basis of the replaced system and of the plant. GEH provided details on software safety approach during previous (Grand Gulf and Columbia) projects. See RAI #1 and 2 in GNRO-2011/00039 (ML111460590) and Section 4.4.1.9 in NEDC-33685 (ML12040A074).
11.		Appendix D, NUMAC Systems Independent Verification and Validation	open	yes	
		a) Section 2.1 describes the GEH organization. This section states the GEH Chief Engineer's office supervises independent V&V activities. However, Appendix D, Figure 2-1 identifies the Chief			The Chief Consulting Engineer reports to the Chief Engineer's Office.

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		Consulting Engineer as the person responsible for V&V activities.			
		b) Section 3.1.2 describes the safety analysis for the concept phase. It is not clear if this activity will include the preliminary hazard analysis, since it seems to only cover evaluation of the documentation.			See response to open item 10.
		c) Is the safety analyses described in each lifecycle phase considered to be the hazard analysis identified in IEEE Std. 1012? If so, will this also include the risk analysis identified in IEEE Std. 1012?			Hazard analysis is performed during various lifecycle phases as indicated in Appendix K, Table 5 for cross-reference of IEEE Std 1012 to NUMAC process. Project risk management is performed during all system life cycle development phases in accordance with the GEH Quality Assurance Program
		d) Appendix K refers to the IVVP Section 4.0 to confirm item B.3.1.10.1, risks. Section 4.0 describes the baseline process. So it is not clear how the baseline process will be used to identify and manage risks associated with the V&V process.			Project risk management is performed during all system life cycle development phases in accordance with the GEH Quality Assurance Program. SyIVVP Section 4.2 describes Technical Reviews. Although not stated in the SyIVVP, the GEH procedure for Technical Design Reviews requires risks management. SyIVVP Section 4.3 describes Baseline Reviews, which are a process check to ensure the project plans are being followed.
		e) Appendix K refers to several sections in the IVVP to confirm item B.3.1.10.2, measurement. However, the information provided does not clearly define the indicators that will be used.			3/15/2016 Supplemental Response See open item 6.c. 2/16/2016 See response to open item 6.c.

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		f) Section B.3.1.10.2, procedures requires applicants to describe how anomalies are identified and reported. This information is not provide in the plan (See item 11.b above)			3/15/2016 Supplemental Response See open item 7.b. 2/16/2016 Per section 2.2.2 and 2.2.3 of the SyIVV, the System Verification Engineer and System Safety Analysis Engineer are responsible for documenting results of reviews including anomalies in their respective tasks reports. The task reports are discussed in sections 4.4.1 and 4.4.2.
12.	EICB	Software Configuration Management Plan (SCMP) GEH did to submit a separate plan for this. However, GEH (Appendix K) identified the NUMAC documents that cover the requirements for this plan (BTP 7-14, Section B.3.1.11). Based on this information, the staff identified the following question: Appendix K refers to the SyEDP for the information required in section B.3.1.11.2, procedures. However, the information identified in these sources seem to address only configuration of documents, and not all configuration items (e.g., software tools, source code, etc.). How will GEH control these items?	open	yes	SyEDP - section 3.4 specifies configuration management of source code and section 5 specifies configuration management of firmware. Tools are controlled at the baseline in which they are introduced. Configuration Status Accounting includes all the configurable items.
13.	EICB	EQ Testing The system equipment qualification (EQ) test plan was not submitted with the LAR.	Close	no	NRC update 03022016: The qualification summary report will provide the information requested.

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		Instead the licensee submitted an EQ program in Appendix H. This program states the EQ plans will provide the details on the system to be qualified. Also, that the EQ program provides guidance to prepare EQ plans, if they are necessary. For this amendment, GEH described design changes for the HVPS, Relay Logic Card, and UFP Display. Therefore, a qualification plan for these components should be submitted. ISG-06, Section D.5.2 describes the information to be provided for the staff to evaluate EQ of I&C systems. Section D.5.2 requires submittal of the EQ plan.			These items are encompassed by Appendix H. They are specifically identified in Section 3.3 and qualification approach is discussed in Section 5.
14.	EICB	EQ Testing Requirements Are the EQ requirements based on the plant conditions?	Close	no	The EQ requirements are based on plant conditions: From NEDC-33864P Appendix H Section 1.1: The replacement NUMAC PRNM system is designed to maintain functional operability under conditions specified in the PSEG Hope Creek Generating Station Power Range Neutron Monitoring System (PRNM) Upgrade Project H-1-SE-KDS-0494 [Reference 7.1]. The qualification requirements, the subject of this system qualification program, are further delineated in the NUMAC PRNM System Requirements Specification [Reference 7.2]. Reference 7.2 is provided as NEDC-

