



February 27, 2012

PG&E Letter DCL-12-024

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

10 CFR 50.90

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 PG&E Letter
DCL-11-018, "License Amendment Request 11-02, Revision to Technical
Specification 3.7.1, 'Main Steam Safety Valves (MSSVs)'"

- Reference: 1. PG&E Letter DCL-11-018, "License Amendment Request 11-02, Revision to Technical Specification 3.7.1, 'Main Steam Safety Valves (MSSVs),' dated February 17, 2011
2. PG&E Letter DCL-11-055, "Supplement to License Amendment Request 11-02 Revision to Technical Specification 3.7.1, 'Main Steam Safety Valves (MSSVs),' dated April 21, 2011

In Reference 1, Pacific Gas and Electric Company (PG&E) submitted a license amendment request to revise Technical Specification (TS) 3.7.1, "Main Steam Safety Valves (MSSVs)," Table 3.7.1-1, "Maximum Allowable Power Range Neutron Flux High Setpoint With Inoperable MSSVs," to remove a one-time note specific to Diablo Canyon Power Plant (DCPP), Unit 2 for Cycle 15, which is no longer applicable or needed. In Reference 1, PG&E also proposed to revise the TS Bases, applicable to DCPP, Units 1 and 2, to adopt a new analysis methodology for establishing the reduced power range neutron flux high setpoint for one inoperable MSSV as listed in TS Table 3.7.1-1.

In Reference 2, PG&E clarified that the revision to the TS Bases requested in Reference 1 is a revision to the Final Safety Analysis Report Update (FSARU), as the TS Bases are incorporated into the FSARU by reference. Reference 2 supplemented Reference 1 by providing proposed revisions to FSARU Sections 15.2.7.3, "Results," and 15.2.16, "References."

The NRC Staff provided a request for additional information (RAI) via e-mail, dated February 6, 2012. The Enclosure to this letter provides PG&E's response to the NRC RAI.



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

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

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

Executed on February 27, 2012.

Sincerely,

James R. Becker
Site Vice President

SSZ/4040/50456803

Enclosure

cc: Diablo Distribution
cc/enc: Elmo E. Collins, NRC Region IV
Michael S. Peck, NRC Senior Resident Inspector
Joseph T. Sebrosky, NRR Project Manager
Alan B. Wang, NRR Project Manager

PG&E Response to NRC Request for Additional Information Regarding PG&E Letter DCL-11-018, "License Amendment Request 11-02, Revision to Technical Specification 3.7.1, 'Main Steam Safety Valves (MSSVs)'"

NRC Question:

Please provide the basis for the change in the MSSV accumulation initial condition uncertainties from 3% accumulation used in PG&E Calculation N-114, Rev. 0 to 5 psi accumulation used as an input parameter in the new Westinghouse RETRAN-02W analyses.

PG&E Response:

Per ASME Code Section III Article subparagraph NC-7512.2, the steam generator safety valves (commonly referred to as main steam safety valves (MSSVs)) shall lift within a set pressure tolerance that does not exceed 1 percent. Per ASME Code Section III Article subparagraph NC-7512.1, the MSSVs must attain rated lift (typically termed accumulation) at a pressure that does not exceed the set pressure by more than 3 percent. The ASME code does not establish any requirements or provide any guidance on how to model analytically the MSSVs obtaining full lift during pressure increase accident analyses. Therefore, the safety analyses such as that documented in PG&E Calculation N-114 have historically assumed that such spring-loaded valves open linearly over a pressure range of 3 percent above the analytical opening pressure. However, because the N-114 calculation assumed a set pressure tolerance of +3 percent, assuming an additional 3 percent accumulation above this lift setpoint is overly conservative with respect to the ASME code requirements.

Reference 5 notes that extensive industry testing, including EPRI Report NR-4306-SR (Reference 1) demonstrated that once a spring-loaded safety valve reaches the point of first stem movement, the valve immediately "pops" wide open relieving steam at, or near, full capacity with no appreciable accumulation. The MSSVs installed at Diablo Canyon Power Plant (DCPP) are type 3700 valves manufactured by Dresser Industries to ASME code requirements for nuclear power application. Westinghouse has evaluated the DCPP Dresser MSSVs and determined that, if properly maintained and set per the Manufacturer's Maintenance Manual, they will pop open and achieve full lift within a 5 psi accumulation. Based on this evaluation, the Crosby MSSV test data referenced in EPRI Report NR-4306-SR (Reference 1) is applicable to the Dresser MSSVs, and the 5 psi accumulation MSSV model is applicable to the DCPP Dresser MSSVs.

