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

April 4, 2012

LICENSEE: Pacific Gas and Electric Company

FACILITY: Diablo Canyon Power Plant, Unit Nos. 1 and 2

SUBJECT: SUMMARY OF MARCH 21, 2012, TELECONFERENCE MEETING WITH PACIFIC GAS AND ELECTRIC COMPANY ON DIGITAL REPLACEMENT OF THE PROCESS PROTECTION SYSTEM PORTION OF THE REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURES ACTUATION SYSTEM AT DIABLO CANYON POWER PLANT (TAC NOS. ME7522 AND ME7523)

On March 21, 2012, a Category 1 teleconference public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Pacific Gas and Electric Company (PG&E, the licensee) at NRC Headquarters, One White Flint North, 11555 Rockville, Maryland. The purpose of the teleconference meeting was to discuss the license amendment request (LAR) submitted by PG&E on October 26, 2011, for the Digital Replacement of the Process Protection System (PPS) Portion of the Reactor Trip System and Engineered Safety Features Actuation System at Diablo Canyon Power Plant, Unit Nos. 1 and 2 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML113070457). A list of attendees is provided in Enclosure 1.

The teleconference meeting is one in a series of publicly noticed teleconference meetings to be held approximately every 2 weeks to discuss issues associated with the NRC staff's LAR review. Preliminary issues that the NRC staff identified during its initial review and the licensee's responses to these preliminary issues were discussed during the teleconference meeting. The list of preliminary issues is provided in Enclosure 2.

During the discussion, the NRC staff indicated that in the near future it expects to address some of the issues identified in Enclosure 2 as requests for additional information. There was also a discussion that some detailed design information that would help the staff understand the LAR will be provided through a secure internet site that is password protected. The staff will review the material and determine if any of the documents need to be placed on the docket as part of the review.

Please direct any inquiries to me at 301-415-1132 or at Joseph.Sebrosky@nrc.gov.

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Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:
1. List of Attendees
2. Staff Identified Issues

cc w/encls: Distribution via Listserv

LIST OF ATTENDEES

MARCH 21, 2012, TELECONFERENCE MEETING WITH

PACIFIC GAS AND ELECTRIC COMPANY REGARDING

DIGITAL UPGRADE AT DIABLO CANYON POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-273 AND 50-323

NAME	ORGANIZATION
Scott Patterson	Pacific Gas and Electric
Bob Lint	Altran
John Hefler	Altran
J. Basso	Westinghouse
Steve Seaman	Westinghouse
Roman Shaffer	Invensys/Triconex
Bill Kemper	U.S. Nuclear Regulatory Commission
Rich Stattel	U.S. Nuclear Regulatory Commission
Bernard Dittman	U.S. Nuclear Regulatory Commission
Joe Sebrosky	U.S. Nuclear Regulatory Commission
Shiattin Makor	U. S. Nuclear Regulatory Commission
Geoffrey Miller	U. S. Nuclear Regulatory Commission
James Byam	Exelon
Gordon Clefton	Nuclear Energy Institute

No	Src/RI	Issue Description	P&GE response:	Status	RAI No. (Date Sent)	RAI Response (Due Date)	Comments
001	AR (BD)	[ISG-06 Enclosure B, Item 1.3] Deterministic Nature of Software: The Diablo Canyon Specific Application should identify the board access sequence and provide corresponding analysis associated with digital response time performance. This analysis should be of sufficient detail to enable the NRC staff to determine that the logic-cycle; a. has been implemented in conformance with the ALS Topical Report design basis, b. is deterministic, and c. the response time is derived from plant safety analysis performance requirements and in full consideration of communication errors that have been observed during equipment qualification. As stated in the LAR, information pertaining to response time performance will be submitted as a Phase 2 document. Please ensure this matter is addressed accordingly.	**P&GE response:** **ALS** Diablo Canyon PPS document 6116-00011, "ALS System Design Specification", Section 7.5, identifies the ALS board access sequence and provides an analysis associated with digital response time performance. a) The Diablo Canyon PPS ALS system is configured in accordance with the qualification requirements of the ALS platform topical report, b) The analysis in Diablo Canyon PPS document 6116-00011, "ALS System Design Specification", Section 7, describes a logic cycle that is deterministic. c) The requirements for the response time of the PPS processing instrumentation (from input conditioner to conditioned output signal) is specified as not to exceed 0.409 seconds in Section 3.2.1.10 of the "Diablo Canyon Power Plant Units 1 & 2 Process Protection System Replacement Functional Requirements Specification (FRS)", Revision 4 submitted as Attachment 7 of the LAR. In Section 1.5.8 of the "Diablo Canyon Power Plant Units 1 & 2 Process Protection System Replacement Interface Requirements Specification (IRS)", Revision 4, submitted as Attachment 8 of the LAR, the 0.409 seconds PPS processing instrumentation response time is allocated between the ALS and Tricon as follows:	Open	N/A		Response acceptable; waiting on PG&E to provide the time response calculation for the V10 Tricon PPS Replacement architecture by April 16, 2012.