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					33864P Appendix F Part 1 (NUMAC PRNM System Requirements Specification). Section 2.5 references Hope Creek specification H-1-SE-KDS-0494; the qualification requirements in Appendix F Part 1 Section 9 are obtained directly from the Hope Creek specification.
15.	APHB	Section D.9.4, "Technical Evaluation," of DI&C-ISG-06, Subsection D.9.4.2.14, "IEEE Std. 603, Clause 5.14, Human Factors Considerations," states, in part, that the information provided should be sufficient to demonstrate that the guidance contained in Standard Review Plan, Appendix 18-A, has been met. NUREG-0800, Standard Review Plan, Appendix 18-A, "Crediting Manual Operator Actions in Diversity and Defense-in-Depth (D3) Analyses," Revision 0, states, in part, that a diversity and defense-in-depth analysis should include the justification of any operator actions that are credited for response to an Anticipated Operational Occurrence/Postulated Accident concurrent with software Common Cause Failure (CCF). It further states that credited manual operator actions and their associated interfaces (controls, displays, and alarms) should be specifically addressed in the vendor/licensee/applicant's Human Factors Engineering (HFE) Program. The vendor/licensee/applicant should commit,	Standby – awaiting additional information from the licensee		An analysis, consistent with NUREG-0800, Appendix 18-A, will be provided demonstrating that the manual operator actions remain both feasible and reliable, and the ability to perform the actions reliably within the time available is maintained. The analysis will be provided in the HCGS PRNM Electronic Reading Room portal, in the second quarter of 2016. <u>PSEG would like to discuss some clarifications concerning Appendix 18-A</u>: a. Phase 3 vs Phase 1 required time: If the required time (and margin to time available) has been verified via Phase 3 ISV, is it still necessary to perform the Phase 1 time required estimate? b. For the two manual operator action items from the D3 report the HCGS Operators have multiple existing indications available. Consequently, PSEG does not need the simulator PRNM digital modification to support the18-A Phase 3 ISV; the existing plant/simulator configuration supports the

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		in the defense-in-depth submittal, to include the proposed defense-in-depth coping actions in an HFE Program consistent with that described in NUREG-0711 and to provide the results of the HFE Program to the staff prior to implementation of the proposed action(s). As stated in NUREG-0800, Appendix 18-A, to credit operator actions, an acceptable method would be to demonstrate that the manual actions in response to a BTP 7-19 software CCF are both feasible and reliable, given the time available, and that the ability of operators to perform credited actions reliably will be maintained for as long as the manual actions are necessary to satisfy the defense-in-depth analysis. Changes in plant design, including those that do not add, change, or delete the credited manual operator actions, may affect the ability of operators to correctly and reliably perform manual actions due to performance shaping factors (e.g., workload, time pressure) or other causes. Provide information regarding the analysis, consistent with NUREG-0800, Appendix A, that was used to demonstrate that the manual actions remain both feasible and reliable, and the ability to perform the actions reliably within the time available is maintained. The analysis should			ISV. The ISV is scheduled to be completed in March/April 2016. (Note: if simulator modifications were required before timing operator actions that could not be done until couple of months before modification implementation, ie 2018)

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		demonstrate that (1) the time available to perform the required manual actions is greater than the time required for the operator(s) to perform the actions, and (2) the operator(s) can perform the actions correctly and reliably in the time available. PSEG should provide sufficient information to demonstrate that the conclusions reached in the previously performed analysis regarding the feasibility and reliability of credited manual operator actions will remain valid in the post-modification environment (i.e., that the time available to perform the required manual actions and the time required to perform such actions will not be adversely affected by the proposed modification).			
16.	RA	System Requirements Appendix F defines the system requirements for the NUMAC PRNM system. It is not clear if these requirements reflect the system to be installed in HCGS. Specifically, does appendix F include the requirements for the modified components described in Appendix J?	New		3/15/2016 The Hope Creek System Requirements Specification (Appendix F) is plant specific. The following discussion elaborates on how the topics from Appendix J are addressed in the Hope Creek specifications. LTR Deviations 1. APRM Upscale / OPRM Upscale / APRM Inop. Appendix F1, Section 6.1 reflects this LTR deviation. NOTE: Appendix J Reference document 001N5636 can be provided in the reading room portal, if desired. This topic was discussed during previous PRNM projects. Please see, Enclosure 1 (Section 1.5 and

