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PG&E Letter DCL-12-065

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MSSVs," to remove a one-time note specific to Diablo Canyon Power Plant (DCPP), Unit 2 for Cycle 15, which is no longer applicable or needed.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 March 19, 2012. PG&E's responses to the staff's RAI are provided in the Enclosure.

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. Tom Baldwin at (805) 545-4720.

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

Executed on July 2, 2012.

Sincerely,

James M. Welsch
Station Director

dngd/4955/50466545
Enclosure
cc: Diablo Distribution
cc/enc: Elmo E. Collins, NRC Region IV
Michael S. Peck, NRC Senior Resident Inspector
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PG&E Responses to NRC Requests 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 1:

Can PG&E provide the Crosby test data referenced in EPRI Report NP-4306-SR that supports a 5 psi max accumulation behavior for main steam safeties?

PG&E Response:

Westinghouse attempted to get the Crosby data referenced in EPRI Report NP-4306-SR from Crosby and was unsuccessful. However, Westinghouse was able to provide some relevant data covering Dresser Main Steam Safety Valve (MSSV) (Model 3777Q) testing performed at Wyle Laboratories. The tested valve belongs to Dresser relief valve Series 3700, which is the same series as the MSSVs installed in Diablo Canyon Power Plant (DCPP) (Model 3707). The test was performed as a qualification program of the MSSV to simulate the valve performance under different environmental transients by testing at various initial temperature conditions. A review of the test data concluded that it was more appropriate to cover the range of Dresser MSSV operating conditions at DCPP than the Crosby pressurizer safety valve (PSV) data in the EPRI report. Table 1 tabulates the "open" tested pressures at which the Dresser MSSV would achieve rated flow. From the table, Westinghouse calculated the average "open" pressure of the MSSV, and the standard deviation.

Valve Design and Setting

Dresser Model 3777Q Spring Loaded Safety Valve
Steam Relief
MSSV Set Pressure 1235 plus or minus 1 percent
Valve Lift approximately 0.94 inch

Test Results

μ (mean) = 1213.36 psig (Test)

σ (standard deviation) = 25.44 psig (Test)

From Table 1, the difference between the average "open" pressure and the nominal set pressure is negative 21.64 pounds per square inch, gage (psig) (i.e., 1235 -1213.36 = -21.64 psig). The difference between the average "open" pressure plus one (1) standard deviation and the nominal set pressure is 3.8 psig (i.e., 1213.36 +25.44 -1235 = 3.8). The test data indicates that the MSSVs statistically opened slightly lower than the set pressure. The Dresser MSSV valve test data indicates that it is statistically probable that the full open 5 psi accumulation will be reached at a value at or very near the set pressure. Therefore, with the valve set at

1235 plus or minus 1 percent and with a 5 psi accumulation, the MSSV would conservatively be expected to be "open" at 1252.35 psig (i.e., 1235 + 12.35 + 5 = 1252.35 psig). It can be seen from the data that there is no "open" pressure that exceeds 1252.35 psig. This test data based on a plus or minus 1 percent set pressure supports the 5 psig accumulation and 3 percent drift assumption as being conservative for modeling the "open" pressure for Dresser MSSVs.

Table 1

Popping Pressure and Lift for Various Valve Body Temperature Conditions

	Body Temp (°F)	**"Open" Pressure (psig)**	**Lift (in)**	
Set Pressure Test Following Repair	266	1236	1.04	
	250	1218	0.92	
	248	1242	1.08	
	250	1239	1.04	
	248	1239	1.0	μ = 1213.36 psig
Set Pressure Following Condition 1 Evaluation	320	1174	1.0	$\Delta = (\mu\text{-}1235)$ = -21.64 psig
	317	1174	1.0	
	317	1193	1.0	σ = 25.44 psig
Set Pressure Following Condition 2 Evaluation	276	1223	1.0	
	281	1200	1.0	
	286	1209	1.0	

NRC Question 2:

Can PG&E provide the Westinghouse evaluation that determines that the DCPP Dresser valves will perform in a similar manner?

PG&E Response:

The Westinghouse evaluation that shows that the Dresser MSSV will perform like the Crosby PSVs is a proprietary document of Westinghouse. However, the content of the evaluation is summarized herein. The evaluation considered the DCPP MSSV 5 psi accumulation assumption with respect to the safety valve opening characteristics. The evaluation determined that the Dresser MSSV would behave like the Crosby safety valve as referenced in the EPRI Report NR-4306-SR in that the relief valves without bellows (i.e., Dresser MSSVs) would behave like safety valves with bellows as long as the back

pressure is no more than 10 percent of set pressure. The Westinghouse evaluation also utilized the information contained in the Dresser MSSV Instruction Manual to show how the MSSV operates during opening. From information obtained from the instruction manual and communication with Crosby, the evaluation showed that for a 5 psi accumulation, the Dresser MSSV would open in about 0.09 seconds. Finally, the Westinghouse evaluation estimated the pressurization rate of the MSSV to show that with a pressurization rate of 55 psi/second the accumulation is approximately 5 psi. The evaluation was performed because, at the time the report was prepared, Westinghouse had no access to the Dresser MSSV test data.

As stated in the response to NRC Question 1 above, Westinghouse was able to gain access to a Dresser test report. The availability of the newly acquired test data on the Dresser MSSV and the post TMI-EPRI/C-E PSV allows for a more realistic assessment of the performance of the Dresser valves. Using the two data sources, Westinghouse compared the results of the Dresser MSSV test data shown in Table 2 and the Dresser PSV test data shown in Table 3. The variation in the tested "open" pressures was not pertinent as the comparison focused on the relative opening characteristics of the safety valves with respect to the 5 psi accumulation assumption. Table 2 tabulates the Dresser MSSV test "open" pressure and the valve lift or stroke time, which are consistent with the evaluated pressurization rate and opening time discussed above. Table 3 tabulates the test data of Dresser safety valves performed by EPRI and shows the pre-test valve conditions, the "initial lift" pressure at which the valve first begins to open, the "open" pressure, and the valve lift or stroke time. A comparison of the Table 2 and Table 3 data shows that the opening characteristics are linear and the stroke time is very rapid for the two Dresser valves. It is reasonable that the faster stroke times in the EPRI tests may be attributed to the different test conditions and pressurization rates associated with testing at the higher set pressure. However, the EPRI Dresser PSV test data supports the conclusion that a 5 psi accumulation is characteristic of Dresser valves.

Table 2

Dresser MSSV Opening Characteristics and Open Time

Test	Ramp rate (psi/sec)	Set Pressure (psig)	Lift (inch)	Opening Characteristics	Stroke time (sec)
1	20	1200	1.04	Linear	0.12
2	18	1239	1.0	Linear	0.13
3	20	1205	1.04	Linear	0.15
4	15	1200	1.0	Linear	0.089

Table 3

Valve Transient Performance Data for the Dresser 31739A Safety Valve

			PRE-TEST VALVE CONDITIONS					
TEST NO.	TEST TYPE	MEDIA	NOMINAL VALVE INLET PRESS. (PSIA)	NOMINAL VALVE INLET TEMP. (◦F)	INITIAL LIFT PRESS. (PSIA)	"OPEN" PRESS. (PSIA)	STROKE TIME (SEC)*	VALVE STABILITY
1003	STEAM	STEAM	2300	SAT	2460	2460	.015	Stable
1005	STEAM	STEAM	2285	SAT	2425	2431	.016	Chatter
1008	STEAM	STEAM	2287	SAT	2446	2450	.014	Stable
1011	STEAM	STEAM	2300	SAT	2478	2482	.016	Stable
1012	STEAM	STEAM	2285	SAT	2490	2495	.021	Stable
1018	STEAM	STEAM	2300	SAT	2455	2458	.024	Stable
1104 a	STEAM	STEAM	2300	SAT	2550	2550	.013	Stable

* Linear characteristics

NRC Question 3:

Can PG&E provide a description of the current inservice testing methodology for the MSSVs and a summary of the inservice test results over the period that this methodology has been used? Can PG&E also provide a summary of MSSV failures or unplanned maintenance actions during this same period?

PG&E Response:

The DCPP program for testing ASME Code Class 1, 2, and 3 safety and relief valves, which includes the MSSVs, is described in Surveillance Test Procedure (STP) M-77, "Safety and Relief Valve Testing." A copy of STP M-77 is provided in Attachment 1. STP M-77 classifies the various safety and relief valves into groups based on valve type and manufacturer with the MSSVs comprising their own distinct group for testing purposes.

Test Frequency

STP M-77 Step 1.3.5 specifies that although the MSSVs are ASME Code Class 2 valves, per the ASME Code for the Operation and Maintenance (OM) of Nuclear Power Plants, OM-2001, Appendix I, Section I 1350(a), they are tested on the same frequency as ASME Code Class 1 valves. STP M-77 Step 3.1.1 specifies that all MSSVs are

tested within a five year period, with a minimum of 20 percent of the MSSVs tested within any 24 month period.

On line Testing

The MSSVs are testable at power using the Furmanite Trevitest System as detailed in DCPP Mechanical Maintenance Procedure MP M-4.18A, which is provided in Attachment 2. The Trevitest System places an external pulling load on the MSSV valve stem which overcomes the spring force allowing the valve to lift off its seat. Once the lift point is reached, the lift value is recorded as a permanent record. The Trevitest Mark VIII system currently used for MSSV testing per MP M-4.18A can be configured to measure the valve spindle deflection via a lift potentiometer or the valve discharge via acoustic detection. The Trevitest Mark VIII system also measures the valve inlet pressure with a pressure transducer, and the spring relaxation force with a load cell.

Test Acceptance Criteria

The initial lift for the MSSVs except for the valves with the lowest setpoint is required to be within plus or minus 3 percent of the specified setpoint. The four valves with the lowest setpoint of 1065 psig are required to lift within plus 3 percent and only minus 2 percent to ensure the MSSV does not lift before the steam generator atmospheric dump valve, which is set at 1035 psig. If the initial lift of a MSSV is outside this acceptance criteria then a corrective action notification is issued to evaluate the potential impact on the plant, and the test scope is expanded to include two additional MSSVs.

At least two consecutive, lifts without adjustment are required to be within the plus or minus 1 percent "As Left" specification in order for the MSSV to be declared acceptable.

Summary of Testing Results

Attachments 3 and 4 for Units 1 and 2, respectively, provide a detailed summary of the MSSV test data obtained for the time period since the Trevitest System has been used at DCPP.

