Burkhardt, Janet

From: Lingam, Siva
Sent: Wednesday, December 23, 2015 2:22 PM
To: Schrader, Kenneth (KJSe@pge.com)
Cc: Pascarelli, Robert; Waters, Michael; Stattel, Richard; Alvarado, Rossnyev; Huckabay, Victoria; Darbali, Samir; 'mjrm@pge.com'; Thatipamala, Ramakrishna
Subject: Diablo Canyon 1 and 2 - RAIs for Digital Replacement of the Process Protection System LAR (TAC Nos. ME7522 and ME7523)

By letter dated October 26, 2011, as supplemented by letters dated December 20, 2011; and April 2, April 30, June 6, August 2, September 11, November 27 and December 5, 2012; and March 7, March 25, April 30, May 9, May 30, and September 17, 2013; and April 24 and April 30, 2014; and February 2 and June 22, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML113070457, ML113610541, ML12094A072, ML12131A513, ML12170A837, ML12222A094, ML12256A308, ML13004A468, ML12342A149, ML13267A129, ML13093A311, ML13121A089, ML13130A059, ML13154A049, ML13261A354, ML14205A031, ML14121A002, ML15062A386, and ML15173A469, respectively), Pacific Gas and Electric (PG&E, the licensee), requested the U.S. Nuclear Regulatory Commission (NRC) staff's approval of an amendment for the Diablo Canyon Power Plant, Units 1 and 2 (DCPP). The proposed license amendment request (LAR) would provide a digital replacement of the Process Protection System (PPS) portion of the Reactor Trip System and Engineered Safety Features Actuation System at DCPP.

Please note the following **official** requests for additional information (RAIs) for the subject LAR. Please provide your responses by January 21, 2016, as suggested by you. We transmitted draft RAIs 71 through 75 to you on September 21, 2015, RAI 76 during June 22-26, 2015, audit by NRC staff at the Westinghouse facility in Warrendale, Pennsylvania, and RAI 77 on December 1, 2015, and we had a clarification call on December 22, 2015. Your timely responses will allow the NRC staff to complete its review on schedule.

71. (Open Item (OI) 115) Electro Magnetic Compatibility (Tricon):

    Section 4.14 – ASAI-6 of the LAR states the equipment vendors are required to confirm equipment compliance with physical requirements in the DCPP Functional Requirements Specification (FRS). These requirements include the Electro Magnetic Compatibility (EMC) requirements from Section 3.1.6 of the PPS FRS, which states: "the PPS shall be qualified by test, analysis, or a combination thereof, to function without fault or error in an electromagnetic environment in accordance with the guidance of Regulatory Guide (RG) 1.180."

    In contrast to this, the Tricon V10 safety evaluation (SE) determined that the Tricon V10 Programmable Logic Controller system did not fully meet the guidance of RG 1.180, Revision 1, for conducted or radiated emissions or susceptibility. As a result, the SE of the Tricon platform states: "before using the Tricon V10 system equipment in safety-related systems in a nuclear power plant, licensees must determine that the plant-specific Electro Magnetic Interference (EMI) requirements are enveloped by the capabilities of the Tricon V10 system as approved in this SE."

    To complete its SE, the NRC staff requires the licensee to provide documentation to show the DCPP specific EMI requirements to be enveloped by the Tricon V10 test levels achieved and documented in the Tricon V10 SE.

72. (Open Item 119) Invensys Operations Management (IOM) Laptops:

    IOM is using laptops, one per Protection Set plus one backup, each with TriStation 1131 installed, to develop the V10 Tricon protection set application code for the DCPP PPS Replacement project. PG&E bought these five development laptops and IOM will be delivering them to PG&E as part of the Tricon

product delivery. However, during the Invensys audit on June 3-5, 2014, PG&E informed the NRC staff that it does not plan to use these laptops, and only plans to use the TriStation installed on the PPS maintenance work stations. Please clarify what PG&E will do with the five development laptops once they are delivered to them. Also, please clarify what controls will be placed on the TriStation software installed on these laptop computers.

73. (Open Item 129) The Advanced Logic System (ALS) HALT Mode Operation:

    Please describe the HALT mode of operation and the vital errors that can occur to cause a board to enter the HALT mode.

74. (Open Item 146) In the response to OI 94 ([Application Specific Action item] ASAI-04), PG&E referred to document 6116-00204, Revision 1, "ALS Subsystem Equipment Qualification Evaluation." The NRC staff needs to review this document. This Environmental Qualification (EQ) evaluation document will need to be submitted on the docket to be used as a basis for the SE conclusions.

