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PG&E Letter DCL-15-081

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

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Response to NRC Request for Additional Information Regarding License Amendment Request 15-01, "Incorporation into Licensing Basis of Pressurizer Filling Analysis for Major Rupture of a Main Feedwater Pipe Accident"

References: 1. PG&E Letter DCL-15-023, License Amendment Request 15-01, "Incorporation into Licensing Basis of Pressurizer Filling Analysis for Major Rupture of a Main Feedwater Pipe Accident," dated February 25, 2015 (ADAMS Accession No. ML15056A773)

2. NRC Email, "Diablo Canyon, Units 1 and 2 – RAIs for LAR Associated with Pressurizer Filling Concerns due to MFW Pipe Rupture Accident," dated June 4, 2015 (TAC Nos. MF5785 and MF5786)

Dear Commissioners and Staff:

Pacific Gas and Electric Company (PG&E) Letter DCL-15-023, dated February 25, 2015, submitted License Amendment Request (LAR) 15-01, "Incorporation into Licensing Basis of Pressurizer Filling Analysis for Major Rupture of a Main Feedwater Pipe Accident" (Reference 1).

On June 4, 2015, the NRC Staff requested additional information to complete the review of LAR 15-01 (Reference 2). PG&E's responses to the Staff's questions are provided in the Enclosure. The responses are based on the requests for additional information as clarified during two phone calls with the NRC Staff.

This information does not affect the results of the technical evaluation or the no significant hazards consideration determination previously transmitted in PG&E Letter DCL-15-023.

Enclosure 3 of this submittal contains proprietary information. PG&E requests that this proprietary enclosure be withheld from public disclosure in accordance with 10 CFR 2.390(a)(4). Enclosure 2 provides a notarized affidavit from Westinghouse Corporation, which sets forth the basis on which the information in Enclosure 3 may be withheld from public disclosure by the NRC and addresses with specificity the considerations listed by paragraph (b)(4) of 10 CFR 2.390. Enclosure 1 provides the non-proprietary version of Enclosure 3.

PG&E makes no regulatory commitments (as defined by NEI 99-04) in this letter. This letter includes no revisions to existing regulatory commitments.

If you have any questions, or require additional information, please contact Mr. Hossein Hamzehee at (805) 545-4720.

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

Executed on July 8, 2015.

Sincerely,

James M. Welsch
Site Vice President

mlkk/50407034-0029
Enclosures: 1. Non-Proprietary Response to RAIs
2. Affidavit
3. Proprietary Response to RAIs

cc: Diablo Distribution
cc/enc: Marc L. Dapas, NRC Region IV Administrator
Thomas R. Hipschman, NRC Senior Resident Inspector
Siva P. Lingam, NRR Project Manager
Gonzalo L. Perez, Branch Chief, California Department of Public Health

ENCLOSURE 1

Non-Proprietary Response to RAIs

Pacific Gas and Electric Company (PG&E) Response to NRC Request for Additional Information (RAI) Regarding License Amendment Request 15-01, "Incorporation into Licensing Basis of Pressurizer Filling Analysis for Major Rupture of a Main Feedwater Pipe Accident"

SRXB-RAI-1

Section 3.4.2 of the LAR dated February 25, 2015, states that "The transient response following a FLB [feedwater line break] accident was calculated with a detailed simulation of the plant in accordance with the NRC approved methodology for a 4-loop plant using the Westinghouse version of the RETRAN-02 computer code (RETRAN-02W). The NRC's generic approval of the Westinghouse methodology is documented in the safety evaluation report (SER) dated February 11, 1999, which is included in WCAP-14882-P-A (Reference 9)." When discussing relief valve flow in the SER to WCAP-14882-P-A, it states "The calculation of critical flow for subcooled or saturated conditions is not a significant consideration for the non-LOCA [non-loss-of-coolant accident] transients and accidents to be analyzed by Westinghouse using RETRAN." However, in the case of the current pressurizer filling analysis, the flow through the power operated relief valve (PORV) is a significant consideration as it has an effect on the number of PORV cycles. Given that the number of PORV cycles was not a concern in the generic approval of RETRAN-02, justify the applicability of Westinghouse's existing NRC-approved non-LOCA safety analysis methodology in computing the PORV mass flow rate and number of PORV cycles.