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		ALS: 175 ms for RTD processing Tricon: 200 ms Contingency: 34 ms The 0.409 seconds PPS processing instrumentation value is the same as the value that is currently allocated to PPS processing instrumentation. As long as the 0.409 second PPS processing instrumentation value is not exceeded, the total response time values assumed in the plant safety analyses contained in FSAR Table 15.1-2 will not be exceeded; 7 seconds for Overtemperature ΔT RT and Overpower ΔT RT functions, 2 seconds for High pressurizer pressure RT, Low pressurizer pressure RT, and Low Low SG water level RT functions, 1 second for Low reactor coolant flow RT function, 25 seconds for Low pressurizer pressure, High containment pressure, and Low steam line pressure Safety Injection initiation, 60 seconds for Low low SG water level auxiliary feedwater initiation, 18 seconds for High containment pressure, Low pressurizer pressure, and Low steam line pressure Phase A containment isolation, 48.5 seconds for High High containment pressure containment spray initiation, 7 seconds for High High containment pressure steam line isolation, 66 seconds for High High SG water level auxiliary feedwater isolation, and 8 seconds for Low steam line pressure steam line isolation. The ALS response time will be verified as part of the FAT and the results will be included in the FAT summary report to be submitted by 12/31/12. **Tricon** Invensys provided detailed information on the deterministic operation of the V10 Tricon in Invensys Letter No. NRC V10-11-001, dated January 5, 2011. In support of the V10 Tricon safety evaluation, Invensys submitted document 9600164-731, Maximum Response Time Calculations, describing the worst-case response time for the V10 Tricon Qualification System. Included in document 9600164-731 are the standard equations for calculating worst-case response time of a given V10 Tricon configuration. The time response calculation for the V10 Tricon PPS Replacement architecture will be submitted by April 16, 2012. The System Response Time Confirmation Report, 993754-1-818, will be submitted to the staff as part of the ISG-06 Phase 2 submittals at the completion of factory acceptance testing of the V10 Tricon PPS Replacement. The Tricon response time will be verified as part of the FAT and the results will					The staff will likely need the Tricon time response calc's submitted on the docket. It is not efficient for the staff to travel to a remote facility to

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		be included in the FAT summary report to be submitted by 12/31/12.					audit SP calc's. PG&E stated that they will provide the Tricon Time response calc's in a document submitted on the docket.
002	AR (RA)	[ISG-06 Enclosure B, Item 1.4] Software Management Plan: Regulatory Guide (RG) 1.168, Revision 1, "Verification, Validation, Reviews and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," dated February 2004 endorses IEEE (Institute of Electrical and Electronics Engineers) 1012-1998, "IEEE Standard for Software Verification and Validation," and IEEE 1028-1997,"IEEE Standard for Software Reviews and Audits," with the exceptions stated in the Regulatory Position of RG 1.168. RG 1.168 describes a method acceptable to the NRC staff for complying with parts of the NRC's regulations for promoting high functional reliability and design quality in software used in safety systems. Standard Review Plan(SRP) Table 7-1 and Appendix 7.1-A identify Regulatory Guide 1.168 as SRP acceptance criteria for reactor trip systems (RTS) and for engineered safety features Westinghouse/ALS 6116-00000 Diablo Canyon PPS Management Plan, Figure 2-2, shows the Verification and Validation (V&V) organization reporting to the Project Manager. This is inconsistent with the information described in the ALS Management Plan for the generic system platform, where the V&V organization is independent form the Project Manager. This is also inconsistent with the criteria of RG 1.168 and will need to be reconciled during the LAR and ALS LTR reviews. **P&GE response:**		Open	N/A		Response acceptable; waiting on revised W/ALS PPS MP, which is due on March 29. 2012.

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		ALS The PPS Replacement LAR referenced Westinghouse document 6116-00000 Diablo Canyon PPS Management Plan, dated July 25, 2011, that was based on CSI document 6002-00003 ALS Verification and Validation Plan, Revision 4. CS Innovations subsequently submitted a revised V&V plan, "6002-00003 ALS Verification and Validation Plan", Revision 5, on November 11, 2011, that revised the required V&V organization structure such that the management of the verification personnel is separate and independent of the management of the development personnel. The Westinghouse 6116-00000 Diablo Canyon PPS Management Plan is being revised to require a V&V organization structure in which the management of the verification personnel is separate and independent of the management of the development personnel. PG&E will submit the revised Westinghouse 6116-00000 Diablo Canyon PPS Management Plan document by March 29, 2012.					
3	AR (RA)	[ISG-06 Enclosure B, Item 1.9] Software V&V Plan: The ALS V&V plan states that Project Manager of the supplier is responsible for providing directions during implementation of V&V activities. Also, the organization chart in the Diablo Canyon PPS Management Plan shows the IVV manager reporting to the PM. The ALS V&V plan described in ISG6 matrix for the ALS platform and the Diablo Canyon PPS Management Plan do not provide sufficient information about the activities to be performed during V&V. For example, the ALS V&V Plan states that for project specific systems, V&V activities are determined on a project by project basis and are described in the project Management Plan, in this case, 6116-00000, "Diablo Canyon PPS Management Plan." However, the 6116-00000 Diablo Canyon PPS Management Plan states: "See the ALS V&V Plan for more information and the interface between the IV&V team and the PPS Replacement project team." The Triconex V&V plan states that the Engineering Project Plan defines the scope for V&V activities. As mentioned before, the Triconex EPP is not listed in the ISG6 matrix. These items will need further clarification during the LAR review to demonstrate compliance with Regulatory Guide (RG) 1.168, Revision 1,		Open	N/A		**Status: Fig. 3 of the PPS SVVP (Pg. 16/46) indicates sufficient organizational independence between the Nuclear Delivery (Design) Organization and the IV&V Organization.** **Fig. 3 of the PPS PMP (993754-1-905) (pg. 22/81) also denotes the**