Therefore, the Loss of Load analyses documented in PG&E Letter DCL-11-018 still conservatively model actual safety valve behavior based on simulating the MSSV opening as a ramp function from closed to full open over a 5 psi pressure increase range. The analyses in DCL-11-018 still assume that the MSSVs do not start to open until the main steam system pressure is 3 percent above the nominal set pressure. Assuming that the MSSVs achieve rated flow capacity within an additional 5 psi above

the +3 percent set point tolerance is still conservative with respect to the 3 percent accumulation requirement specified in the ASME code.

The use of a 5 psi safety valve accumulation is now part of the standard Westinghouse methodology. Westinghouse has confirmed that it has been used in the safety analyses as documented in a number of plant licensing applications that have been approved by the NRC. The NRC specifically issued a Request for Additional Information (RAI) to the Union Electric (UE) Company's Callaway plant regarding the 5 psi accumulation model used in the safety analysis in support of a license amendment. In the RAI response of March 4, 1998, (Reference 2) Callaway provided a detailed technical basis and justification for use of the 5 psi accumulation model consistent with that discussed above. The NRC accepted the applicable Callaway safety analysis and approved the license amendment (Reference 3). The Safety Evaluation in Reference 3 acknowledged that UE provided supplemental information in the March 4, 1998, letter (Reference 2), in addition to other letters. The Safety Evaluation did not identify any restrictions or concerns related to use of the 5 psi accumulation model.

The 5 psi MSSV accumulation model was incorporated into the DCPD design basis via 10 CFR 50.59 for the non-LOCA safety analyses performed in support of the Replacement Steam Generator (RSG) project. This MSSV accumulation model was evaluated as an element of the methodology because a mathematical model is utilized to simulate the response of the valve when the setpoint is reached. This is in accordance with the definition and discussion of elements of methodology in NEI 96-07, Section 3.10 (Reference 4). However, since the MSSV model is based on the performance characteristics of the valve, the change was also evaluated as an input change to the analysis. Westinghouse used the RETRAN-02W computer code and +5 psi accumulation model for all of the non-LOCA accident analyses that credited MSSV actuation in support of the RSG project. The analysis results met all applicable acceptance criteria, and established the basis for acceptably incorporating these changes per 10 CFR 50.59.

In addition, Westinghouse performed sensitivity runs to benchmark and compare the 5 psi MSSV accumulation model with the 3 percent accumulation model used in the previous Analysis of Record (AOR). The benchmarking was done for the same set of accidents and plant conditions to verify that the results were comparable. The comparison of the new and old models also considered time behavior of results that were found to be very similar for the events analyzed in support of the RSG project. The differences were deemed to be within the margins for error for the analyses such that the results were essentially the same per the guidance in NEI 96-07, Section 4.3.8.1, and acceptable per 10 CFR 50.59.

The 5 psi MSSV accumulation model is more consistent with actual tested valve behavior and is still conservative with the ASME code requirements since the MSSV set point tolerance is already assumed to be at +3 percent. The 5 psi MSSV accumulation model has been accepted by the NRC in numerous non-LOCA safety analyses with no identified physical constraints or methodology restrictions and has been evaluated into

the DCPP design basis via 10 CFR 50.59 for comparable safety analysis applications. In summary, the 5 psi MSSV accumulation model is conservative and appropriate for evaluating the Loss of Load with an inoperable MSSV in support of the subject LAR 11-02 in DCL-11-018.

References

- 1) EPRI Report NR-4306-SR, "Safety and Relief Valves in Light Water Reactors," December 1985.
- 2) Union Electric Company Letter ULNRC-03747, "MSSV Setpoint Tolerance Revision" for Callaway Plant, Docket No. 50-483, March 4, 1998.
- 3) "Amendment No. 128 to Facility Operating License No. NPF-30 - Callaway Plant, Unit 1, (TAC No. M99149)," October 2, 1998. [Accession Number ML021640293]
- 4) NEI 96-07, Rev. 1, Guidelines for 10 CFR 50.59 Implementation, November 2000.
- 5) Westinghouse Letter PGE-09-05, "Input to Replacement Steam Generator Program Licensing Basis Impact Evaluation (LBIE)," February 3, 2009.