PG&E Response

WCAP-14882-P-A includes a provision for using RETRAN to calculate flow rate through the pressurizer power operated relief valves (PORVs) under liquid relief conditions as presented below.

WCAP-14882-P-A, Section 3.10.2, "Pressurizer Pressure Control," states the following regarding the PORV modeling for water relief: [

] [a,c] Calculation of the [

] [a,c] is used to account for the change in mass flow rate that occurs when water is relieved through the valves as described in the response to SRXB-RAI-3.

Because WCAP-14882-P-A includes a provision for calculating flow rate through the PORVs under liquid relief conditions, the existing NRC-approved Westinghouse

non-loss-of-coolant accident (LOCA) safety analysis methodology is applicable for computing the PORV mass flow rate and number of PORV cycles for the feedwater line break (FLB) pressurizer filling analysis.

In addition, the NRC previously approved the use of the Westinghouse version of RETRAN-02 for the Seabrook Spurious Safety Injection (SSI) pressurizer-filling analysis as described in Section 4.2 of License Amendment Request (LAR) 15-01.

SRXB-RAI-2

Section 3.4.2 of the LAR states "The pressurizer PORV relief flow is controlled by the choking velocity. As discussed in Section 3.5.2 of WCAP-14882-P-A (Reference 9), the valve flow area is based on the extended Henry-Fauske critical flow correlation for subcooled choking and isoenthalpic expansion model for saturated and superheated conditions." Is the flow rate and associated critical flow model conservative for both operator action time(s) and number of pressurizer PORV cycles? Were other critical flow models considered? How does the modelled pressurizer PORV flow rate compare to the design flow rate?

PG&E Response

The PORV flow rate and associated critical flow model used in the FLB pressurizer filling analysis are conservative for both operator action times and number of pressurizer PORV cycles, and are consistent with WCAP-14882-P-A. Appendix B of the WCAP includes, "Westinghouse Responses to NRC Requests for Additional Information." In letter NSD-NRC-98-5765 (August 26, 1998), the response to Question 7 provides background information that is relevant. The response noted that the RETRAN computer code allows the user to select between different options for controlling the choked flow limitations for each junction, and that Westinghouse elected to use the [

]^{a,c} The response also explained that,

> "In reality, the model selected makes little difference because the choked flow rate used for the pressurizer and steam line relief and safety valves in the Westinghouse RETRAN model is [
>
>]^{a,c}

As a result, regardless of the choked flow model selected, the Westinghouse RETRAN model [

]^{a,c}

As described in the response to SRXB-RAI-3, [

]^{a,c} since a lower relief flow rate conservatively results in more frequent PORV cycling. Minimizing the water relieved with each PORV cycle minimizes the volume of water required to refill the pressurizer and to increase the pressure to the opening setpoint for the next PORV opening. This minimizes the time until the next opening, increasing the frequency of the PORV cycling and minimizing the time operators have to stop the event before 300 PORV cycles is reached. This model and the other key assumptions noted in Section 3.4.3 of LAR 15-01 ensure that the overall results of the analysis are conservative for determination of the required operator action times and the number of pressurizer PORV cycles.

Other RETRAN critical flow models are not considered in the analysis. As discussed above and in the response to SRXB-RAI-3, the PORV flow rate is modeled in the analysis to be consistent with the minimum design flow rate by calculation of the [

]^{a,c}

SRXB-RAI-3

Section 3.4.2 of the LAR states "A valve flow area multiplier is included in the PORV model to account for the change in mass flow rate that occurs when water is relieved through the valves." Describe the valve flow area multiplier in more detail and state what value is used in the analysis.

PG&E Response

The analysis model was developed to calculate water relief through the PORVs based on a conservative minimum relief capacity through the PORV. [

]^{a,c}

The resulting conservatively calculated [ ]^{a,c} is used in the PORV model to account for the change in mass flow rate that occurs when water (instead of steam) is relieved through the valves.