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		"Verification, Validation, Reviews and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants,"					**DCPP PPS project organization, and provides sufficient independence between the ND and IV&V Organizations.** **Close the Invensys part of the OI.** **W/ALS response acceptable; waiting on revised W/ALS PPS MP, which is due on March 29. 2012.** **Status: Fig. 3 of the PPS SVVP (Pg. 16/46) indicates sufficient organizational independence between the Nuclear Delivery (Design)**
		P&GE response: **ALS** The Westinghouse 6116-00000 Diablo Canyon PPS Management Plan is being revised to include details on how the IV&V team has an independent organizational reporting structure from the design and implementation team; the Scottsdale Operations Director and the ALS Platform & Systems Director report to different Westinghouse Vice Presidents. The IVV Manager and Scottsdale Operations Director both report to the same Westinghouse Vice President, but via independent reporting structures. Description of 6116-00000 Diablo Canyon PPS Management Plan V&V activity updates - IN PROGRESS PG&E will submit the revised Westinghouse 6116-00000 Diablo Canyon PPS Management Plan that includes the above changes by March 29, 2012. **Tricon** The organizational structure of Invensys Operations Management comprises, in part, Engineering and Nuclear Delivery. Each of these organizations plays a specific role in the V10 Tricon application project life cycle. Invensys Engineering is responsible for designing and maintaining the V10 Tricon platform, and Nuclear Delivery is responsible for working with nuclear customers on safety-related V10 Tricon system integration projects. Invensys Engineering department procedures require "Engineering Project Plans (EPP)," whereas Nuclear Delivery department procedures require "Project Plans." Invensys Engineering is not directly involved in system integration, but Nuclear Delivery may consult with Engineering on technical issues related to the V10 Tricon platform. The NRC applied ISG-06 to the V10 Tricon safety evaluation. Invensys submitted a number of documents pertaining to the design of the V10 Tricon platform as well as process and procedure documents governing Invensys				

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		Engineering activities, including the EPP. In most cases, these platform-related documents are preceded with document number *9600164*. The platform-level documents reviewed by the staff during the V10 Tricon safety evaluation will not be resubmitted by Nuclear Delivery during application-specific system integration projects. In support of the PG&E LAR for the DCPP PPS Replacement, Invensys Nuclear Delivery is required to submit the application design documents as defined in ISG-06. These project documents are preceded by document number *993754*. The Phase 1 submittal under Invensys Project Letter 993754-026T, dated October 26, 2011, contained, in part, the following: PPS Replacement Project Management Plan (PMP), 993754-1-905. "Project Management Plan" was used to more closely match BTP 7-14 with regard to "management plans"; and PPS Replacement Software Verification and Validation Plan (SVVP), 993754-1-802. The PMP describes the PPS Replacement Project management activities within the Invensys scope of supply. The guidance documents BTP 7-14 and NUREG/CR-6101 were used as input during development of the PMP. With regard to compliance with RG 1.168, the PPS Replacement PMP and SVVP both describe the organizational structure and interfaces of the PPS Replacement Project. The documents describe the Nuclear Delivery (ND) design team structure and responsibilities, the Nuclear Independent Verification and Validation (IV&V) team structure and responsibilities, the interfaces between ND and Nuclear IV&V, lines of reporting, and degree of independence between ND and Nuclear IV&V. In addition, the PMP describes organizational boundaries between Invensys and the other external entities involved in the PPS Replacement project: PG&E, Altran, Westinghouse, and Invensys suppliers. The combination of the PMP and SVVP demonstrate compliance of the Invensys organization with RG 1.168.				**Organization and the IV&V Organization.** **Fig. 3 of the PPS PMP (993754-1-905) (pg. 22/81) also denotes the DCPP PPS project organization, and provides sufficient independence between the ND and IV&V Organizations.** **Close the Invensys part of the OI.**

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4	AR (RA)	[ISG-06 Enclosure B, Item 1.10] Software Configuration Management Plan: The LAR includes PG&E CF2.ID2, "Software Configuration Management for Plant Operations and Operations Support," in Attachment 12. However, the document provided in Attachment 12 only provides a guideline for preparing Software Configuration Management (SCM) and SQA plans. Though it is understood that the licensee will not perform development of software, PGE personnel will become responsible for maintaining configuration control over software upon delivery from the vendor. The staff requires the actual plan to be used by the licensee for maintaining configuration control over PPS software in order to evaluate against the acceptance criteria of the SRP. For example, the ALS Configuration Management (CM) Plan (6002-00002) describes initial design activities related to ALS generic boards. This plan does describe the configuration management activities to be used for the development and application of the ALS platform for the Diablo Canyon PPS System. The staff requires that configuration management for this design be described in the DCPP project specific plan. These items will need further clarification during the LAR review to demonstrate compliance with BTP-14.		Open	N/A		
		P&GE response: PG&E will develop a SyCMP procedure to address configuration control after shipment of equipment from the vendor and will submit the document by May 31, 2012.					