The summary for Unit 1 shows that of the 166 MSSV tests performed, 23 valves were found with a lift setpoint greater than or equal to 2 percent and only 2 MSSVs were found Out of Tolerance with a lift setpoint greater than or equal to 3 percent. Attachment 3 also shows that 36 MSSV tests required some adjustment to obtain an "As Left" setpoint within the required plus or minus 1 percent tolerance.

The summary for Unit 2 shows that of the 125 MSSV tests performed, 19 valves were found with a lift setpoint greater than or equal to 2 percent and only 3 MSSVs were found Out of Tolerance with a lift setpoint greater than or equal to 3 percent. Attachment 4 also shows that 46 MSSV tests required some adjustment to obtain an "As Left" setpoint within the required plus or minus 1 percent tolerance.

Recent MSSV Maintenance / Failure Summary

August 2009 – Failure MSSV MS-2-RV-224

During the on line Trevitest performance for Unit 2, MSSV MS-2-RV-224 was determined to be inoperable due to a linear crack indication on the valve spring. Unit 2 reactor power was reduced and the Power Range High Flux trip setpoint was reduced to 87 percent in accordance with Technical Specification (TS) 3.7.1 Condition A.1. In addition, MSSV MS-2-RV-224 was gagged for the remainder of the operating cycle as a prudent measure. The remaining Unit 2 MSSVs and all Unit 1 MSSVs were subsequently inspected and no additional indications were identified. The MSSV MS-2-RV-224 spring was replaced during the subsequent Unit 2 Refueling Outage 15 (2R15) in November 2009 and the valve was returned to service.

November 2009 – Prudent Replacement of 2 MSSVs

During 2R15, two MSSVs were identified to have some corrosion similar to that observed on the MSSV MS-2-RV-224, which had a cracked spring as discussed previously. Although there was no adverse impact on the valves and they remained functional, they were replaced as a prudent measure.

December 2008 – Leakage MSSV-1-RV-11

Following the on-line performance of the Trevitest for Unit 1 MSSV MS-1-RV-11, the valve was found to be slightly weeping at a rate of about two drops per minute. The MSSV remained operable as the small leakage did not impact the valve functionality and the lift setpoint was verified to be within acceptable limits. The MSSV leakage was monitored for the remainder of the operating cycle and no adverse increase in the rate of leakage was noted through the time Unit 1 shutdown for refueling in late January 2009. The MSSV RV-11 spring was replaced during the Unit 1 Refueling Outage 15.

November 2005 – Leakage MSSV MS-1-RV-60

During the startup from Unit 1 Refueling Outage 13, the MSSV MS-1-RV-60 was observed to be weeping. The small amount of leakage was determined not to impact the valve function and the MSSV remained operable. A leakage monitoring program was established including administrative limits to shut down and replace the valve if the leakage exceeded the criteria. During a planned curtailment, the valve was gagged for several days in an attempt to reseal the valve seat; however, the weeping continued. The valve leakage remained steady and never increased to an unacceptable level during the remainder of the operating cycle. The MSSV MS-1-RV-60 was replaced during Unit 1 Refueling Outage 14 in May 2007.

NRC Question 4:

Because the EPRI report identified that a safety valve's performance may vary based upon the physical plant piping configuration, the staff requests the licensee evaluate the individual plant configuration in which the safeties are installed for an effect on the valve's performance.

PG&E Response:

The EPRI Report NP-4306-SR evaluated various test configurations for both inlet and discharge piping effects with respect to safety valve performance. The DCPP MSSVs discharge directly to the atmosphere and therefore the discharge piping analysis documented in EPRI Report NP-4306-SR, Section 11, is not applicable for the DCPP MSSV piping configuration. In Section 6, the EPRI Section 6 Report NP-4306-SR evaluated two basic inlet test configurations; a short vertical inlet and a loop seal configuration. For configurations which did not incorporate a loop seal, the seal was drained and this test configuration was defined as a long inlet.

The only significant effects on the observed test results described in the EPRI Report NP-4306-SR Section 6 were due to the inlet piping configuration during two phase transition and liquid relief flow conditions. The DCPP MSSVs relieve only saturated steam conditions and these effects are not applicable. The EPRI test results did describe that the safety valve performance was characteristically less stable on longer inlet configurations and sometimes required ring adjustments to obtain stable performance under steam relief conditions.

Each DCPP unit has two of the four main steam leads that are located outside and the MSSVs are attached directly to the main steam line with essentially no inlet piping. The other two main steam leads pass through the auxiliary building with the MSSVs connected to the main steam line by a vertical header 25 to 30 feet long to enable them to discharge directly to the atmosphere. However, this MSSV header is almost as large (Diameter equals 24 inches) as the main steam line itself (Diameter equals 28 inches) and is a straight pipe run that is more representative of the short inlet configuration as tested in the EPRI report and not the loop seal or long configuration. Therefore, the only effect of the header configuration is a slight increase in the total pressure drop to the MSSV inlet that occurs during MSSV relief flow conditions.

Therefore, PG&E performed a design calculation to determine the maximum total system pressure drop from the steam generator exit to the MSSV inlet for the limiting main steam line configuration for both Unit 1 and Unit 2. When Westinghouse developed the current MSSV analytical model for DCPP, they conservatively adjusted the MSSV lift and full open setpoints to bound the effects of this maximum pressure drop during relief flow conditions. These setpoint adjustments were conservatively applied to all four main steam leads and MSSVs in the analysis model irrespective of whether the lead contained an actual header configuration or not.

In summary, the DCPP MSSV piping configuration is consistent with that tested in the EPRI Report NP-4306-SR, and the MSSV analytical model used conservatively bounds the maximum system pressure drop due to the limiting MSSV header configuration.

Enclosure
Attachment 1
PG&E Letter DCL-12-065

Diablo Canyon Procedure
STP M-77, Safety and Relief Valve Testing

========== Cover Sheet ==========

Unit(s): 1&2
Procedure: STP M-77
Revision: 32
Classification: QUALITY RELATED
Title: Safety and Relief Valve Testing

Level of Use: Periodic

Issued For Use By: _____
Date: _____
Expires: _____

Completion of this cover sheet satisfies the requirement to complete the "Issued for Use" banner on the first page of the attached document.

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TITLE: Safety and Relief Valve Testing

1 AND 2

03/02/09
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

1. SCOPE

1.1 This test consists of verifying lift point settings (and recalibration IF required) of the safety and relief valves required by ASME Code for the Operation and Maintenance (OM) of Nuclear Power Plants, except as exempted.

1.2 Revision 28 of this procedure made extensive changes as required by the third 10 year In-Service Testing (IST) interval. Revision 17 of this procedure made extensive changes as required by the second 10 year IST interval. This procedure addresses the differences in test requirements between ASME Code Class 1 and ASME Code Class 2 or 3 components.

1.3 Conversion to the second 10 year IST interval added a significant number of Code Class 2 and 3 relief valves to the program. Testing of Code Class 2 and 3 relief valves was previously being performed under the Preventative Maintenance (PM) Program, so many of the valves now subject to IST have a test history. The following guidelines were used to determine when testing is first required for a valve group.

1.3.1 The previous PM testing of a valve was considered acceptable to satisfy the first 48 month interval, even though expanded testing was not part of the PM Program.

1.3.2 For any valve group which does not have a recent PM test to satisfy the first 48 month interval, one valve was selected for testing in the Eighth Refueling Outage (1R8/2R8).

1.3.3 When a valve on only one unit would have required testing to ensure the first 48 month interval was met for that unit, the corresponding valve on the other unit was tested to ensure consistency.

1.3.4 Valve manufacturer, type, size, system application, and service media were used to determine acceptable valve groups. Resultant valve groups include a maximum of 5 valves.

1.3.5 Main Steam Safety Valves (MSSV's) are ASME Code Class 2 valves. However, per Appendix I, section I-1350(a) of OM-2001, they shall be tested on the same frequency as ASME Code Class 1 valves.

1.3.6 Setpoint, as used in this procedure, generally refers to the stamped set pressure of the valve. The exception is when the manufacturer's suggested temperature correction has been applied due to service conditions; valves in the Residual Heat Removal (RHR) flowpath fall into this category.

2. RESPONSIBILITIES

2.1 Test Performer is responsible for operation of test equipment, as required, and forwarding the "As Found" data (from MP M-51.5) to the Test Director upon completion of testing Code Class 2 and 3 valves.

2.2 Test Performer is responsible for insuring test equipment used to determine valve set-pressure shall have an overall combined accuracy not to exceed ±1% of the indicated (measured) set-pressure per Appendix I, section I-1400 of OM-2001.

2.3 Test Director is responsible for reviewing test results for acceptance, reporting results, and for compiling data for Code Class 2 and 3 valves on Attachment 8.6 and 8.7.

2.4 Engineer is responsible for review of results.

3. FREQUENCY

3.1 As required by Tech Spec 5.5.8 and ASME OM-2001 Code, valves shall be tested as follows:

3.1.1 ASME Code Class 1 Safety and Relief Valves

NOTE: The 5 year test period referenced in step 3.1.1a starts from the date the Class 1 valve is last tested, not at the time of installation into service. (Refer to References 6.8 and 6.9)

a. All valves of each type and manufacturer shall be tested within each 5 year period with a minimum of 20% of the valves tested within any 24 months. This 20% shall be previously untested valves, if they exist.

b. Attachment 8.3 indicates minimum test requirements.

c. MSSV's are testable at power. Test requirements for these valves may be satisfied anytime during the operating cycle, provided the 20% within any 24 months criteria of step 3.1.2a is met.

3.1.2 ASME Code Class 2 and 3 Relief Valves

NOTE: The 10 year test period referenced in step 3.1.2a starts from the date the Class 2 or 3 valve is last tested, not at the time of installation into service.

a. All valves within a valve group, with the exception of MSSV's, shall be tested within each 10 year period, with a minimum of 20% of the valves tested within any 48 months. This 20% shall be previously untested valves, if they exist.

3.2 Testing of Valves after Replacement with Pretested Valves.

3.2.1 ASME Code Class 1 Safety and Relief Valves

a. If testing is satisfied by installing a partial complement of pretested valves for a valve group, the valves removed from the system shall be set pressure tested prior to the resumption of electric power generation. In practice, set pressure testing of removed valves shall be performed as soon as possible after the valve has been removed to allow any expanded testing (step 3.3) to be performed with minimum effect on the outage.

b. If testing is satisfied by installing a full complement of pretested valves for a valve group, the valves removed from the system shall be set pressure tested within 12 months of removal from the system.

c. If "As Found" setpoint criteria is not met for any valve, then a Notification must be written to evaluate the condition. If the setpoint is exceeded by ±3%, expanded testing per step 3.3 is required.