SRXB-RAI-4

Section 3.4.3 of the LAR states "However, relief through the PORVs that are actuated on the indicated (measured) pressurizer pressure signal (i.e., the PG&E Design Class I PORVs) has been modeled with the assumptions that maximize the number of PORV opening cycles experienced." Describe the assumptions used to model the PORV to maximize the number of PORV cycles.

PG&E Response

In addition to the conservatism discussed in the response to SRXB-RAI-3, the assumptions used to model the PORV to maximize the number of PORV cycles include:

1. The minimum PORV opening and closing setpoints, accounting for uncertainty, are used in the model. (Uncertainties are discussed in the response to SRXB-RAI-6.) Use of the minimum setpoints causes the PORVs to cycle more to control pressure to the lower pressure value, resulting in a slightly shorter time until the maximum number of PORV cycles is reached.

2. The analysis models the minimum delay times between when the PORV opening or closing setpoint is sensed by the pressurizer pressure transmitter and when the PORV starts to open or close. The calculated opening and closing delay times each include an electronic delay followed by a pneumatic air supply delay. Using the minimum delay time minimizes the time between PORV cycles, resulting in a slightly shorter time until the maximum number of PORV cycles is reached.

3. The analysis models the minimum opening and closing stroke times from the time the PORV starts to open or close until the time the PORV actuator is pressurized to the full open value or depressurized to the full close value. Using

the minimum stroke time minimizes the time between PORV cycles, resulting in a slightly shorter time until the maximum number of PORV cycles is reached.

4. The analysis assumes only one PG&E Design Class I PORV is available for the duration of the event. For cases with the single failure assumed to be a failure other than that of a PG&E Design Class I PORV, both Class I PORVs could be assumed to be available for pressure relief on demand. However, when modeling the two PG&E Design Class I PORVs, it is assumed the opening and closing setpoints are identical for each valve. If the opening setpoints are assumed to be offset by even a fairly small difference in pressure, it would be expected that only the PORV with the lower opening setpoint would initially cycle open and close (i.e., it would be expected that this PORV would open quickly enough and have sufficient capacity to maintain pressure below the higher opening setpoint of the second PORV), until the maximum number of cycles has been reached, after which the PORV with the higher opening setpoint would be available. Assuming the opening and closing setpoints for the two valves are identical is equivalent to assuming only one PORV is available for the duration of the event, minimizing the time until the maximum number of PORV cycles is reached.

SRXB-RAI-5

Section 3.4.3 of the LAR states "Therefore, transient mitigation must be demonstrated to occur before 300 PORV cycles is reached." For this criterion to be met, the number of pressurizer PORV cycles would have to be 299 or less. Section 3.4.4 states "The system response showing that the maximum number of PORV cycles is not reached is presented in new Updated Final Safety Analysis Report (UFSAR) Figures 15.4.2-24 through 15.4.2-27." In Figure 15.4.2-26 of the UFSAR markup the red curve, indicating calculated PORV cycles, appears to slightly exceed the dotted grid line at 300 cycles. Confirm that the actual number of pressurizer PORV cycles in the analysis is below 300.

PG&E Response

The total number of PORV cycles shown on the graph in Figure 15.4.2-26 of the UFSAR markup is 300 cycles. Table 15.4-8, Sheet 5 of 5 of the UFSAR markup indicates that the steam bubble forms again in the pressurizer at 6723 seconds (112.05 minutes), before the maximum number of 300 PORV cycles is reached at 7137.6 seconds (119 minutes). Once the steam bubble forms, the transient is ended, since the pressurizer safety valve (PSV) is no longer in jeopardy of relieving water. The number of PORV cycles experienced before the steam bubble forms at 6723 seconds is 295. To ensure this is clear in the UFSAR markup, the second paragraph on page 15.4-44 will be revised to the following:

The system response is presented in Figures 15.4.2-24 through 15.4.2-27. Table 15.4-8, "Sequence of Events," indicates that a steam bubble forms again in the pressurizer at 6723 seconds. This occurs at cycle 295 before the maximum number of 300 PORV cycles is reached at 7137.6 seconds.