75. (Open Item 147) EQ: Temperature and Humidity

    Please clarify if FRS Section 3.1.4.1 specifies the temperature and relative humidity worst case conditions expected in the cable spreading room (i.e., mild environment) for normal, abnormal, and accident conditions. Please provide evaluation results for plant-specific configuration of Tricon and ALS components to establish:

    a. Maximum temperature rise in each cabinet,
    b. Maximum ambient temperature in the cable spreading room, and
    c. Design basis temperature margin has not been affected?

    The licensee has specified a broader range of relative humidity (RH) than the qualified and tested range for the ALS and Tricon platforms. Please clarify how the use of the ALS and Tricon subsystems is acceptable for the broader range of RH specified in the FRS Section 3.1.4.1.2.

    Provide DCM T-20, EQ including Appendix A titled "Environmental Conditions for EQ of Electric Equipment." This reference is cited in Section 3.11.2.1 of the Updated Final Safety Analysis Report under Accident Environments.

76. (Open Items 151 and 152)

    PG&E "DCPP Project Procedure, System Verification and Validation Plan (SyVVP) for the PPS Replacement Project" and "Quality Assurance Plan for the Diablo Canyon Process Protection System Replacement" state that PG&E will perform management and activities during the design, development, and testing of the ALS and Tricon System. Please describe the activities performed by PG&E.

77. (Open Item 156) Human Factors:

a. Section 4.10.2.14, "Clause 5.14 Human Factors Considerations (Section D.9.4.2.14 of DI&C-ISG-06 [1])," of the Enclosure to the LAR states, in part: "The existing operator interface using control panel mounted switches and indicators is maintained." It further states: "The PPS will share a Human System Interface (HSI) unit on CC4 that will be installed by the PCS [Plant Computer System] replacement project for system health and status displays." It also states: "The PPS HSI design should follow the guidance provided in the DCPP HSI Development Guidelines Document, which reference NUREG 0700, and which will be implemented during development of the formal design change following receipt by PG&E of the SER [safety evaluation report] approving this change."

Section 3.5.1, “System Human Factors,” of the Functional Requirements Specification Document No. 08-0015-SP-001, Revision 9, states: “The PPS HSI should follow the guidance provided in the DCPP HSI Development Guidelines Document.”

Please provide information regarding what elements of the HSI are being added, deleted, or changed in accordance with the DCPP HSI Development Guidelines Document, as part of the proposed license amendment.

b. Section 4.10.2.14 of the Enclosure to the LAR states, in part: “Existing PPS outputs to the MAS [Main Annunciator System] are modified to dry contacts. The existing AC/DC [alternating current/direct current] converters on the PPS outputs to the MAS are deleted. Additional outputs to the MAS are provided…”

   Section 1.1, “System Purpose,” of the Functional Requirements Specification Document No. 08-0015-SP-001, Revision 9, states, in part: “Output signals of PPS parameters are provided to the Main Control Room (MCR) for indication and recording, to the Plant Process Computer (PPC) for monitoring, and to the Main Annunciator System (MAS) for alarming.”

   Section 3.2.1.3, “Indicators, Status Lights, and Controls,” identifies the requirements for status indication, manual trip switches, and manual bypass switches applicable to all PPS channels.

   Section 3.2.1.5, “Alarms and Annunciators,” identifies the requirements for alarms and annunciators that must be provided for each Protection Set, and the appropriate subsections of Sections 3.2.2 through 3.2.13 identify additional requirements for alarms and annunciators that are specific to the respective channels.

   Please clarify what additional indicators, status lights, alarms, and annunciators are being added as part of the proposed license amendment.

c. Please describe the impact, if any, of the proposed modification on operating procedures, operator training, and the training simulator.

   Please describe any changes to operating procedures needed to support the proposed license amendment. If possible, identify which procedures will be revised.

   If the Emergency Operating procedures are affected, please describe any changes that were required of the Control Room task analysis that was done as part of your Detailed Control Room Design Review. If no update to the task analysis was necessary, describe how task requirements were developed.

d. Please identify any operator manual actions that will be added, deleted, or changed to support the proposed license amendment. If there are any new or changed manual operator actions, describe the process used to verify and validate the ability of your operators to accomplish the tasks required for the proposed LAR. In lieu of a description, you may provide the relevant administrative procedure(s) for verification and validation.

e. Please explain if an operating experience review has been done, including plant-specific condition reports, Licensee Event Reports, INPO [Institute of Nuclear Power Operations] reports, and other

relevant sources. If so, describe what sources of information were considered and the outcome of the review (i.e., list any relevant [Human Factors Engineering] HFE-related problems that were identified, analyzed, and addressed).

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