3.2.2 ASME Code Class 2 and 3 Safety and Relief Valves

a. Although the code required time interval for testing valves replaced with a partial complement of pretested valves is different for Class 2 and 3 valves, DCPP will apply the same criteria as is used for Code Class 1 valves outlined in step 3.2.1. This will allow the evaluation of the need for expanded testing, as required by the Code, prior to the resumption of electric power generation.

3.3 Expansion of Test Scope

3.3.1 Additional valves shall be tested in accordance with the following requirements.

a. If the "As Found" set-pressure of any valve exceeds the greater of either its acceptance criteria, or the valve setpoint by ±3%, 2 additional valves, in that group, shall be tested for each failure up to the total number of valves in that group.

NOTE 1: Expanded testing is based upon valve groups. In this section, references to testing 2 additional valves mean 2 additional valves within that valve group. Additionally, for groups with only 2 valves, testing the 1 additional valve in that group satisfies the Code requirements.

NOTE 2: If all valves within a valve group are tested, expanded testing requirements are not applicable.

b. If any of the additional valves tested exceeds its setpoint criteria by ±3%, then all remaining valves within that group shall be tested.

4. TECHNICAL SPECIFICATIONS

4.1 This procedure satisfies Technical Specification Surveillance Requirements 5.5.8, SR 3.4.10.1 and SR 3.7.1.1, and ECG SR 7.3.

5. ACCEPTANCE CRITERIA

5.1 Main Steam Safety Valves

5.1.1 Initial lift acceptance criteria for all valves, except those set at 1065 psig, is ±3% of the specified setpoint.

a. For valves with a setpoint of 1065 psig (RV-3, -7, -11 and -58), initial lift acceptance criteria is +3%, -2%.

5.1.2 At least two consecutive lifts without adjustment are required to be within the ±1% "As Left" specification for the valve to be acceptable.

5.2 Pressurizer Safety Valves

5.2.1 Initial lift acceptance criteria is -3%, +2.3% of specified setpoint of 2485 psig.[T36485]

5.2.2 At least two consecutive lifts without adjustment are required to be within the ±1% "As Left" specification for the valve to be acceptable.

5.3 Class 2/3 Relief Valves

5.3.1 Acceptance criteria is ±3% of setpoint for most valves. Exceptions are as follows:

a. Valves with a setpoint of 70 psig or less - acceptance criteria is ±2 psig of setpoint.

b. Valves RV-930 and RV-931 (Spray Additive Tank Vacuum Breakers) - acceptance criteria is -1.5 ±0.9" Hg (0.6 to 2.4" Hg Vacuum).

5.3.2 Acceptance criteria for each valve is listed within the setpoint section of the applicable functional location within SAP. If no data is available in the setpoint section, guidance on acceptable criteria is provided in MP M-51.5.

5.4 IF setpoint criteria is not met on the initial lift during testing,
THEN a Notification must be written. If lift point exceeds the setpoint by ±3%, expanded testing is required. Refer to step 3.3.

6. REFERENCES

6.1 AD13.ID5, "Inservice Testing Program"

6.2 MP M-4.9, "Main Steam Safety Valve Setpoint Testing/Setting Using Steam"

6.3 MP M-4.18A "Verification of Main Steam Safety Valve Lift Point Using Furmanite's Trevitest Equipment"

6.4 MP M-7.36, "Pressurizer Safety Valve Lift Point Setting Using Steam"

6.5 MP M-51.5, "Testing and Maintenance of Safety Relief Valves"

6.6 Diablo Canyon Power Plant IST Program Plan

6.7 Engineering Calculation STA-211, System Overpressure Protection Devices Safety Function Design Basis for IST Program

6.8 Notification 50086229, "NRC / ASME Symposium on In-service Testing"

6.9 NUREG/CP-0152, Volume 7 "Proceedings of the Tenth NRC / ASME Symposium on Valves, Pumps and In-service Testing" Pages 2A:28 - 2A:29

6.10 Title 10 of the Code of Federal Regulations, Part 50, Section 50.55a (10 CFR 50.55a)

6.11 ASME OM Code-2001, "Code for Operation and Maintenance of Nuclear Power Plants," including addenda through the 2003 Addenda

7. APPENDICES

None

8. ATTACHMENTS

8.1 "Valves Tested To ASME Class 1 Criteria," 06/01/02

8.2 "Valves Tested To ASME Class 2/3 Criteria," 02/15/09

8.3 "Test Schedule - Valves Tested to Class 1 Criteria," 06/01/06

8.4 "Test Schedule - Valves Tested to Class 2/3 Criteria," 02/28/08

8.5 "Pressurizer Safety Valves Data Sheet," 03/23/07

8.6 "Main Steam Safety Valves Data Sheet," 03/23/07

8.7 "Class 2/3 Relief Valves Data Sheet," 06/01/06

9. PRECAUTIONS AND LIMITATIONS

None

10. PREREQUISITES

10.1 The potential for expanded scope should be evaluated and valves chosen to satisfy any additional test requirements prior to test performance.

11. PROCEDURE

11.1 Pressurizer Safety Valves

11.1.1 Perform testing as detailed in MP M-7.36.

11.2 Main Steam Safety Valves

NOTE: One valve per each steam lead can be tested in MODE 1 (Reference Tech Spec 3.7.1).

11.2.1 Perform testing as detailed in MP M-4.9 or MP M-4.18A.

11.2.2 After valve refurbishment, perform testing per MP M-4.9.

11.3 Class 2/3 Relief Valves

11.3.1 Perform relief valve testing as detailed in MP M-51.5.

11.3.2 Test the Spray Additive Tank Vacuum Breakers using a currently calibrated vacuum gage and a vacuum source of sufficient capacity to verify acceptance criteria per step 5.3.1b.

12. DATA REDUCTION AND EVALUATION

12.1 Test Performer, Test Director and Maintenance Engineer complete and review the following Data Sheets, as appropriate:

12.1.1 Attachment 8.5 - Pressurizer Safety Valves Data Sheet.

12.1.2 Attachment 8.6 - Main Steam Safety Valves Data Sheet.

12.1.3 Attachment 8.7 - Class 2/3 Relief Valves Data Sheet.

13. REVIEW AND ROUTING

13.1 Data Sheets shall be placed in RMS and retained for the life of the component.

DIABLO CANYON POWER PLANT
STP M-77
ATTACHMENT 8.1

1 AND 2

TITLE: Valves Tested To ASME Class 1 Criteria

1. Pressurizer Safety Valves (Units 1 & 2)

VALVE	SETPOINT	ASME CLASS
8010A	2485	1
8010B	2485	1
8010C	2485	1

2. Main Steam Safety Valves

VALVE	SETPOINT	ASME CLASS
RV-3	1065	2
RV-4	1078	2
RV-5	1090	2
RV-6	1103	2
RV-7	1065	2
RV-8	1078	2
RV-9	1090	2
RV-10	1103	2
RV-11	1065	2
RV-12	1078	2
RV-13	1090	2
RV-14	1103	2
RV-58	1065	2
RV-59	1078	2
RV-60	1090	2
RV-61	1103	2
RV-222	1115	2
RV-223	1115	2
RV-224	1115	2
RV-225	1115	2

DIABLO CANYON POWER PLANT
STP M-77
ATTACHMENT 8.2

1 AND 2

TITLE: Valves Tested To ASME Class 2/3 Criteria

VALVE NO.	GROUP NO. (NOTE 1)	DESCRIPTION	BENCH SETPOINT (NOTE 2)	ASME CLASS
CVCS-8117	N/A	PENETRATION 35 (LETDOWN)	600	2
RHR-8707	N/A	RHR SUCTION RELIEF	455	2
CS-930	B	SPRAY ADD TANK VAC BKR	1.5 in. Hg vac	2
CS-931		SPRAY ADD TANK VAC BKR	1.5 in. Hg vac	2
CVCS-8121	D	RCP SEAL RET HDR INSIDE CONTAINMENT	150	2
CVCS-8123		SEAL WATER HX	150	2
SI-8856A	E	RHR DISCH HDR PP 1	606	2
SI-8856B		RHR DISCH HDR PP 2	606	2
RHR-8708	F	RHR DISCH TO HOT LEG	606	2
SI-8851		SI COLD LEG	1750	2
SI-8858		SI SUCTION RELIEF	220	2
SI-8853A		SI PP 1 DISCH	1750	2
SI-8853B		SI PP 2 DISCH	1750	2
CS-8987	N/A	SPRAY ADD TANK RELIEF	10	2
FW-536	H	AFW PP SUCTION	100	3
FW-537		AFW PP SUCTION	100	3
SI-8855A	J	SI ACCUMULATOR 1	700	2
SI-8855B		SI ACCUMULATOR 2	700	2
SI-8855C		SI ACCUMULATOR 3	700	2
SI-8855D		SI ACCUMULATOR 4	700	2
CS-9007A	K	CONTMT SPRAY PENETRATION	260	2
CS-9007B		CONTMT SPRAY PENETRATION	260	2
CVCS-8125		CVCS SUCTION RELIEF	220	2

STP M-77 (UNITS 1 AND 2)
ATTACHMENT 8.2

TITLE: Valves Tested To ASME Class 2/3 Criteria

VALVE NO.	GROUP NO. (NOTE 1)	DESCRIPTION	BENCH SETPOINT (NOTE 2)	ASME CLASS
CCW-45	P	CCW SURGE TANK	30	3
CCW-51		RCP LUBE OIL COOLING CCW RELIEF	150	3
CCW-52		EXCESS LETDOWN HX	150	2
CCW-46	R	RHR HX 1	70	3
CCW-47		RHR HX 2	70	3
CCW-41	S	RCP THERMAL BARRIER	2485	3
CCW-42		RCP THERMAL BARRIER	2485	3
CCW-43		RCP THERMAL BARRIER	2485	3
CCW-44		RCP THERMAL BARRIER	2485	3

NOTE 1: Valves are divided into groups for test purposes. When N/A is present in this column, valve is unique and is tested on a nominal 48 month frequency.

NOTE 2: Setpoints noted here for convenience only. If a conflict exists between this number and the setpoint listed for the applicable functional location within SAP, the SAP functional location data shall be considered the official setpoint. Setpoints are PSIG unless otherwise noted. SAP functional location history must be used for setpoints of installed components if a setpoint change is in progress (refer to A0431672 for an example of this situation).