SRXB-RAI-6

For a given opening setpoint pressure, an increase in the closing setpoint pressure will result in additional pressurizer PORV cycles and may result in depleting the backup nitrogen supply. What pressurizer PORV opening/closing setpoint pressures were used in the analysis and how do these compare to the current plant setpoints? What is the uncertainty in the physical PORVs opening/closing pressures, including any setpoint drift effects? Were these uncertainties taken into consideration in the analysis?

PG&E Response

Pressurizer pressure signals are input to the PORVs, with PORVs opening on high pressure and closing on low pressure.

The current plant setpoint pressures are 2335 pounds per square inch gage (psig) for opening and 2322.5 psig for closing. The closing setpoint is based on the opening setpoint minus 12.5 psig (1 percent of span) dead band. The calculated overall channel uncertainty for the PORV actuation is plus or minus 22.63 psig, which includes sensor drift (plus or minus 1.2 percent of span), rack drift (±0.2 percent of span) and display device drift (plus or minus 0.25 percent of span), in addition to other uncertainties such as calibration accuracies and sensor temperature effects.

The FLB pressurizer filling analysis uses minimum setpoint pressures of 2305 psig for opening and 2292.5 psig for closing. As discussed in SRXB-RAI-4, use of the minimum setpoints causes the PORVs to cycle more to control pressure to the lower value, resulting in a slightly shorter time until the maximum number of PORV cycles is reached. The minimum values are based on current plant setpoints minus 30 psig to bound the overall channel uncertainty of 22.63 psig. See table below for a summary of the setpoint pressures and uncertainties.

PORV Setpoint Pressures and Uncertainties

	Opening (psig)	Closing (psig)
Current plant setpoint pressure	2335	2322.5[(1)]
Analysis setpoint pressure[(2)]	2305	2292.5
Calculated overall channel uncertainty[(3)]	±22.63	±22.63
Analysis uncertainty	±30	±30

Note 1 – Closing setpoint is opening setpoint minus 12.5 psig (1 percent of span) deadband.

Note 2 – Analysis setpoint pressures are based on current setpoint pressures minus uncertainty of 30 psig.

Note 3 – Calculated overall channel uncertainty includes sensor drift (plus or minus 1.2 percent of span), rack drift (plus or minus 0.2 percent of span) and display device drift (plus or minus 0.25 percent of span) in addition to other uncertainties such as calibration accuracies and sensor temperature effects.

SRXB-RAI-7

Section 3.4.3 of the LAR discussed the auxiliary feedwater (AFW) assumptions. In the current pressurizer filling analysis, some AFW flow begins one minute after trip, however, in the UFSAR Section 15.4.2.2 FLB analysis, AFW does not begin for 10 minutes. Explain the difference in AFW modelling assumptions between the UFSAR FLB and current FLB analyses and describe how the current analysis is conservative.

PG&E Response

As described in LAR 15-01, Assumption 3.4.3 (13), the AFW system is designed with one Turbine Driven AFW pump (TDAFWP) that supplies AFW to all four steam generators (SGs), and two Motor Driven AFW pumps (MDAFWPs) that each independently provide flow to two of the four SGs. All three AFW pumps are designed to begin providing flow within one minute after the generation of a SG low-low level trip signal occurs. With the limiting single failure of the TDAFWP, and the assumption that the MDAFWP flow feeding the faulted SG is spilled out the break, the second MDAFWP is available to provide AFW flow to two intact SGs within one minute after the SG low-low trip signal occurs. The FLB pressurizer filling analysis also included cases with the single failure as the MDAFWP aligned to the two intact SGs such that AFW flow to the intact loop from the TDAFWP does not start until 10 minutes after the transient begins; however, these cases were not limiting for the pressurizer filling analysis.

For the acceptance criteria in the UFSAR 15.4.2.2 FLB analysis (demonstrate that no bulk boiling occurs in the reactor coolant system), there is analysis margin available to assume that no AFW flow is credited until after the operators isolate the faulted SG at

10 minutes. The FLB pressurizer filling analysis presented in LAR 15-01 has a more restrictive acceptance criteria (prevent water relief through the PSVs), which is sensitive to the minimum AFW system flow. Therefore, for the cases not assuming single failure of the MDAFWP aligned to the intact loop, the FLB pressurizer filling analysis credits the MDAFWP connected to two intact SGs to begin providing AFW flow at one minute after the SG low-low level trip signal occurs, as designed.