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5	AR (RA)	[ISG-06 Enclosure B, Item 1.11] Software Test Plan: The V10 platform documents identified in ISG6 matrix state that the interface between the NGIO (Next Generation Input Output) Core Software and IO-specific software will not be tested. It is not clear when and how this interface will be tested, and why this test is not part of the software unit testing and integration testing activities. Further, the 993754-1-813 Diablo Canyon Triconex PPS Validation Test Plan states that the DCPP's TSAP will not be loaded on the system; instead Triconex will use another TSAP for the validation test. It is not clear why the DCPP's TSAP will not be used for the validation test or when the DCPP's TSAP will be loaded on the system and validated for the Diablo Canyon PPS System. These items will need further clarification during the LAR review to demonstrate compliance with BTP-14.		Closed	N/A		NGIO Core software is tested and qualified as a platform component. As such, it does not need to be separately tested during the application development process.
	(BK)	Follow-on question pertaining to the PPS VTM: Section 1.4.4 (pg. 12/38) states "The network equipment, including media converter, NetOptics Network Aggregator Tap, and gateway hub, and the MWS will not be within the test scope of this VTP. The Nuclear Delivery (ND) group will coordinate with Pacific Gas & Electric for system staging prior to turn over to Nuclear IV&V. The Nuclear IV&V group will confirm proper operation of network communications system interfaces before beginning testing addressed in this VTP." When, where, and what procedures will be used to test the network equipment?? Also, section 5.1.4 (3) Hardware Validation Tests states that the ALS equipment will not be included in the FAT (pg. 27/38) . Where, when, and what procedures will be used to fully test the Integrated PPS system (both Tricon V10 and ALS platforms together) be subjected to FAT.					TSAP is a Test Specimen Application Program used for purposes of platform qualification. Invensys stated that The Diablo Canyon Application will be loaded onto plant system hardware during FAT.
		P&GE response: **Tricon** The next-generation input/output (I/O) modules qualified for the V10 Tricon are the 3721N 4-20 mA, 32-point analog input (AI) module, and the 3625N 24 Vdc, 32-point digital output (DO) module. Technical data on these two					

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		modules was provided to the NRC in support of the V10 Tricon safety evaluation. Configuration and functional testing is performed when the I/O modules (hardware and embedded core firmware) are manufactured. From the factory the I/O modules are shipped to Invensys Nuclear Delivery for use in nuclear system integration projects, i.e., application specific configurations. Because the module hardware and embedded core firmware are within the scope of the V10 Tricon safety evaluation, the verification and validation of the embedded core firmware will not be repeated as part of application-specific system integration projects. There are certain design items that must be done with TriStation 1131 (TS1131), such as specifying which I/O module is installed in a particular physical slot of the Tricon chassis, resulting in each module having a unique hardware address in the system. Also, TS1131 is used to specify which application program parameters (i.e., program variable tagnames) are assigned to a particular point on a given I/O module. The design items configured in TS1131 will be within the scope of validation activities conducted by Invensys Nuclear IV&V for application-specific system integration projects. The necessary collateral (system build documents, configuration tables, test procedures, test results, etc.) will be submitted to the NRC to support the staff's technical review of the PPS Replacement LAR in accordance with ISG-06. The Phase 1 submittal under Invensys Project Letter 993754-026T, dated October 26, 2011, contained, in part, the Validation Test Plan (VTP), 993754-1-813. This document describes the scope, approach, and resources of the testing activities that are required for validation testing of the V10 Tricon portion of the PPS Replacement, including: Preparing for and conducting system integration tests Defining technical inputs to validation planning Defining the test tools and environment necessary for system validation testing Scheduling (and resource loading of the schedule)				Staff re-examined Invensys doc. "Validation Test Plan (VTP), 993754-1-813," Section 1.3.2 of the VTP that describes the Hardware Validation Test activities and Section 1.3.3 of the VTP and determined that **the application program TSAP will be used for the FAT (Section 5.1.5 FAT) Close this portion of the OI.**

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		Section 1.3.2 of the VTP describes the Hardware Validation Test activities and Section 1.3.3 of the VTP describes the V10 Tricon portion of the Factory Acceptance Test activities for the V10 Tricon portion of the PPS Replacement. Details on the application program are proprietary and need to be provided to the staff separately.					.
6	AR (SM)	[ISG-06 Enclosure B, Item 1.14] Equipment Qualification Testing Plans - The LAR Sections 4.6, 4.10.2.4 and 4.11.1.2 provide little information on the plant specific application environmental factors. The Tricon V10 Safety Evaluation, ML 11298A246, Section 6.2 lists 19 application specific actions Items (ASAI's) that the licensee should address for plant specific applications. The licensee should address each of these for Tricon portion of the PPS replacement. Similar information for the ALS portion of the PPS replacement will also be required.	**P&GE response:** **ALS** PG&E will respond to ALS ASAI's when they are available. **Tricon** IN PROGRESS. All of the Application Specific Action Items for the Tricon V10 will be addressed by March 29 2012 in a submittal to the NRC.	Closed	Develop a generic RAI to provide a response to ASAIs for both platforms when the SERs are issued.		Staff agreed that PG&E should submit a separate submittal (LAR amendment) to address the ASAIs for both platforms. it is not necessary to delineate exactly what will be done for each ASAI in this OI matrix.
7	AR (BK)	[ISG-06 Enclosure B, Item 1.16] Design Analysis Reports: The LAR does not appear to comply with the SRP (ISG-04) regarding the connectivity of the Maintenance Work Station to the PPS. The TriStation V10 platform relies on software to effect the disconnection of the TriStation's capability to modify the safety system software. Based on the information provided in the LTR, the NRC staff determined that the Tricon V10 platform does not comply with the NRC		Open	N/A		Waiting for t he the V10 Tricon portion of the PPS Replacement Failure Modes and Effects Analysis, an