DIABLO CANYON POWER PLANT
STP M-77
ATTACHMENT 8.3

1 AND 2

TITLE: Test Schedule - Valves Tested to Class 1 Criteria

SERVICE	VALVE NO.	REFUELING OUTAGE		COMMENTS
		8	9	
PZR Safety Valves (PSV's)	RCS-8010A	X		(1) This schedule to repeat in Outage 10 and beyond. (2) This schedule would satisfy code requirements if current practice changes. Current practice is to changeout and test all valves each outage.
	RCS-8010B		X	
	RCS-8010C		X	
Main Steam Safety Valves (MSSV's)	RV-3	X		(3) This schedule to repeat in Outage 10 and beyond. (NOTE 1)
	RV-4	X		
	RV-5	X		
	RV-6	X		
	RV-7	X		
	RV-8	X		
	RV-9	X		
	RV-10	X		
	RV-11		X	
	RV-12		X	
	RV-13		X	
	RV-14		X	
	RV-58		X	
	RV-59		X	
	RV-60		X	
	RV-61		X	
	RV-222	X		
	RV-223	X		
	RV-224		X	
	RV-225		X	

NOTE 1: Testing may be performed in MODES 1 through 6, either pre-outage or post-outage.

DIABLO CANYON POWER PLANT
STP M-77
ATTACHMENT 8.4

1 AND 2

TITLE: Test Schedule - Valves Tested to Class 2/3 Criteria

GROUP	VALVE	REFUELING OUTAGE NUMBER														
		8	9	10	11	12	13	14	15	16	17	18	19	20	21	
N/A	CVCS-8117	X		X		X		X		X		X		X		
N/A	RHR-8707		X		X		X		X		X		X		X	
B	CS-930		X*		X*		X*		X*		X*		X*		X*	*(NOTE 1)
	CS-931		X*		X*		X*		X*		X*		X*		X*	*(NOTE 1)
D	CVCS-8121	X				X				X				X		
	CVCS-8123			X				X				X				
E	SI-8856A			X				X				X				
	SI-8856B	X				X				X				X		

STP M-77 (UNITS 1 AND 2)
ATTACHMENT 8.4

TITLE: Test Schedule - Valves Tested to Class 2/3 Criteria

		REFUELING OUTAGE NUMBER													
GROUP	VALVE	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
F	RHR-8708		X				X				X				X	
	SI-8851			X				X				X				
	SI-8858				X				X				X			
	SI-8853A	X*				X				X				X		*(NOTE 2)
	SI-8853B	X*				X				X				X		*(NOTE 2)
N/A	CS-8987		X*		X*		X*		X*		X*		X*		X*	*(NOTE 1)
H	FW-536	X				X				X				X		
	FW-537			X				X				X				
J	SI-8855A	X*				X				X				X		*(NOTE 3)
	SI-8855B		X				X				X				X	
	SI-8855C			X				X				X				
	SI-8855D				X				X				X			

STP M-77 (UNITS 1 AND 2)
ATTACHMENT 8.4

TITLE: Test Schedule - Valves Tested to Class 2/3 Criteria

		REFUELING OUTAGE NUMBER													
GROUP	VALVE	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
K	CS-9007A		X			X			X			X			X	
	CS-9007B			X			X			X			X			
	CVCS-8125	X*			X			X			X			X		*(NOTE 4)
P	CCW-45	X*			X			X			X			X		*(NOTE 2)
	CCW-51		X			X			X			X			X	
	CCW-52			X			X			X			X			
R	CCW-46			X				X*				X				*(NOTE 5)
	CCW-47	X				X				X				X		
S	CCW-41		X				X				X				X	
	CCW-42			X				X				X				
	CCW-43				X				X				X			
	CCW-44	X*				X				X				X		*(NOTE 2)

NOTE 1: Testing may be performed in MODES 1 through 6, either pre-outage or post-outage.

NOTE 2: Testing not required for either unit in Outage 8; block is marked for future rotation.

NOTE 3: Testing required for Unit 2 only in Outage 8.

NOTE 4: Testing not required for either unit in Outage 8; block is marked for future rotation. Testing marked for Outage 11 for CVCS-2-RV-8125 was deferred to Outage 12 (A0569796). Testing marked for outage 14 for CVCS-2-RV-8125 is deferred to outage 15 (A0719824). Return CVCS-2-RV-8125 to schedule as shown in outage 17.

NOTE 5: Test marked for Unit One RV-46 is deferred on a one time basis to 1R15, Ref. A0695761.

DIABLO CANYON POWER PLANT
STP M-77
ATTACHMENT 8.5

1 AND 2

TITLE: Pressurizer Safety Valves Data Sheet

WORK ORDER _____

UNIT _____ REFUELING OUTAGE _____

VALVE	SERIAL NO.	SET-POINT	AS FOUND ACCEPT. RANGE	WORK ORDER	AS FOUND	AS LEFT (±1% OF SETPOINT)	PERFORMED BY
8010 A	_____	2485	2411-2542	_____	_____	_____	_____
8010 B	_____	2485	2411-2542	_____	_____	_____	_____
8010 C	_____	2485	2411-2542	_____	_____	_____	_____

Test Director:

Valves Acceptable (As Left) Yes _____ No _____

Valves meet design and functional requirements * Yes _____ No _____

* IF all valves are not changed out in any given outage AND this is no, THEN contact Shift Foreman

_____ _____
Test Director Date

Engineer Review:

_____ _____
Engineer Date

DIABLO CANYON POWER PLANT
STP M-77
ATTACHMENT 8.6

1 AND 2

TITLE: Main Steam Safety Valves Data Sheet

WORK ORDER _____

UNIT _____ REFUELING OUTAGE _____

VALVE	SERIAL NO.	SET-POINT	AS FOUND ACCEPT. RANGE	WORK ORDER	AS FOUND	AS LEFT (±1% OF SETPOINT)	PERFORMED BY
3	_____	1065	1044-1097	_____	_____	_____	_____
4	_____	1078	1046-1110	_____	_____	_____	_____
5	_____	1090	1057-1123	_____	_____	_____	_____
6	_____	1103	1070-1136	_____	_____	_____	_____
7	_____	1065	1044-1097	_____	_____	_____	_____
8	_____	1078	1046-1110	_____	_____	_____	_____
9	_____	1090	1057-1123	_____	_____	_____	_____
10	_____	1103	1070-1136	_____	_____	_____	_____
11	_____	1065	1044-1097	_____	_____	_____	_____
12	_____	1078	1046-1110	_____	_____	_____	_____
13	_____	1090	1057-1123	_____	_____	_____	_____
14	_____	1103	1070-1136	_____	_____	_____	_____
58	_____	1065	1044-1097	_____	_____	_____	_____
59	_____	1078	1046-1110	_____	_____	_____	_____
60	_____	1090	1057-1123	_____	_____	_____	_____
61	_____	1103	1070-1136	_____	_____	_____	_____
222	_____	1115	1082-1148	_____	_____	_____	_____
223	_____	1115	1082-1148	_____	_____	_____	_____
224	_____	1115	1082-1148	_____	_____	_____	_____
225	_____	1115	1082-1148	_____	_____	_____	_____

STP M-77 (UNITS 1 AND 2)
ATTACHMENT 8.6

TITLE: Main Steam Safety Valves Data Sheet

Test Director:

Valves Acceptable (As Left)	Yes _____	No _____
Valves meet design and functional requirements *	Yes _____	No _____

* IF no, THEN contact Shift Foreman

_____ _____
Test Director Date

Engineer Review:

_____ _____
Engineer Date

DIABLO CANYON POWER PLANT
STP M-77
ATTACHMENT 8.7

1 AND 2

TITLE: Class 2/3 Relief Valves Data Sheet

WORK ORDER _____

UNIT _____ REFUELING OUTAGE _____

NOTE: Summarize testing of relief valves performed in the table below:

VALVE NO.	BENCH SETPOINT (PSIG**)	ACCEPTANCE RANGE (PSIG**)	AS FOUND* (PSIG**)	WORK ORDER	PERFORMED BY

Continue on additional sheet(s) [ ]

* "As Left" data is not applicable for valves removed from the system; all valves are either refurbished and tested prior to installation by MP M-51.5 or discarded if refurbishment is not feasible. "As Found" data only is required for this procedure.

** If data is other than psig, include units in these columns.

The following signatures indicate that all RV testing required this refueling outage (including any scope expansion) is complete.

_____ _____
Test Director Date

Engineer Review:

_____ _____
Engineer Date

Enclosure
Attachment 2
PG&E Letter DCL-12-065

Diablo Canyon Procedure
MP M-4.18A, Verification of Main Steam Safety Valve Lift Point with the Furmanite Trevitest

========== Cover Sheet ==========

Unit(s): 1&2

Procedure: MP M-4.18A

Revision: 10

Classification: QUALITY RELATED

Title: Verification of Main Steam Safety Valve Lift Point with the Furmanite Trevitest

Level of Use: Periodic

Issued For Use By: _____

Date: _____

Expires: _____

Completion of this cover sheet satisfies the requirement to complete the "Issued for Use" banner on the first page of the attached document.

==========

Verification of Main Steam Safety Valve Lift Point with the Furmanite Trevitest

03/16/11
Effective Date

QUALITY RELATED

Table of Contents

1. SCOPE

1.1 Provide direction for lift point verification of the Main Steam Safety Valves (MSSVs) using the Trevitest System utilized by Furmanite.[T31130]

2. DISCUSSION

2.1 Trevitest System places an external pulling load on the relief valve stem. This overcomes spring forces allowing valve to lift off its seat. Once lift point is reached, the relief valve closes. Lift point is then recorded and becomes a permanent record. Calibration checks are also recorded and placed permanently in the order package.

2.2 The Trevitest Mark VIII can measure spindle deflection, (lift potentiometer) or valve discharge (acoustic detection), as well as inlet pressure (pressure transducer). This is in addition to measuring the spring relaxation force (load cell) that had been available with the Mark V.

3. REFERENCES

3.1 AD1.ID2, "Procedure Process Control"

3.2 MP M-4.16, "Main Steam Safety Valve Leakby Mitigation"

3.3 OP1. DC20, "Sealed Components"

3.4 OP O-12, "Operation of Manual Containment Isolation Valves"

3.5 STP M 77, "Safety and Relief Valve Testing"

3.6 Tech Spec 3.7.1, "Main Steam Safety Valves (MSSVs)

3.7 Tech Spec 3.6.3, "Containment Isolation Valves"

3.8 BD M-4.18A, "Basis Document for Main Steam Safety Valve Lift Test"

3.9 Furmanite's Trevitest Operations Manual

4. ACCEPTANCE CRITERIA

4.1 Acceptance criteria is the satisfactory completion of the applicable parts of the procedure.

5. PREREQUISITES

5.1 Furmanite's Trevitest operations manual for the test equipment being used (Mark V or Mark VIII) has been approved for use on site PER AD1.ID2.