The previous analysis made a more conservative assumption relative to the design of the AFW system, assuming a delay of 10 minutes before AFW flow. The new analysis assumption of a one minute delay before AFW flow is also conservative relative to the design of the AFW system.

SRXB-RAI-8

In UFSAR Section 15.2.15.2 Spurious Safety Injection (SSI) Pressurizer Overfill Analysis, the operators are credited with making a pressurizer PORV available within 11 minutes of the initiation of the event. This event is considered a condition II fault of moderate frequency. For this case, the 11 minute time frame is consistent with times in the ANSI/ANS-[American National Standards Institute/American Nuclear Society]-58.8-1994 standard (5 minute diagnosis and 1+ minute for each action). However, in the current FLB pressurizer overfill analysis, the event is a condition IV limiting fault (much lower frequency of occurrence) and credits operator action within 8.6 minutes. This value is significantly lower than the ANSI/ANS-58.8-1994 standard (20 minute diagnosis and 5+ minutes for each operator action) for this type of event. Address the discrepancy between the proposed operator action time and the ANSI/ANS standard.

PG&E Response

ANSI/ANS-58.8 is referenced in Information Notice (IN) 97-78, "Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times," which states, "ANSI-58.8 provides estimates of reasonable response times for operator actions; however, licensees may use time intervals derived from independent sources provided they are based on analyses with consideration given to human performance." IN 97-78 also provides nine criteria used by the NRC to review analyses crediting time critical operator actions (TCOAs), which address factors that affect human performance. Section 3.5 of the LAR provides a discussion of the proposed TCOAs with respect to the nine criteria.

Accounting for 20 minutes of diagnosis time as required by the standard is not appropriate, since Diablo Canyon Power Plant (DCPP) emergency operating procedures (EOPs) are symptom-based. This is supported by the existing TCOA for the FLB accident to isolate a faulted SG within 10 minutes, which was included in the original DCPP Final Safety Analysis Report (FSAR) approved by the NRC.

The action to ensure a PORV is available within 11 minutes is an existing TCOA for the SSI event. The action to make a PORV available is also an existing early action in EOPs used to respond to transients involving a reactor trip, safety injection, loss of reactor coolant, or loss of secondary coolant. Since operators typically perform this action in less than 5 minutes, the proposed TCOA of 8.6 minutes allows ample recovery time from any credible error. (See the response to RAI-APHB-7 for actual operator response times during TCOA demonstrations.)

SRXB-RAI-9

The current analyses show different runs for the different time critical operator actions. Was an analysis performed using all four of the proposed time critical operator actions in a single run to assure that all the acceptance criteria are met at the same time?

PG&E Response

An analysis was not performed using all four of the proposed TCOAs in a single run. The purpose of the current analysis is to determine the limiting time operators have to perform credited actions that prevent water relief through the PSVs. Separate analysis cases were run for TCOA-1 because the conditions that result in limiting values for TCOA-1 are different than the conditions that result in limiting values for TCOA-3 and TCOA-4. TCOA-2 remains constant as an input to the analysis. For example, the limiting condition for times to isolate charging flow and stop reactor coolant pump (RCP) seal injection flow occurs when a PORV is available from the beginning of the event to relieve steam (since this maximizes the number of PORV cycles). The time required to ensure a PORV is available in this scenario is not relevant, since a PORV is already available from the beginning of the event (the PORV begins to relieve steam at 20.9 seconds from the time the feedline rupture occurs). Another example of the differences in modeling is that the limiting condition for calculating the time to ensure a PORV is available occurs with a loss of offsite power, whereas the limiting condition for the times to isolate charging flow and stop RCP seal injection flow occurs when offsite power is available.

SRXB-RAI-10

Is there any single failure (common cause) that would cause loss of backup nitrogen to both safety grade pressurizer PORVs?