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		guidance provided in ISG-04, Highly Integrated Control Rooms—Communications Issues, (ADAMS Accession No. ML083310185), Staff Position 1, Point 10, hence the DCPP PPS configuration does not fully comply with this guidance. In order for the NRC staff to accept this keyswitch function as an acceptable deviation to this staff position, the staff will have to evaluate the DCPP PPS specific system communications control configuration--including the operation of the keyswitch, the software affected by the keyswitch, and any testing performed on failures of the hardware and software associated with the keyswitch. The status of the ALS platform on this matter is unclear at this time and will be resolved as the ALS LTR review is completed. Moreover, the Tricon V10 system Operational Mode Change (OMC) keyswitch does change operational modes of the 3008N MPs and enables the TriStation 1131 PC to change parameters, software algorithms, etc, related to the application program of the safety channel without the channel or division being in bypass or in trip. As stated in Section 3.1.3.2 of the Tricon V10 SER, the TriStation 1131 PC should not normally be connected while the Tricon V10 is operational and performing safety critical functions. However, it is physically possible for the TriStation PC to be connected at all times, and this should be strictly controlled via administrative controls (e.g., place the respective channel out of service while changing the software, parameters, etc). The LAR does not mention any administrative controls such as this to control the operation of the OMC (operational mode change) keyswitch. Furthermore, in order to leave the non-safety TriStation 1131 PC attached to the SR Tricon V10 system while the key switch is in the RUN position, a detailed FMEA of the TriStation 1131 PC system will be required to ascertain the potential effects this non-safety PC may have on the execution of the safety application program/operability of the channel or division. These issues must be addressed in order for the NRC staff to determine that the DCPP PPS complies with the NRC Staff Guidance provided in Staff Position 1, Point 11. The status of the ALS platform on this point is unclear at this time. **P&GE response:**				ISG-06 Phase 2 document to be submitted to NRC in May 2012. PG&E/Invensys needs to provide a technical explanation of how the MP3008N processor actually ignores all commands when in RUN—address the items in the OI. This issue will also have to be addressed for the ALS platform.

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		Tricon The OMC keyswitch controls only the mode of the V10 Tricon 3008N MPs. In RUN position the 3008N MPs ignore* all commands from external devices, whether WRITE commands from external operator interfaces or program-related commands from TS1131. Multiple hardware and software failures would have to occur on the V10 Tricon (in combination with human-performance errors in the control room and at the computer with TS1131 installed) in order for the application program to be inadvertently reprogrammed. Therefore, there is no credible single failure on the V10 Tricon that would allow the safety-related application program to be inadvertently programmed, e.g., as a result of unexpected operation of the connected computer with TS1131 installed on it. The above conclusion will be confirmed (for the V10 Tricon portion of the PPS Replacement) in the Failure Modes and Effects Analysis, an ISG-06 Phase 2 document planned for submittal to NRC in May 2012. Additionally, Invensys Operations Management will support the staff's review of the hardware and software associated with the OMC keyswitch by making all of the technical data available for audit. *TS1131 contains function blocks that allow WRITE-access to a limited set of parameters programmed into the application software, but only for a limited duration after which the capability is disabled until WRITE-access is re-enabled. However, without these function blocks programmed into the application program neither the application program nor application program parameters can be modified with the OMC keyswitch in the RUN position. **PG&E** Administrative controls on use of keyswitch will be provided with commitment to include in procedures in response. Note, TS1131 is not used to change setpoints and protection set is inoperable when keyswitch is not in RUN position.				PG&E/Invensys needs to provide a technical explanation of how the MP3008N processor actually ignores all commands when in

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							RUN—address the items in the OI.
8	AR (RS)	[ISG-06 Enclosure B, Item 1.21] Setpoint Methodology: The NRC staff understands that a summary of SP (setpoint) Calculations will be provided in Phase 2, however, section 4.10.3.8 of the LAR also states that PGE plans to submit a separate LAR to adopt TSTF 493. The NRC cannot accept this dependency on an unapproved future licensing action. The staff therefore expects the licensee to submit a summary of setpoint calculations which includes a discussion of the methods used for determining as-found and as-left tolerances. This submittal should satisfy all of the informational requirements set forth in ISG6 section D.9.4.3.8 without a condition of TSTF 493 LAR approval	**P&GE response:** The evaluation of the setpoints for the PPS replacement will need to be performed by Westinghouse in two phases in order to provide sufficient documentation to support 95/95 two-sided uncertainty values for the setpoints. This is because the NRC staff has been requesting additional information and additional data and analysis to demonstrate that the uncertainties used in the setpoint calculation have been based on a statistically sufficient quantity of sample data to bound the assumed values (to justify the confidence level of the calculation is appropriate) during recent Westinghouse projects involving setpoints. Significant information is required from the transmitter and RTD vendors, that has never been obtained before, to support development of calculations that can support 95/95 two-sided uncertainty values. The first phase of the evaluation of the setpoints will include evaluation of the PPS replacement setpoints for the Tricon and ALS architecture using expected bounding uncertainty values. A setpoint summary evaluation which includes a discussion of the methods used for determining the as-found and as-left tolerances will be submitted by May 31, 2012. This is a change to the commitment 31 in Attachment 1 to the Enclosure to the PPS Replacement	Open	N/A		