5.2 Plant shall be in either of the following conditions for testing:

5.2.1 Mode 1, power between 30% and 100% (750 - 820 psig).

5.2.2 Mode 3, Tave at approximately 520°F (750 - 900 psig).

- Testing outside the indicated pressure may be performed with an engineering evaluation to consider adequate test equipment capacity and adequate valve spring closing force.

6. PRECAUTIONS AND LIMITATIONS

6.1 Operations shall be notified immediately after any valve lifts outside of the acceptable range provided in Attachment 1.

- This is to allow required actions of Tech Spec 3.7.1 to be met in the required completion time in the event the valve is declared inoperable.
  - Required actions of Tech Spec 3.7.1 include having I&C reduce the power range high neutron flux trip setpoints.

6.2 Only one valve at a time can be tested on each steam generator header.

6.3 To avoid risk of damage to Trevitest equipment, do not exceed recommended working ranges or use it in situations for which it was not designed.

6.4 MSSV lift point verification requires opening of the following containment isolation valves which can only be opened in accordance with OP O-12:

6.4.1 Header 1-1 - PT-515 Test Connection Valve 1-04P-12A

6.4.2 Header 2-1 - PT-514 Test Connection Valve 2-04P-117

6.4.3 Header 1-2 - PT-524 Test Connection Valve 1-04P-100

6.4.4 Header 2-2 - PT-524 Test Connection Valve 2-04P-100

6.4.5 Header 1-3 - MS-1-909

6.4.6 Header 1-4 - MS-1-908

6.4.7 Header 2-3 - MS-2-909

6.4.8 Header 2-4 - MS-2-908

6.5 MSSV lift point verification in Mode 1 requires two-way communication between test site and Control Room.

- Pager/phone at test site is acceptable.

7. INSTRUCTIONS

7.1 Main Steam Safety Test Preparation

7.1.1 Recognize that the steps in this section may be performed in any order.

7.1.2 Notify Radiation Protection for any special restrictions on valve discharge before lifting safety valves (required in the event that a primary to secondary leak exists).

7.1.3 Ensure tailboard includes the following:

- Ensuring craft persons, contractors and test directors understand critical test points.
- Requirement that engineering always be present during actual testing (not necessarily during setup, delays or teardowns).
- Persons taking pressure readings are fully informed as to correct method and timing of readings.
- Appointed engineer will serve as test director.
- Requirements of OP1.DC20 for sealed components.
- Requirements of OP O-12 for containment isolation valves.

7.1.4 Gather required equipment, gauges, fitting, hoses, etc., and assembling test equipment prior to scheduled start of this test.

- At the start of testing, 2 sets of calibrated test equipment should be available.
  - Load cell
  - Digital Trevitest recorder
  - Hydraulic box
- Ensure high accuracy pressure gauges (e.g., Heise) to be used have appropriate ranges for testing.
- For tool list, see EDMS/NPG Library/ Maintenance Services/Mechanical Maintenance/Tools

7.1.5 IF only one set of calibrated test equipment is available at the start of testing,
THEN supervisor authorization shall be obtained prior to testing. [ ]N/A

NOTE: Expected lift point is setpoint of valve being tested.

CAUTION 1: Main Steam pressure must be no higher than 100 psi below the valve's expected lift point to ensure rapid closure of safety valve after lifting.

CAUTION 2: IF system pressure approaches a lift setpoint, THEN lifted safety must be immediately closed or testing must be aborted immediately.

7.1.6 Record the following information in order summary:

- Pressure gauge number, range and calibration due date.
- Temperature gauge number and calibration due date.

7.1.7 Record/SELECT the following information on Attachment 1:

- Unit, valve, serial number and order
- Setpoint, As Found and As Left Acceptance Range

7.1.8 Trevitest to record the following information on their calibration report printout:

- Trevitest Recorder serial number
- Ring gauge size and serial number
- Load cell serial number and size

7.1.9 Trevitest operator to verify testing equipment is sized properly for valve lifts for Consolidated 3707 Rs prior to testing.

a. Calculate force required to lift valve using formula on Attachment 2.

b. Calculate hydraulic pressure setting using formula on Attachment 2.

7.2 Trevitest Equipment Pre-Test Calibration

7.2.1 Perform Pre-Test Calibration PER Furmanite's Trevitest Operations Manual.

a. Pre-test calibration is required only once per shift at the beginning of the test.

b. Calibration from the last shift's post-test calibration may be used as the current pre-test calibration.

HOLD POINT: The following step requires verification on Attachment 1 before continuing this procedure.

7.2.2 Engineer initial indicating pre-test calibration of Trevitest test equipment is complete and acceptable.

7.3 Safety Valve Preparation

7.3.1 Remove valve cap.

7.3.2 Visually inspect spring as follows:

a. Check spring for cracks.

b. Check spring and spindle area for any problems which could bind or interfere with valve operation.

c. Check general condition of entire valve.

d. Document inspection on Attachment 1.

7.3.3 Ensure no accumulation of rust, scale, or other foreign substance that could interfere with free operations of valve, is on valve body or in vent piping.

7.3.4 Verify current calibration of test gauges prior to testing.

a. Recognize that ranges to be used are as follows:
- 750 - 820 psig - Mode 1 testing.
- 750 - 900 psig - Mode 3 testing.

b. Document verification on Attachment 1.

CAUTION:	A voltage drop will occur if more than two 40' leads are used.

7.3.5 Locate Trevitest equipment as far away as necessary from valve being tested.

CAUTION:	There is a potential for a momentary bistable trip when valving in test gauges.

7.3.6 Prior to connecting pressure transducer adapters and pressure transducer to Main Steam vent valve or test connection, perform the following:

a. Prior to installing or valving in test gauges to any pressure tap (Steam leads 1 and 2 only), contact Control Room to verify no coincident bistables are tripped.

b. Notify SFM that the plant is about to be placed in Tech Spec LCO 3.6.3.

CAUTION 1:	There is a potential for a momentary bistable trip when valving in test gauges.
CAUTION 2:	Lines must not be blown out when connecting pressure gauges.
CAUTION 3:	Root valves must not be repositioned closed.

7.3.7 Connect pressure transducer adapters and pressure transducer to Main Steam vent valve or test connection.

a. Recognize that test gauge should be placed ±6" from point of attachment to root valve vertically.

NOTE: Depending on test results, STP M-77 may require testing of additional valves.

b. IF working on Unit 1,
THEN make connections as follows: [ ]N/A

1. IF testing valves on Header 1-1,
THEN connect to PT-515 Test Connection
Valve 1-04P-12A. [ ]N/A

2. IF testing valves on Header 1-2,
THEN connect to PT-524 Test Connection
Valve 1-04P-100 [ ]N/A

3. IF testing valves on Header 1-3,
THEN connect to MS-1-909. [ ]N/A

a) Recognize that this valve is a seal closed valve and subject to the requirements of OP1.DC20.

b) IF vent valve is not available,
THEN use PT-536A. [ ]N/A

4. IF testing valves on Header 1-4,
THEN connect to MS-1-908. [ ]N/A

a) Recognize that this valve is a seal closed valve and subject to the requirements of OP1.DC20.

b) IF vent valve is not available,
THEN use PT-546A. [ ]N/A

NOTE: Depending on test results, STP M-77 may require testing of additional valves.

c. IF working on Unit 2,
THEN make connections as follows: [ ]N/A

1. IF testing valves on Header 2-1,
THEN connect to PT-514 Test Connection
Valve 2-04P-117. [ ]N/A

2. IF testing valves on Header 2-2 ,
THEN connect to PT-524 Test Connection
Valve 2-04P-100. [ ]N/A

3. IF testing valves on Header 2-3,
THEN connect to MS-2-909. [ ]N/A

   a) Recognize that this valve is a seal closed valve and subject to the requirements of OP1.DC20.

   b) IF vent valve is not available,
   THEN use PT-536A. [ ]N/A

4. IF testing valves on Header 2-4 ,
THEN connect to MS-2-908. [ ]N/A

   a) Recognize that this valve is a seal closed valve and subject to the requirements of OP1.DC20.

   b) IF vent valve is not available,
   THEN use PT-546A. [ ]N/A

7.4 Trevitest Valve Testing Equipment Setup

7.4.1 Setup testing equipment PER Furmanite's Trevitest Operations Manual.

7.5 Main Steam Safety Valve Testing

7.5.1 Recognize that a separate Attachment 1 is required to be completed for each valve tested.

7.5.2 Before valve is lifted off seat, perform the following:

a. Notify RP in case primary to secondary leakage requires extra RP measures to be in place on valve discharge.

CAUTION 1: Only one valve at a time may be tested on each S/G header.

CAUTION 2: Trevitest equipment must be post calibration checked at the end of each shift. This calibration can be used as the pre-test calibration for the next shift.

b. Obtain permission to test from SFM.

1. Communicate with Control Room immediately prior to and immediately after testing each valve.

c. Ensure system pressure is correct as follows:

NOTE 1: Main Steam Relief Valve header pressure is no higher than 900 psig or an engineering evaluation is required.

NOTE 2: Expected lift point is the setpoint of the valve being tested.

1. Verify Control Room steam header pressure indication is within 5% of test pressure gauge indication.

2. IF testing in Mode 1,
THEN verify system pressure is 750 psig (minimum). [ ]N/A

3. Record system pressure on Attachment 1.

d. Input into Trevitest database, the following information:
- Valve ID
- Test Number
- System Pressure
- Serial Number

e. Record valve spring temperature on Attachment 1.

f. Perform As Found leak tightness check.

1. Verify seat leakage tightness by audible and/or visual means as described below:
   - Audible: no simmer or chugging noise.
   - Visual: no steam vapor emitting from valve discharge.

2. Document As Found leak tightness on Attachment 1.

3. IF seat leakage is evident,
   THEN recognize that engineering is to evaluate via notification. [ ]N/A
   - Evaluation is to consider gagging the affected valve in accordance with MP M-4.16 or reduce main steam line pressure or both prior to lift point testing.

7.5.3 Notify Senior Control Operator (SCO) or Control Operator (CO) that testing is ready to begin.

7.5.4 Ensure Trevitest, set-up is in Ready to Test status.

7.5.5 Lift test valve as follows:

a. Ensure lift needle valve is open enough to achieve lift as per calculations.

b. Fully open lower needle valve.

c. Position lower operated control valve to lift position.

d. Operate Trevitest equipment to lift valve spindle.