PG&E Response

There is no single failure that would cause loss of backup nitrogen to both safety grade pressurizer PORVs. As described in LAR 15-01, Section 3.1, each unit at DCPP has two PG&E Design Class I pressurizer PORVs, each with an independent PG&E Design

Class I backup nitrogen supply system to provide motive force when instrument air is lost to containment. The only physical plant change being made in support of LAR 15-01 is to increase the size of the nitrogen backup accumulator to provide a greater capacity of available PORV cycles consistent with that required to mitigate the FLB pressurizer filling event. A PG&E design change is being implemented to install the larger nitrogen accumulators along with some minor changes in the mounting configuration, in order to ensure that the two nitrogen backup supply systems remain independent per PG&E Design Class I requirements.

RAI-APHB-1

Are the four operator actions that are proposed to be added completely new actions or have operators had previous training and experience with each of the four actions?

PG&E Response

Operators have had previous training and experience with each of the proposed TCOAs as discussed below. The following table provides a comparison of existing TCOAs to proposed TCOAs.

TCOA-1, Ensure a PG&E Design Class I pressurizer PORV is available within 8.6 minutes:

The action to ensure a PORV is available is an existing TCOA (credited to be performed within 11 minutes) for the SSI event and is an existing early action in EOPs used to respond to transients involving a reactor trip, safety injection, loss of reactor coolant, or loss of secondary coolant. During the three simulator demonstrations of the FLB event, the average time for operators to perform this action was 3.68 minutes. Operators use the same EOP to perform this action whether the initiating event is a SSI or a FLB. Therefore, operators have had previous training and experience with this TCOA.

TCOA-2, Isolate the faulted SG within 10 minutes:

The action to isolate the faulted SG within 10 minutes is a TCOA for the main steam line break (inside and outside containment) accident and the main feedwater break accident. This credited action was included in the original FSAR approved by the NRC and is already included as a TCOA in EOP E-2, "Faulted Steam Generator Isolation." Therefore, operators have had previous training and experience with this TCOA.

TCOA-3, Isolate charging flow within 25 minutes:

The TCOA to isolate charging flow involves the same actions credited for the SSI event to stop all but one charging pump within 14 minutes and to throttle charging flow within 15 minutes. These actions are included as TCOAs in EOP E-0, "Reactor Trip or Safety

Injection;" therefore, operators have had previous training and experience with this TCOA.

TCOA-4, Stop reactor coolant pump (RCP) seal injection flow within 45 minutes:

To stop RCP seal injection flow, the operators must reset Phase B containment isolation, restore component cooling water (CCW) flow to the RCPs and turn the remaining charging pump off. The steps to reset Phase B containment isolation and restore CCW flow are existing steps in EOP E-1.1, "Safety Injection Termination." To support this LAR, these steps will be invoked earlier in EOP E-1.1 in the event that letdown cannot be established.

The final step to turn off the remaining charging pump is an existing step in procedure, EOP FR-I.1, "Response to High Pressurizer Level," but is not currently credited as a TCOA. During implementation of the proposed amendment, this step from EOP FR-I.1 will be added to EOP E-1.1, "Safety Injection Termination" (see response to RAI-APHB-2). In addition, the added step will be designated as a TCOA, which will be formally validated in accordance with the TCOA procedure (discussed in Section 3.3 of the LAR). All operations crews will be trained on the changes to EOP E-1.1.

Comparison of Proposed TCOAs to Existing TCOAs

Proposed TCOAs for FLB		**Existing TCOAs**		
Description	**Time Constraint**	**Description**	**Accident**	**Time Constraint**
Ensure a PORV is available	8.6 min	Ensure a PORV is available	SSI	11 min
Isolate the faulted SG	10 min	Start AFW (if not already running) and deliver flow to unfaulted loops(1)	FLB	10 min
Isolate charging flow	25 min	Stop all but one CCP. Throttle charging flow(2)	SSI	14 min 15 min
Stop RCP seal injection flow	45 min	N/A	N/A	N/A

Note 1 – Steps performed for the existing FLB TCOA isolate the faulted SG. The TCOA is reworded per the proposed TCOA to clarify the action being performed.