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		LAR. The second phase of the evaluation of the setpoints will include development of Westinghouse calculations of the PPS replacement setpoints for the Tricon and ALS architecture using sufficient information from vendors to substantiate that the setpoints are based on 95/95 two-sided uncertainty values. The Westinghouse calculations will be completed by December 31, 2012 and will be available for inspection by NRC staff in Washington DC with support provided by Westinghouse setpoint group personnel. The NRC staff inspection of Westinghouse calculations in Washington DC has been performed for another recent utility project involving setpoints.					
9	AR (BK)	LTR Safety Conclusion Scope and Applicability - Many important sections of the DCPP PPS LAR refer the reader to the ALS licensing topical report (LTR) to demonstrate compliance of the system with various Clauses of IEEE 603-1991, IEEE 7-4.3.2-203, and ISG-04. However, many important sections of the ALS LTR state that compliance with various Clauses of these IEEE Stds and ISG-04 are application specific and refer the reader to an application specific license amendment submittal (i.e., the DCPP PPS LAR in this case). The staff has not yet had time to evaluate all the LAR information in detail and compare this information with that provided in the ALS LTR to ensure there is no missing information. However, PG&E and its contractors are encouraged to review these two licensing submittals promptly to verify that compliance with these IEEE Stds and ISG-04 are adequately addressed within both licensing documents.	**P&GE response:** IN PROGRESS, review by Westinghouse and PG&E to date has not found a clause where no justification is provided in LAR.	Open	N/A		
10	RS	Plant Variable PPS Scope - In the Description section of the LAR, section 4.1.3, nine plant variables are defined as being required for RTS and section 4.1.4 lists seven plant variables that are required for the ESFAS. Three additional plant variables were also listed in section 4.10.3.4.		Closed	1		

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		Some variables are not listed in section 4.10.3.4 as being PPS monitored plant parameters. It is therefore assumed that these parameters are provided as direct inputs to the SSPS and that the PPS is not relied upon for the completion of required reactor trip or safety functions associated with them. Please confirm that these plant parameters and associated safety functions will continue to operate independently from the PPS and that the replacement PPS will not adversely impact the system's ability to reliably perform these functions.					
		P&GE response: The PPS Replacement LAR Sections 4.1.3 and 4.1.4 describe the plant variables from which RTS and ESFAS protective functions are generated. The initiation signal outputs to the SSPS coincidence logic are generated in the PPS or other, independent systems, or in some cases, by discrete devices. Section 4.1.3 items 6 (RCP bus UF, UV, and breaker position, 8 (Main Turbine trip fluid pressure and stop valve position) and 9 (seismic acceleration) are generated by discrete devices outside the PPS and provide direct contact inputs to the SSPS. Section 1.4 items 6 (Containment Exhaust Radiation) and 7 (RT breaker position Permissive P-4) are also generated outside the PPS and are direct contact inputs to the SSPS. The initiation signals associated with these plant parameters operate independently from the PPS. The replacement PPS will not adversely affect the reliable performance of the safety functions associated with these plant parameters. The three signals (Wide Range RCS Temperature and Pressure and Turbine Impulse Chamber Pressure) not listed in Sections 4.1.3 and 4.1.4 are monitored by the PPS per Section 4.10.3.4. The Wide Range RCS Pressure and Temperature signals are used to generate the LTOP function described in DCPP FSAR Section 5. The PPS uses Turbine Impulse Chamber Pressure to generate an initiation signal that is used by the SSPS					Neutron Flux is an input to Tricon but it is not listed in Table 4-2 "Process Variable inputs to Tricon" Signals not associated with PPS functions will be designated as such in the SE and they will not be described since they are not in scope.

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		coincidence logic to develop Permissive P-13 as discussed in RAI 3, below. Neutron Flux should be added to Section 4.2 Table 4-2 as follows: Neutron Flux (Power Range, Upper & Lower) — Input to Overtemperature Δ Temperature (OTDT) RT; Input to Overpower Δ Temperature (OPDT) RT					
11	RS	Power Range NIS Function - Section 4.1.7 describes the Existing Power Range NIS Protection Functions and it states that the Power Range nuclear instrumentation provides input to the OTDT, and OPDT protection channels. It is not entirely clear whether any of the described NIS protection functions will be performed by the PPS system. Please clarify exactly what the role of the PPS system is for these NIS Protection functions.	**P&GE response:** Power range analog inputs are provided by the NIS to each PPS Protection Set for use in the calculation of the Overtemperature Delta-T and Overpower Delta-T Setpoint in the Delta-T/Tavg channels. No other NIS signals interface with the PPS. The NIS Protection functions (RT and power range permissives) are generated independently by Nuclear Instrumentation bistable comparators. The NIS bistable outputs are sent directly to the SSPS and have no physical interface with the PPS.	Closed* *RAI still needs to be sent.	2		Only PPS Functions will be described in the SE.
12	RS	Permissive Functions - Several Permissive functions are described within the LAR. It is not clear to the staff whether any of these functions are to be performed by the PPS or if the PPS will only be providing input to external systems that in turn perform the permissive logic described in the LAR. Section 4.1.9 states that "Settings of the bistable comparators used to develop the permissives are not affected by the PPS Replacement Project", which implies that all of these permissive functions are performed by systems other than the PPS. However, it is still unclear if this statement applies to all permissive functions described throughout the LAR or if it applies only to		Open	3		