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					Appendix A) of ML12040A073, submitted for Columbia. 2. Time to Calculate Flow-biased Trip Setpoint. This clarifies a statement in the LTR but does not affect the NUMAC PRNM design. NOTE: Appendix J Reference document 001N5637 can be provided in the reading room portal, if desired. This topic was discussed during a previous PRNM project. Please see, Enclosure 1 of ML12040A073, submitted for Columbia. 3. Abnormal Conditions Leading to Inoperative Status. Appendix F2, Section 4.3.4.9 reflects this LTR deviation. NOTE: Appendix J Reference document 001N5635 can be provided in the reading room portal, if desired. This topic was discussed during a previous PRNM project. Please see Enclosure 1 of ML12040A073, submitted for Columbia. 4. OPRM Pre-Trip Alarms. Appendix F1, Section 4.3.1.2 reflects this LTR deviation. NOTE: Appendix J Reference document 001N5641 can be provided in the reading room portal, if desired. This topic was discussed during a previous PRNM project. Please see Appendix A (page A-5) of ML101790437, submitted for Grand Gulf (DSS-CD Plant like HCGS).

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					5. Increased Instrument Security. Appendix F1 Section 4.1 (traceable item 436R) provides the higher level requirement that the system provides a means to adjust user-configurable parameters, and Appendix F2 Section 4.4.14 (traceable item 2345R) incorporates the same feature at the instrument level. That the Hope Creek design implements increased security relative to previous applications may be seen by comparing it to a previous application. Please see Section 4.4.8 of 25A5916, APRM Performance Specification for CGS (Reference 64 and included in Appendix A) - ML12040A074 submitted for Columbia. That design includes an "OPER-SET" function, a function that enables the user to adjust a small number of select parameters after entering a password but without placing the instrument in INOP. PSEG elected to not include this feature at Hope Creek. NOTE: Appendix J Reference document 001N5640 can be provided in the reading room portal, if desired. 6. PRNM System Input Power Source. The deviation does not affect the PRNM design. Appendix F1 Section 7.5 reflects the type of input power as described in the Hope Creek LAR Attachment 1 Section 4.1.1 page 28 of 46, which deviates from what is described in the LTR. NOTE: Appendix J Reference document

No.	Resp.	Issue Description	Status	RAI No.	PSEG Response
					002N3909 can be provided in the reading room portal, if desired. <u>Differences from Columbia Generating Station PRNM</u> 1. OPRM Solution. Appendix F1 Section 4.1 (traceable item 225) and 4.3 reflect this difference. 2. Relay Logic Module. The new part is incorporated in schematics and bills of material, which may be placed in the reading room portal if desired. The design function is not changed and therefore does not affect Appendix F. 3. APRM High voltage Power Supply. Appendix F2 Section 4.4.2 (traceable item 2322) reflects this difference (note that Appendix F2 Table 4.3-1 erroneously points to Section 3.3.1 vs 4.4.2 for 'Manual LPRM I/V curve request'). 4. Display of Calibration Constants for LPRM Detector and Flow Signals. Appendix F2 Section 4.4.5 (traceable item 2287) reflects this difference. 5. Instrument Front Panel Display. The new part is incorporated in schematics and bills of material, which may be placed in the reading room portal if desired. The design function is not changed and therefore does

No.	Resp.	Issue Description	Status	RAI No.	PSEG Response
					not affect Appendix F.
17.	RA	System Requirements Appendix F defines the system requirements for the NUMAC PRNM system. There are requirements identified (use of the word SHALL) that do not include identifiers in brackets (e.g., Section 5.6). Then there are statements that seems more description than requirements (e.g., Sections 5.4 and 5.5). Clarify if all sections are requirements for the system.	New		3/15/2016 The requirements marked with brackets in Appendix F are identified for traceability purposes. Appendix F also includes several sections that are written in support of the requirements marked with brackets for traceability. Section 4 of Appendix F1 states "The primary system functions of the integrated NUMAC PRNM replacement system are summarized below, followed by a specific identification of the safety functions of the system. See Sections 5 and 6 for more details on the input and output requirements discussed in this section." Therefore, Sections 5 and 6 are also considered as requirements although these requirements would not be explicitly traced in downstream documents. For example, it would be cumbersome to establish traceability for the LPRM assignments in Section 5.1. However, each LPRM assignment will be verified and validated in the V&V activities. The bases for the V&V would be Section 5.1 of Appendix F.
18.					