1. Exercise care when using low forces to ensure that hydraulic pressure regulator is set correctly.

2. IF valve sticks
OR stays open after lifting
THEN immediately perform the following: [ ]N/A

a) Stop test.

b) Apply hydraulic force to open valve beyond point of sticking, then quickly release hydraulic pressure.

3. IF valve sticks
OR stays open after lifting
THEN perform the following: [ ]N/A

a) Notify SFM that valve remained open after lifting.

b) Obtain permission to continue with test from SFM.

e. Observe graph or trace being produced.

- When lift force, and acoustic detection if used, have been recorded, release control valve lever. It automatically returns to neutral position.

f. Record data from test on Attachment 1.

NOTE: Lift point must be calculated/verified using lift point formula on Attachment 2.

7.5.6 Perform 2 lifts starting with step 7.5.4 before making any valve compression screw adjustments. .

a. Recognize the following:

- A five minute duration is required between lifts.
- A minimum of 2 verification lifts within As Left specifications are required to comply with ASME Code testing requirements.
- No adjustment is permitted between verification lifts.
- Additional verification lifts may be performed at engineering test director's discretion to confirm the setpoint is within As Left specifications.
- Two lifts are required to provide data for evaluating seat sticking.
- Mark V bridge voltage will tend to fluctuate during testing but it should not affect test results if within 0.030" of pre calibration bridge voltage.

CAUTION: Delay in notifying SFM for lifts that are not within specifications of Attachment 1 could cause tech spec requirements not to be met.

b. IF first lift is not within As Found specifications (see Attachment 1),
THEN perform the following: [ ]N/A

1. Immediately notify SFM.

2. Create a notification.

3. Document out of specification condition on Attachment 1.

c. IF second lift is not within As Left specifications (see Attachment 1), THEN perform the following: [ ]N/A

1. IF NOT already performed for the valve being tested, THEN perform the following:

   a) Immediately notify SFM.

   b) Create a notification.

2. Prior to making adjustments to MSSV, ensure test equipment (see step 7.5.4) and MSSV are functioning properly.

NOTE: For MSSV compression screw, there is approximately 15 ±5 psig per flat of adjustment.

3. Adjust compression screw and retest valve starting with step 7.5.4.

4. Following adjustment, tighten adjusting nut/locknut assembly prior to any additional testing.[T35414]

d. Document As Left leak tightness Attachment 1.

1. Verify seat leakage tightness by audible and/or visual means as described below:
   - Audible: no simmer or chugging noise.
   - Visual: no steam vapor emitting from valve discharge.

NOTE: At engineer's discretion, leaking valves may have their setpoint re-established to a higher value within Acceptance Range.

e. Recognize that MSSVs that leak after testing shall have their lift point setting reanalyzed by test director and a notification is to be initiated.

f. IF test results become suspect indicating unusual behavior, THEN stop test and evaluate as follows: [ ]N/A

1. Do not make excessive (more than three flats) adjustments without thoroughly verifying equipment and valve are functioning properly.

2. Based on prior As Left data, check that adjustments are reasonable and valve is responding in a predictable manner.

3. Verify test connections are correct and test equipment is responding correctly.
   - IF suspect, THEN use backup test equipment to proceed with verification of test results. [ ]N/A

4. Perform a post calibration check PER Section 7.7 at the first opportunity.

NOTE: Engineer is to determine whether continued valve lifting will affect lift point setting or whether valve is damaged making lift point setting indeterminate.

7.5.7 Notify SCO or CO that:
- Setpoints have been established.
- Test is complete.

7.5.8 Remove Trevitest equipment from valve.
- Perform post calibration check PER Section 7.7 after each shift.

NOTE: This post calibration check can be the pre-test calibration for the following shift.

7.6 Main Steam Safety Valve Restoration

CAUTION 1: There is a potential for a momentary bistable trip when valving in test gauges. Prior to removing or valving out test gauges to any pressure tap (steam leads 1 and 2 only), Control Room must be notified to verify no coincident bistables are tripped.

CAUTION 2: Lines must not be blown out when connecting pressure gauges.

CAUTION 3: Root valves must not be repositioned closed.

7.6.1 Recognize the following test connection restoration requirements:

- After all safety valves on a header have been tested, the test connections shall be disconnected and the caps reinstalled.
- Independent verification of test gauge removal is required to be documented on Attachment 1 (test data record).
- IF test connections are needed for testing of additional safety valves on a header,
  THEN record on Attachment 1 which safety valve test data record will document the independent verification of test gauge removal.

[ ]N/A

7.6.2 Check tightness of compression locknut.[T35414]

7.6.3 Install valve cap and lead seal.

NOTE: Sealing may be accomplished by Furmanite or the company.

7.6.4 Complete Attachment 1 and forward to engineer for review.

7.6.5 At the end of testing, have all pressure gauges rechecked for range calibration.

a. Calibration check should be made at pressures within 10 psig of line pressure used during testing.

7.7 Trevitest Equipment Post-Test Calibration

7.7.1 Perform Post-Test Calibration PER Furmanite's Trevitest Operations Manual at the end of each shift. This calibration may be used as the pre-test calibration for the next shift.

7.7.2 All discrepancies noted in the post calibration verification will be resolved prior to accepting test results.

a. IF any post calibration test fails,
THEN notify engineering. [ ]N/A

7.7.3 IF retesting is required,
THEN SFM will be notified and retesting started as soon as possible. [ ]N/A

HOLD POINT: The following step requires verification on Attachment 1 before completing this procedure.

7.7.4 Post calibration of Trevitest test equipment is complete and acceptable.

7.8 Documentation and Notification

7.8.1 Appointed engineer, will serve as test director, and shall ensure:

a. Test results are signed and dated thereby verifying, to the best of his/her knowledge, their accuracy, and that the test was conducted per this procedure.

b. Instrumentation used in testing has not exceeded its calibration period.

c. Test results are fully documented on STP M-77 data sheets, as required, and are forwarded to work planner for package/surveillance test procedure closeout.

d. Test results and recommendations relating to test or equipment are summarized in order.

7.8.2 Verify acceptance criteria met and documentation complete; e.g., signoffs, data, and N/As have been entered as appropriate.

Main Steam Safety Valve Test Data Record **U1&2 Attachment 1: Page 1 of 2**

Unit _____ RV_____ Serial Number_____ Order_____

1. (step 7.1.7)

Test Criteria					
RV	Setpoint (PSIG)	Acceptable As Found (PSIG)		Acceptable As Left (PSIG)	
		Min	Max	Min	Max
[ ] 3, 7, 11, 58	1065	1044	1097	1054	1076
[ ] 4, 8, 12, 59	1078	1046	1110	1067	1089
[ ] 5, 9, 13, 60	1090	1057	1123	1079	1101
[ ] 6, 10, 14, 61	1103	1070	1136	1092	1114
[ ] 222, 223, 224, 225	1115	1082	1148	1104	1126

2. Test Equipment Pre-Calibration

   a. Trevitest Equipment Calibration Acceptable Initials _____ Date _____ (step 7.2.2)

   b. Plant Equipment Calibration Acceptable Initials _____ Date _____ (step 7.3.4)

3. Test Conditions

   a. Mode _____

   b. Control Room Average Line Pressure _____ PSIG (PPC@SGPRESS) (step 7.5.2c)

   c. Valve Spring Temperature _____ (°F) (step 7.5.2e)

   d. Spring visually inspected and there are no apparent cracks. Initials _____ (step 7.3.2a)

   e. As Found leak tightness acceptable YES[ ] NO[ ] (step 7.5.2f)

4. Operations Contacted and Testing Approved Initials _____ (step 7.5.3)

Main Steam Safety Valve Test Data Record **U1&2 Attachment 1: Page 2 of 2**

5. Test Results (step 7.5.5f)

Lift	Line Pressure (PSIG)	Assist Force (% of L.C.)	Lift Point (PSIG)	Adjustment (Flats) (-) = CCW (+) = CW	
1					(7.5.6)
	Notification Required	YES[ ] NO[ ]	Notification Number:		(7.5.6b)
2					
3					
4					
5					
6					
7					
8					
9					
10					

6. As Left leak tightness acceptable YES[ ] NO[ ] (step 7.5.6d)

7. Operations Notification of Test Results Initials_____ (step 7.5.7)

8. Test Gauge Removal [ ] N/A - See Test Report for RV _____ (step 7.6.1)

   a. Test Gauge Isolation Valve Number _____ [ ] Cap Installed

   b. Removed By: _____ Date _____ Time _____

   c. Verified By: _____ Date _____ Time _____

9. Test Equipment Post Calibration

   Plant Equipment Initials _____ Date _____ (step 7.6.5)

   Trevitest Equipment Initials _____ Date _____ (Section 7.7)

Test Director: _____ Date: _____

Engineering Review: _____ Date: _____

For this procedure, data may be rounded to the least significant digit in the MSSV setpoint calculation.

Data for the calculation may have digits to the right of the decimal point and may or may not be used in determining the final answer. However, the final answer will be rounded off to the least significant digit (e.g., 1065.4 is 1065, 1065.5 is 1066, 1065.6 is 1066, etc.).

When using a calculator that is set to display digits to the right of the decimal point, rounding off will be as described above. If the calculator is set to display no digits to the right of the decimal point, then rounding off will be automatic, in either case the above is held constant.

Force Required to Lift Valve

The force required to lift the valve is provided by the pressure stored in the hydraulic unit.

On-line or "hot" lifting is where the system applies the differential forces between the available line pressure and the set pressure.

F_s = Pressure Differential x Mean Seat Area (MSA)
= $(P_s - P_L)$ x MSA Where F_s = Force of Load Cell
P_s = Set Pressure of Valve
P_L = Line Pressure/System Pressure

This is applicable whenever there is pressure on the underside of the valve acting on the seating area.

In "cold" lift situations the system applies the total force between zero and the set pressure or:

$F_s = P_s$ x MSA

In finding the value of Fs, it allows one to choose the proper load cell needed for testing. It should be noted that the force is the ideal force needed if the valve is properly set.