No	Src/RI	Issue Description	P&GE response:	Status	RAI No. (Date Sent)	RAI Response (Due Date)	Comments
		those permissives relating to Pressurizer Pressure. It is also possible that the permissive functions are being performed by the existing PPS and will continue to be performed by the replacement system and therefore remain "not affected" by the PPS replacement project. Please provide additional information for the following permissive functions to clearly define what the role of the PPS system will be for each. P-4 Reactor Trip P-6 Intermediate Range Permissive P-7 Low Power Permissive (Bypasses low P_{pzr} reactor trip) * P-8 Loss of Flow Permissive P-9 Power Permissive P-10 Power Range Power Low Permissive P-11 Low Pressurizer Pressure SI Operational Bypass P-12 No-Load Low-Low T_{ave} Temperature Permissive P-13 Turbine Low Power Permissive * P-14 Hi-Hi Steam Generator Level * The LAR states that "These signals are generated in the PPS"				
		P&GE response: Permissive function initiation signals generated within the existing PPS will continue to be performed by the replacement PPS and therefore remain "not affected" by the PPS replacement project. Permissive function initiation signals that are generated independently of the existing PPS will continue to be generated independently. • Permissive P6, P-8, P-9, and P-10 initiation signals are bistable comparator outputs from the independent NIS to the SSPS. There is no interface with the PPS. • Permissive P-4 initiation signals are direct contact inputs to the SSPS coincidence logic generated from contacts in the Reactor Trip Breakers (RTB). There is no interface with the PPS. • Permissive P-11, P-12, P-13, and P-14 initiation signals are				The response states that P14 is generated in the NIS independently from PPS and it states that P14 is generated by the

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		generated by bistable comparator outputs generated in the PPS and sent to the SSPS. • Permissive P-7 is generated in the SSPS from 3 out of 4 power range NI channels (from NIS - P-10) below setpoint and 2/2 turbine impulse chamber pressure channels below setpoint (From PPS – P13). The bistable initiation signals described above are monitored by the SSPS. The SSPS generates the Permissive when appropriate coincidence of initiation signals is detected. No SSPS permissive or safety function coincidence logic is changed by the PPS replacement project. Permissives P-6, P-7, P-8, P-9, P-10, and P-13 are functionally described in FSAR Table 7.2-2. Permissives P-4, P-11, P-12, and P-14 are functionally described in FSAR Table 7.3-3. The bistable comparator setpoints for the above-listed permissives are not expected to change at this time.					PPS. Which is it? The coincidence of P7 is not performed as a function of PPS. The NRC understands that only P11, P13, and P14 are developed within the PPS system. All other permissives are generated by external systems independently of the PPS. See 13 below.
13	RS	P12 Permissive Contradiction - The second paragraph of section 4.1.20 describes the P-12 interlock and states that "These signals are developed in the PPS". This statement is then contradicted in the third paragraph by the following statement; "These valves are not safety-related, but are interlocked with the P-12 signal from the SSPS." In conjunction with the response to RAI3, please provide a resolution for this contradiction in section 4.1.20 of the LAR.	**P&GE response:** The word "signals" in the referenced Section 4.1.20 sentence, "These signals	Open	4		The NRC understands that the P12 signal is generated by the SSPS using signals developed in the PPS.

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		are developed..." is referring to the bistable comparator outputs which are monitored by the SSPS. The PPS does not generate the P-12 Permissive itself. The actual P-12 Permissive is generated by the SSPS when appropriate coincidence of initiation signals is detected. The SSPS output is interlocked with the valves as stated in the third paragraph of Section 4.1.20. The LAR Section 4.1.20 is clarified by the following statement: "...The P-12 Permissive is developed in the SSPS based on coincidence of the P-12 bistable comparator output initiation signals from the PPS... Protection System Permissives (P-11 unblock SI from ALS, P13 Turbine power permissive from Tricon, and P-14 Steam Generator Level high-high from Tricon) are generated by coincident logic in the SSPS based on initiating signals (bistable outputs) from the PPS as noted in the response to OI #12. Permissive development, including initiating signals and logic coincidence is shown in FSARU Tables 7.2-2 (RTS) and 7.3-3 (ESFAS). The PPS does not perform coincident logic functions and does not "generate" any protection system permissives.					Does this response also apply to the P11, P13, and P14 permissives? If so then no permissives are generated by the PPS. Is that correct?
14		Section 4.1.1 SSPS contains the following statement in the last paragraph; *"Information concerning the PPS status is transmitted to the control board status lamps and annunciators by way of the SSPS control board demultiplexer and to the PPS by way of the SSPS computer demultiplexer."* Why would the PPS status need to be transmitted to the PPS as the sentence suggests in the last phrase?		New			
		PG&E response: The sentence in Section 4.1.1 contains a a typographical error. The sentence should read: "Information concerning the PPS status is transmitted to the control board status lamps and annunciators by way of the SSPS control board demultiplexer and to the *Plant Process Computer (PPC)* by way of the SSPS computer demultiplexer."					

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		As used in the Section 4.1.1. paragraph, "PPS Status" means "PPS Channel Trip Status."					
15	(BK)	An ISG-04 compliance matrix for the DCPP PPS system was not submitted with, or referenced in, the LAR for the W/ALS platform. Instead the ISG-04 compliance section 4.8 of the LAR refers the reader to the ALS LTR for nearly all the points of ISG-04. Fig. 4.4 and 4.5 of the LAR indicate various 1E and non-1E communication pathways to and from ALS processor (e.g., Maintenance Work Station, plant computer, prococess control, port aggregator, and 4-20 ma temperature signal to Tricon processor). These are all application specific features of the PPS and the staff expects a W/CSI ALS document to be submitted similar to the Invensys "PACIFIC GAS & ELECTRIC COMPANY NUCLEAR SAFETY-RELATED PROCESS PROTECTION SYSTEM REPLACEMENT DIABLO CANYON POWER PLANT DI&C-ISG-04 CONFORMANCE REPORT" Document No. 993754-1-912 Revision 0, to be submitted on the docket, which explains how the ALS portion of the PPS application comforms with the guidance of ISG-04.		New			
		PG&E response: Westinghouse will provide a DCPP PPS specific ISG-4 Compliance Table by March 31, 2012 and PG&E will submit the Table by May 31, 2012.					