Note 2 – Steps performed for the existing SSI TCOAs isolate charging flow. The proposed TCOA wording clarifies the action being performed.

RAI-APHB-2

Which procedures will require revision to support this LAR (plant-specific number, title, and revision)?

PG&E Response

EOP E-1.1, "Safety Injection Termination," (current revisions Unit 1 – 29, Unit 2 – 22) will require revision to implement the License Amendment. A step will be added to EOP E-1.1 to cycle the remaining operating charging pump off-and-on to control pressurizer level if letdown cannot be established. This action is currently included in EOP FR-I.1, "Response to High Pressurizer Level," but has not been previously credited as a TCOA.

Administrative procedure OP1.ID2, "Time Critical Operator Actions," (current revision 8A) will be revised to add TCOA-1, TCOA-3, and TCOA-4 to the main feedwater break accident and to revise the existing title of TCOA-2 to clarify that the action performed is to isolate the faulted SG.

RAI-APHB-3

Please provide the NRC with any operating experience that was used in this proposed change. This may include but is not limited to plant-specific condition reports, Licensee Event Reports, Institute of Nuclear Power Operations (INPO) reports, prior implementations of the design, and other relevant sources.

PG&E Response

A precedence review was performed to identify applicable industry experience regarding mitigating the effects of pressurizer filling during a FLB accident. This review identified the previous NRC approval of the Westinghouse version of RETRAN-02 for the Seabrook SSI pressurizer-filling analysis, which was discussed in Section 4.2 of the LAR.

As discussed in the response to RAI-APHB-1, the actions being credited in the new FLB pressurizer filling analysis are existing actions in the emergency operating procedures. No changes are being made to controls, alarms, or displays. Because the changes proposed in the LAR do not change how existing human-system interface components are used, an Operating Experience Review was not performed in accordance with NUREG-1764, Revision 1, Section 3.2.

RAI-APHB-4

Will any changes to the Safety Parameter Display System be required? If yes, describe.

PG&E Response

No changes to the Safety Parameter Display System (SPDS) are required. Applicable parameters (e.g., pressurizer level, pressurizer pressure, reactor coolant system temperature, and SG level) are currently available on SPDS.

RAI-APHB-5

Other than the modification to the nitrogen supply, will any modifications to the Control Room, controls, displays, or alarms be required to support this LAR?

PG&E Response

No modifications to the Control Room, controls, displays, or alarms are required to support the LAR. Applicable controls, displays, and alarms are currently available in the Control Room.

RAI-APHB-6

Discuss the sample of operators used for validation and how it was representative of the population of operators expected to perform the four actions. If all of the potential operators/crews who could be involved were used, a statement to that fact would be enough.

PG&E Response

PG&E conducted three simulator demonstrations of the FLB event that demonstrated operators can perform the proposed credited actions within the analyzed timeframes. Results of the three demonstrations are provided in the PG&E response to RAI-APHB-7.

Crews did not have prior review of the event or training on the new step to be added to EOP E-1.1. The participants in the three demonstrations described below were representative of the minimum crew required to be on duty in the Control Room during plant operation.

> Demonstration 1: A 3-person crew consisting of 1 senior reactor operator (SRO) and two reactor operator (RO) qualified personnel.

Demonstrations 2 and 3: Two typical Control Room crews in operations continuing training. Each crew consists of a mix of SRO and RO qualified personnel.

To implement the License Amendment, the TCOA to stop RCP seal injection flow will be added to EOP E-1.1, the TCOAs will be formally documented and validated in accordance with the TCOA program described in Section 3.3 of the LAR, and all operations crews will be trained on the change in accordance with the operating procedure change process.

RAI-APHB-7

Provide the results of the validation. Show each operator's response time for each action, and the total time for each operator to perform all four actions. If validated by crew, show response times and totals by crew. Identify and discuss any operator errors that were observed. Do not identify operators by name or other personally identifiable information.

PG&E Response

PG&E conducted three simulator runs of the FLB event that demonstrated operators can perform the proposed credited actions within the analyzed timeframes. Results of the three demonstrations are provided below. The time to perform TCOA-4 represents the total time to perform all four actions. The times were recorded by crew and no operator errors were observed.