Hydraulic Pressure Setting

The lift force is provided by the hydraulic unit, therefore, the pressure setting of the hydraulic unit must be determined.

$$R_v = \frac{F_s}{RA} \times 1.25$$

Where R_v = Hydraulic Pressure Setting
RA = Ram Area Used (usually 2.76 in^2)
1.25 = Factor to Overcome Friction/Expansion

Lift Point

Trevitest Mark V	Trevitest Mark VIII
$\text{Lift Point} = \frac{[(Lc)\ (\%FS)] - W}{MSA} + P_L$	$\text{Lift Point} = \frac{Lo}{MSA} + P_L$
P_L = Line Pressure, PSI (from test gauge) Lc = Load Cell, lb %FS = Percent of Full Scale – Chart Recorder W = Weight of Piston/RAM, lb MSA = Mean Seat Area of 23.046 in^2	P_L = Line Pressure, PSI (from test gauge) Lo = Opening Load, lb, from Mark VIII Recorder MSA = Mean Seat Area of 23.046 in^2

Summary of MSSV Test Data for Unit 1

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
6/25/1997	Lead 3								
	11	1065	1044	1097	1068	0.3%	1056	-0.8%	0.0
	12	1078	1046	1110	1089	1.0%	1079	0.1%	0.0
	13	1090	1057	1123	1105	1.4%	1097	0.6%	0.0
	14	1103	1070	1136	1125	2.0%	1110	0.6%	-2.0
	224	1115	1082	1148	1129	1.3%	1117	0.2%	0.0
6/26/1997	Lead 4								
	58	1065	1044	1097	1071	0.6%	1066	0.1%	0.0
	59	1078	1046	1110	1088	0.9%	1084	0.6%	0.0
	60	1090	1057	1123	1082	-0.7%	1090	0.0%	1.0
	61	1103	1070	1136	1120	1.5%	1107	0.4%	0.0
	225	1115	1082	1148	1112	-0.3%	1108	-0.6%	0.0
8/26/1997	Lead 1								
	3	1065	1044	1097	1060	-0.5%	1061	-0.4%	0.0
	4	1078	1046	1110	1085	0.6%	1072	-0.6%	-1.0
	5	1090	1057	1123	1096	0.6%	1092	0.2%	0.0
	6	1103	1070	1136	1100	-0.3%	1101	-0.2%	2.0
	222	1115	1082	1148	1139	2.2%	1117	0.2%	-2.5
8/27/1997	Lead 2								
	7	1065	1044	1097	1069	0.4%	1070	0.5%	-1.5
	8	1078	1046	1110	1092	1.3%	1078	0.0%	-2.0
	9	1090	1057	1123	1097	0.6%	1079	-1.0%	0.0
	10	1103	1070	1136	1108	0.5%	1100	-0.3%	1.5
	223	1115	1082	1148	1145	2.7%	1122	0.6%	-2.5
8/28/1997	Lead 3								
	11	1065	1044	1097	1049	-1.5%	1064	-0.1%	1.0
	12	1078	1046	1110	1087	0.8%	1076	-0.2%	0.0
	13	1090	1057	1123	1088	-0.2%	1095	0.5%	0.0
	14	1103	1070	1136	1104	0.1%	1105	0.2%	0.0
	224	1115	1082	1148	1117	0.2%	1117	0.2%	0.0
8/28/1997	Lead 4								
	58	1065	1044	1097	1067	0.2%	1069	0.4%	0.0
	59	1078	1046	1110	1080	0.2%	1079	0.1%	0.0
	60	1090	1057	1123	1089	-0.1%	1084	-0.6%	0.0
	61	1103	1070	1136	1104	0.1%	1105	0.2%	0.0
	225	1115	1082	1148	1109	-0.5%	1113	-0.2%	0.0
1/20/1998	Lead 1								
	3	1065	1044	1097	1062	-0.3%	1061	-0.4%	0.0

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	4	1078	1046	1110	1074	-0.4%	1070	-0.7%	0.0
	5	1090	1057	1123	1093	0.3%	1092	0.2%	0.0
	6	1103	1070	1136	1104	0.1%	1106	0.3%	0.0
	222	1115	1082	1148	1116	0.1%	1123	0.7%	0.0
1/21/1998	Lead 2								
	7	1065	1044	1097	1063	-0.2%	1063	-0.2%	0.0
	8	1078	1046	1110	1069	-0.8%	1073	-0.5%	0.0
	9	1090	1057	1123	1085	-0.5%	1086	-0.4%	0.0
	10	1103	1070	1136	1104	0.1%	1097	-0.5%	0.0
	223	1115	1082	1148	1125	0.9%	1121	0.5%	0.0
7/24/1998	Lead 3								
	11	1065	1044	1097	1069	0.4%	1068	0.3%	0.0
	12	1078	1046	1110	1088	0.9%	1076	-0.2%	-0.5
	13	1090	1057	1123	1105	1.4%	1098	0.7%	0.0
	14	1103	1070	1136	1106	0.3%	1105	0.2%	0.0
	224	1115	1082	1148	1125	0.9%	1123	0.7%	0.0
7/24/1998	Lead 4								
	58	1065	1044	1097	1056	-0.8%	1060	-0.5%	0.0
	59	1078	1046	1110	1078	0.0%	1076	-0.2%	0.0
	60	1090	1057	1123	1092	0.2%	1084	-0.6%	0.0
	61	1103	1070	1136	1106	0.3%	1108	0.5%	0.0
	225	1115	1082	1148	1106	-0.8%	1106	-0.8%	0.0
1/20/1999	Lead 1								
	3	1065	1044	1097	1060	-0.5%	1054	-1.0%	0.0
	4	1078	1046	1110	1086	0.7%	1072	-0.6%	0.0
	5	1090	1057	1123	1108	1.7%	1098	0.7%	0.0
	6	1103	1070	1136	1115	1.1%	1109	0.5%	0.0
	222	1115	1082	1148	1122	0.6%	1122	0.6%	0.0
1/20/1999	Lead 2								
	7	1065	1044	1097	1062	-0.3%	1066	0.1%	0.0
	8	1078	1046	1110	1083	0.5%	1074	-0.4%	0.0
	9	1090	1057	1123	1097	0.6%	1092	0.2%	0.0
	10	1103	1070	1136	1128	2.3%	1108	0.5%	-1.0
	223	1115	1082	1148	1122	0.6%	1124	0.8%	0.0
1/21/1999	Lead 3								
	11	1065	1044	1097	1079	1.3%	1076	1.0%	0.0
	12	1078	1046	1110	1085	0.6%	1082	0.4%	0.0
	13	1090	1057	1123	1112	2.0%	1100	0.9%	0.0
	14	1103	1070	1136	1110	0.6%	1108	0.5%	0.0

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	224	1115	1082	1148	1134	1.7%	1121	0.5%	0.0
1/21/1999	Lead 4								
	58	1065	1044	1097	1067	0.2%	1067	0.2%	0.0
	59	1078	1046	1110	1075	-0.3%	1069	-0.8%	0.0
	60	1090	1057	1123	1113	2.1%	1095	0.5%	0.0
	61	1103	1070	1136	1123	1.8%	1113	0.9%	-1.0
	225	1115	1082	1148	1112	-0.3%	1119	0.4%	0.0
9/12/2000	Lead 1								
	3	1065	1044	1097	1068	0.3%	1075	0.9%	0.0
	4	1078	1046	1110	1079	0.1%	1068	-0.9%	0.0
	5	1090	1057	1123	1104	1.3%	1094	0.4%	0.5
	6	1103	1070	1136	1126	2.1%	1102	-0.1%	-1.0
	222	1115	1082	1148	1131	1.4%	1122	0.6%	0.0
9/13/2000	Lead 2								
	7	1065	1044	1097	1060	-0.5%	1062	-0.3%	0.0
	8	1078	1046	1110	1074	-0.4%	1071	-0.6%	0.0
	9	1090	1057	1123	1084	-0.6%	1090	0.0%	0.0
	10	1103	1070	1136	1113	0.9%	1103	0.0%	0.0
	223	1115	1082	1148	1106	-0.8%	1112	-0.3%	0.0
9/14/2000	Lead 3								
	11	1065	1044	1097	1087	2.1%	1075	0.9%	0.0
	12	1078	1046	1110	1084	0.6%	1081	0.3%	0.0
	13	1090	1057	1123	1119	2.7%	1093	0.3%	-1.0
	14	1103	1070	1136	1109	0.5%	1104	0.1%	0.0
	224	1115	1082	1148	1137	2.0%	1115	0.0%	-1.0
9/14/2000	Lead 4								
	58	1065	1044	1097	1064	-0.1%	1059	-0.6%	0.0
	59	1078	1046	1110	1093	1.4%	1084	0.6%	-0.5
	60	1090	1057	1123	1114	2.2%	1099	0.8%	0.0
	61	1103	1070	1136	1110	0.6%	1105	0.2%	0.0
	225	1115	1082	1148	1108	-0.6%	1109	-0.5%	0.0
4/4/2002	Lead 3								
	11	1065	1044	1097	1064	-0.1%	1060	-0.5%	0.0
	12	1078	1046	1110	1085	0.6%	1079	0.1%	0.0
	13	1090	1057	1123	1106	1.5%	1094	0.4%	0.0
	14	1103	1070	1136	1110	0.6%	1109	0.5%	0.0
	224	1115	1082	1148	1129	1.3%	1121	0.5%	0.0
4/5/2002	Lead 4								

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	58	1065	1044	1097	1068	0.3%	1058	-0.7%	0.0
	59	1078	1046	1110	1080	0.2%	1075	-0.3%	0.0
	60	1090	1057	1123	1115	2.3%	1093	0.3%	-0.5
	61	1103	1070	1136	1106	0.3%	1105	0.2%	0.0
	225	1115	1082	1148	1105	-0.9%	1106	-0.8%	0.0
2/17/2004	Lead 1								
	3	1065	1044	1097	1074	0.8%	1071	0.6%	0.0
	4	1078	1046	1110	1070	-0.7%	1067	-1.0%	1.0
	5	1090	1057	1123	1113	2.1%	1092	0.2%	-0.5
	6	1103	1070	1136	1102	-0.1%	1094	-0.8%	-1.0
	222	1115	1082	1148	1110	-0.4%	1106	-0.8%	0.0
2/18/2004	Lead 2								
	7	1065	1044	1097	1072	0.7%	1063	-0.2%	0.0
	8	1078	1046	1110	1072	-0.6%	1085	0.6%	0.5
	9	1090	1057	1123	1083	-0.6%	1088	-0.2%	0.0
	10	1103	1070	1136	1093	-0.9%	1096	-0.6%	0.0
	223	1115	1082	1148	1121	0.5%	1117	0.2%	0.0
9/20/2005	Lead 3								
	11	1065	1044	1097	1063	-0.2%	1062	-0.3%	0.0
	12	1078	1046	1110	1076	-0.2%	1080	0.2%	0.0
	12	1078	1046	1110	1079	0.1%	1088	0.9%	1.0
	13	1090	1057	1123	1116	2.4%	1092	0.2%	0.0
	14	1103	1070	1136	1118	1.4%	1101	-0.2%	0.0
	224	1115	1082	1148	1141	2.3%	1117	0.2%	-0.5
9/21/2005	Lead 4								
	58	1065	1044	1097	1066	0.1%	1057	-0.8%	0.0
	59	1078	1046	1110	1067	-1.0%	1080	0.2%	1.0
	60	1090	1057	1123	1090	0.0%	1097	0.6%	0.0
	61	1103	1070	1136	1121	1.6%	1109	0.5%	0.0
	225	1115	1082	1148	1101	-1.3%	1106	-0.8%	0.8
3/28/2007	Lead 1								
	3	1065	1044	1097	1065	0.0%	1066	0.1%	0.0
	4	1078	1046	1110	1089	1.0%	1080	0.2%	0.0
	5	1090	1057	1123	1119	2.7%	1090	0.0%	-1.5
	6	1103	1070	1136	1078	-2.3%	1096	-0.6%	1.0
	222	1115	1082	1148	1120	0.4%	1117	0.2%	0.0
3/28/2007	Lead 2								
	7	1065	1044	1097	1066	0.1%	1075	0.9%	0.0
	8	1078	1046	1110	1096	1.7%	1082	0.4%	0.0