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16	(BK)	Section 1.4.4 (pg. 12/38) of document 993754-1-813 Diablo Canyon Triconex PPS Validation Test Plan (VTM) states "The network equipment, including media converter, NetOptics Network Aggregator Tap, and gateway hub, and the MWS will not be within the test scope of this VTP. The Nuclear Delivery (ND) group will coordinate with Pacific Gas & Electric for system staging prior to turn over to Nuclear IV&V. The Nuclear IV&V group will confirm proper operation of network communications system interfaces before beginning testing addressed in this VTP." When, where, and what procedures will be used to test the network equipment??		New			
		PG&E response: IN PROGRESS					
17	(BK)	Section 5.1.4.3, Hardware Validation Tests, (pg. 27/38) of document 993754-1-813 Diablo Canyon Triconex PPS Validation Test Plan (VTM) states that the ALS equipment will not be included in the FAT. Where, when, and what procedures will be used to fully test the Integrated PPS system (both Tricon V10 and ALS platforms together) be subjected to FAT.		New			
		PG&E response: IN PROGRESS					

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18	(BK)	Software Management Plan: Regulatory Guide (RG) 1.168, Revision 1, "Verification, Validation, Reviews and Audits for Digital Computer Software Used in Safety Systems of Nuclear Power Plants," dated February 2004 endorses IEEE (Institute of Electrical and Electronics Engineers) 1012-1998, "IEEE Standard for Software Verification and Validation," and IEEE 1028-1997,"IEEE Standard for Software Reviews and Audits," with the exceptions stated in the Regulatory Position of RG 1.168. RG 1.168 describes a method acceptable to the NRC staff for complying with parts of the NRC's regulations for promoting high functional reliability and design quality in software used in safety systems. Standard Review Plan (SRP) Table 7-1 and Appendix 7.1-A identify Regulatory Guide 1.168 as SRP acceptance criteria for reactor trip systems (RTS) and for engineered safety features actuation systems (ESFAS) The Invensys PPS Replacement Software Verification and Validation Plan (SVVP), 993754-1-802 does not provide a clear explanation of how the Invensys SVVP complies with IEEE 1012-1998. Please provide a cross reference table that explains how the Invensys SVVP implements the criteria of IEEE 1012-1998. Also, the Westinghouse/ALS 6116-00000 Diablo Canyon PPS Management Plan, does not provide a clear explanation of how the CSI SVVP complies with IEEE 1012-1998. Please provide a cross reference table that explains how the W/CSI SVVP implements the criteria of IEEE 1012-1998.		New			

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		PG&E response: Westinghouse will provide an IEEE-1012 compliance map by May 4, 2012 to PG&E and PG&E will submit the matrix to the staff by May 31, 2012.					
19	RS	**Section 4.1.1 of the LAR states that;** *"The SSPS evaluates the signals and performs RTS and ESFAS functions to mitigate* ***Abnormal Operational Occurrences and Design Basis Events described in FSAR [26] Chapter 15.****"* however, Chapter 15 of the DCPP FSAR does not use the terms Abnormal Operational Occurrence (AOO) or Design Basis Accident (DBE). Instead, the accident analysis in chapter 15 identifies conditions as follows; CONDITION I - NORMAL OPERATION AND OPERATIONAL TRANSIENTS CONDITION II - FAULTS OF MODERATE FREQUENCY CONDITION III - INFREQUENT FAULTS CONDITION IV - LIMITING FAULTS		New			

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		As such, the statement that AOO's and DBE's are described in the FSAR appears to be inaccurate. Please explain the correlation between the Conditions described in FSAR chapter 15 and the Abnormal Operational Occurrences, and Design Basis Events described in the LAR.					
		PG&E response: IN PROGRESS					

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20	RS	The system description provided in Section 4 of the LAR includes "functions performed by other protective systems at DCPP in addition to the PPS functions". In many cases, there is no explanation of what system is performing the functions described nor is there a clarification of whether the described functions are being performed by the PPS system. As an example, Section 4.1.16 describes a bypass function to support testing of the high-high containment pressure channel to meet requirements of IEEE 279 and IEEE 603. The description of this function does not however, state whether this latch feature is being implemented within the PPS system or in the SSPS. The staff needs to have a clear understanding of the functional scope of the PPS system being modified in order to make its regulatory compliance determinations. Please provide additional information such as PPS function diagrams to help the staff distinguish PPS functions from functions performed by other external systems. PG&E Response: IN PROGRESS		New			The NRC could consider auditing the system Function Diagrams in lieu of having them submitted.
21	RA	Westinghouse/CSI document 6116-00005, "Diablo Canyon PPS System Test Plan," states that the ALS-102 FPGA design is changed for the DCPPS System. Further, Section 5.3.3 states: "Test as many of the ALS-102 requirements as possible." Please identify what document describes the design verification test for this board.	PG&E response: The ALS-102 product subsystem-level test verification will be covered in CS Innovations document 6116-70140, "Diablo Canyon PPS System Test Design Specification". Document 6116-70140 will be submitted to the NRC by TBD.	New			

Please direct any inquiries to me at 301-415-1132 or at Joseph.Sebrosky@nrc.gov.

/RA/

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Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-275 and 50-323

Enclosures:
1. List of Attendees
2. Staff Identified Issues

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