Proposed FLB TCOA Demonstrations[1]

Proposed TCOA No.[2]	Proposed TCOA Description	Credited Time	Crew Response Times			
			Demo 1	Demo 2	Demo 3	AVG
1	Ensure a PORV is available	**8.60**	2.90	3.57	4.57	3.68
2	Isolate the faulted SG[3]	**10.00**	6.75	9.45	9.05	8.42
3	Isolate charging flow	**25.00**	12.75	15.85	14.73	14.44
4	Stop RCP seal injection flow	**45.00**	34.90	27.75	29.00	30.55

Note 1 – All times are in minutes.
Note 2 – TCOA numbers correspond to numbers assigned in LAR on page 15.
Note 3 – Existing TCOA for FLB accident.

ENCLOSURE 2

Affidavit

Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, Pennsylvania 16066
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Direct tel: (412) 374-4643
Direct fax: (724) 940-8560
e-mail: greshaja@westinghouse.com
Proj letter: PGE-15-62

CAW-15-4216

June 25, 2015

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: Responses to NRC Requests for Additional Information (RAIs) on Diablo Canyon Feedline Break Analysis for Pressurizer Filling (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced document is further identified in Affidavit CAW-15-4216 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Pacific Gas and Electric Company (PG&E).

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference CAW-15-4216, and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.

James A. Gresham, Manager
Regulatory Compliance

CAW-15-4216
June 25, 2015

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, Henry A. Sepp, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC (Westinghouse), and that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

Henry A. Sepp, Director
CRE-Systems and Components Engineering

(1) I am Henry A. Sepp, Director, CRE-Systems and Components Engineering, Westinghouse Electric Company LLC (Westinghouse), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Commission's regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

(iii) There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, it is to be received in confidence by the Commission.

(v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in, "Responses to NRC Requests for Additional Information (RAIs) on Diablo Canyon Feedline Break Analysis for Pressurizer Filling (Proprietary)," for submittal to the Commission, being transmitted by Pacific Gas and Electric Company (PG&E) letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with PG&E's request for NRC approval of a License Amendment Request that would allow a change to incorporate into the Diablo Canyon Units 1 and 2 licensing basis an analysis of pressurizer filling concerns associated with the main feedwater pipe rupture accident, and may be used only for that purpose.

(a) This information is part of that which will enable Westinghouse to:

(i) Assist PG&E with obtaining NRC approval of a License Amendment Request that would allow a change to that would incorporate into the Diablo Canyon Units 1 and 2 licensing basis an analysis of pressurizer filling concerns associated with the main feedwater pipe rupture accident.

(ii) Provide results of customer specific calculations.

(iii) Provide licensing support for customer submittals.

(b) Further this information has substantial commercial value as follows:

(iv) Westinghouse plans to sell the use of similar information to its customers for the purpose of submittals for changes to plant licensing basis to incorporate analysis of pressurizer filling concerns associated with the main feedwater pipe rupture accident.

(ii) Westinghouse can sell support and defense of industry guidelines and acceptance criteria for plant-specific applications.

(iii) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar technical evaluation justifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and non-proprietary versions of documents furnished to the NRC associated with PG&E's request for NRC approval of a License Amendment Request.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the Affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE

Pacific Gas and Electric Company (PG&E)

Letter for Transmittal to the NRC

The following paragraphs should be included in your letter to the NRC Document Control Desk:

Enclosed are:

1. One copy of "Responses to NRC Requests for Additional Information (RAIs) on Diablo Canyon Feedline Break Analysis for Pressurizer Filling" (Proprietary)

2. One copy of "Responses to NRC Requests for Additional Information (RAIs) on Diablo Canyon Feedline Break Analysis for Pressurizer Filling" (Non-Proprietary)

Also enclosed is the Westinghouse Application for Withholding Proprietary Information from Public Disclosure CAW-15-4216, accompanying Affidavit, Proprietary Information Notice, and Copyright Notice.

As Item 1 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an Affidavit signed by Westinghouse, the owner of the information. The Affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.390 of the Commission's regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse Affidavit should reference CAW-15-4216 and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.