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	9	1090	1057	1123	1089	-0.1%	1084	-0.6%	0.0
	10	1103	1070	1136	1098	-0.5%	1100	-0.3%	0.0
	223	1115	1082	1148	1120	0.4%	1115	0.0%	0.0
12/11/2008	Lead 3								
	11	1065	1044	1097	1057	-0.8%	1063	-0.2%	1.0
	11	1065	1044	1097	1062	-0.3%	1064	-0.1%	0.5
	12	1078	1046	1110	1070	-0.7%	1073	-0.5%	0.0
	13	1090	1057	1123	1104	1.3%	1092	0.2%	0.0
	14	1103	1070	1136	1113	0.9%	1109	0.5%	0.0
	224	1115	1082	1148	1119	0.4%	1112	-0.3%	0.0
12/11/2008	Lead 4								
	58	1065	1044	1097	1070	0.5%	1062	-0.3%	0.0
	59	1078	1046	1110	1091	1.2%	1081	0.3%	0.0
	60	1090	1057	1123	1112	2.0%	1092	0.2%	0.0
	61	1103	1070	1136	1118	1.4%	1114	1.0%	0.0
	225	1115	1082	1148	1092	-2.1%	1104	-1.0%	0.0
8/17/2010	Lead 1								
	3	1065	1044	1097	1074	0.8%	1070	0.5%	0.0
	4	1078	1046	1110	1102	2.2%	1087	0.8%	0.0
	5	1090	1057	1123	1082	-0.7%	1098	0.7%	1.0
	6	1103	1070	1136	1117	1.3%	1096	-0.6%	0.0
	222	1115	1082	1148	1116	0.1%	1110	-0.4%	0.0
8/18/2010	Lead 2								
	7	1065	1044	1097	1078	1.2%	1072	0.7%	0.0
	8	1078	1046	1110	1095	1.6%	1080	0.2%	0.0
	9	1090	1057	1123	1085	-0.5%	1082	-0.7%	0.0
	10	1103	1070	1136	1115	1.1%	1094	-0.8%	0.0
	223	1115	1082	1148	1115	0.0%	1110	-0.4%	0.0
3/6/2012	Lead 3								
	11	1065	1044	1097	1099	3.2%	1076	1.0%	-1.0
	12	1078	1046	1110	1070	-0.7%	1089	1.0%	0.0
	13	1090	1057	1123	1117	2.5%	1100	0.9%	0.0
	14	1103	1070	1136	1123	1.8%	1104	0.1%	0.0
	224	1115	1082	1148	1126	1.0%	1124	0.8%	0.0
3/8/2012	Lead 4								
	58	1065	1044	1097	1076	1.0%	1067	0.2%	0.0
	59	1078	1046	1110	1095	1.6%	1077	-0.1%	0.0
	60	1090	1057	1123	1129	3.6%	1092	0.2%	-1.5
	61	1103	1070	1136	1122	1.7%	1105	0.2%	-0.5

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	225	1115	1082	1148	1095	-1.8%	1109	-0.5%	1.5
3/9/2012	Lead 2								
(expanded Scope)	8	1078	1046	1110	1091	1.2%	1073	-0.5%	0.0
	9	1090	1057	1123	1076	-1.3%	1089	-0.1%	1.0
Did not test RV-7	10	1103	1070	1136	1108	0.5%	1101	-0.2%	0.0
	223	1115	1082	1148	1112	-0.3%	1107	-0.7%	0.0

Unit 1 Summary

166 MSSVs Tests
36 Tests As Left Adjusted
23 Tests As Found greater than or equal to 2 percent
2 Tests As Found Out of Tolerance greater than or equal to 3 percent

Enclosure
Attachment 4
PG&E Letter DCL-12-065

Summary of MSSV Test Data for Unit 2

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	Lead 3								
7/22/1998	11	1065	1044	1097	1061	-0.4%	1058	-0.7%	0.0
	12	1078	1046	1110	1080	0.2%	1073	-0.5%	0.0
	13	1090	1057	1123	1095	0.5%	1096	0.6%	1.0
	14	1103	1070	1136	1104	0.1%	1097	-0.5%	0.0
	224	1115	1082	1148	1107	-0.7%	1111	-0.4%	1.0
	Lead 4								
7/22/1998	58	1065	1044	1097	1063	-0.2%	1065	0.0%	1.3
	59	1078	1046	1110	1066	-1.1%	1081	0.3%	1.5
	60	1090	1057	1123	1075	-1.4%	1094	0.4%	1.5
	61	1103	1070	1136	1110	0.6%	1103	0.0%	1.0
	225	1115	1082	1148	1102	-1.2%	1108	-0.6%	1.0
	Lead 1								
12/2/1998	3	1065	1044	1097	1056	-0.8%	1062	-0.3%	1.5
1/18/1999	3	1065	1044	1097	1074	0.8%	1068	0.3%	0.0
1/18/1999	4	1078	1046	1110	1099	1.9%	1087	0.8%	0.0
1/18/1999	5	1090	1057	1123	1067	-2.1%	1088	-0.2%	3.0
1/18/1999	6	1103	1070	1136	1117	1.3%	1100	-0.3%	0.0
1/18/1999	222	1115	1082	1148	1116	0.1%	1122	0.6%	1.0
	Lead 2								
12/2/1998	7	1065	1044	1097	1039	-2.4%	1067	0.2%	3.0
1/19/1999	7	1065	1044	1097	1086	2.0%	1074	0.8%	-1.0
12/2/1998	8	1078	1046	1110	1059	-1.8%	1074	-0.4%	1.5
1/19/1999	8	1078	1046	1110	1096	1.7%	1089	1.0%	0.0
	9	1090	1057	1123	1078	-1.1%	1096	0.6%	1.0
	10	1103	1070	1136	1104	0.1%	1096	-0.6%	0.0
	223	1115	1082	1148	1143	2.5%	1122	0.6%	0.0
	Lead 1								
9/8/1999	3	1065	1044	1097	1080	1.4%	1072	0.7%	-0.5
	4	1078	1046	1110	1086	0.7%	1087	0.8%	-1.0
	5	1090	1057	1123	1108	1.7%	1087	-0.3%	-1.0
	6	1103	1070	1136	1103	0.0%	1106	0.3%	0.0
	222	1115	1082	1148	1137	2.0%	1113	-0.2%	-1.0
	Lead 2								
9/9/1998	7	1065	1044	1097	1073	0.8%	1057	-0.8%	-0.8
	8	1078	1046	1110	1084	0.6%	1081	0.3%	
	9	1090	1057	1123	1087	-0.3%	1087	-0.3%	
	10	1103	1070	1136	1092	-1.0%	1099	-0.4%	1.3
	223	1115	1082	1148	1119	0.4%	1115	0.0%	0.0

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	Lead 3								
9/9/1998	11	1065	1044	1097	1087	2.1%	1073	0.8%	0.0
	12	1078	1046	1110	1065	-1.2%	1072	-0.6%	2.0
	13	1090	1057	1123	1115	2.3%	1092	0.2%	-1.0
	14	1103	1070	1136	1112	0.8%	1113	0.9%	0.0
	224	1115	1082	1148	1112	-0.3%	1113	-0.2%	0.0
	Lead 4								
9/10/1999	58	1065	1044	1097	1064	-0.1%	1057	-0.8%	0.0
	59	1078	1046	1110	1071	-0.6%	1080	0.2%	0.0
	60	1090	1057	1123	1103	1.2%	1093	0.3%	-2.0
	61	1103	1070	1136	1096	-0.6%	1102	-0.1%	0.0
	225	1115	1082	1148	1115	0.0%	1112	-0.3%	0.0
	Lead 1								
3/28/2001	3	1065	1044	1097	1072	0.7%	1064	-0.1%	-1.0
	4	1078	1046	1110	1078	0.0%	1073	-0.5%	0.0
	5	1090	1057	1123	1108	1.7%	1088	-0.2%	0.0
	6	1103	1070	1136	1100	-0.3%	1108	0.5%	0.0
	222	1115	1082	1148	1117	0.2%	1119	0.4%	0.0
	Lead 2								
3/29/2001	7	1065	1044	1097	1069	0.4%	1068	0.3%	0.0
	8	1078	1046	1110	1080	0.2%	1087	0.8%	0.0
	9	1090	1057	1123	1075	-1.4%	1081	-0.8%	0.0
	10	1103	1070	1136	1098	-0.5%	1103	0.0%	0.0
	223	1115	1082	1148	1119	0.4%	1117	0.2%	0.0
	Lead 3								
1/22/2003	11	1065	1044	1097	1099	3.2%	1074	0.8%	-1.5
	12	1078	1046	1110	1101	2.1%	1082	0.4%	-0.5
	13	1090	1057	1123	1127	3.4%	1082	-0.7%	-1.0
	14	1103	1070	1136	1100	-0.3%	1093	-0.9%	0.0
	224	1115	1082	1148	1116	0.1%	1108	-0.6%	0.0
	Lead 4								
1/22/2003	58	1065	1044	1097	1057	-0.8%	1054	-1.0%	0.0
	59	1078	1046	1110	1070	-0.7%	1071	-0.6%	0.0
	60	1090	1057	1123	1074	-1.5%	1085	-0.5%	1.5
	61	1103	1070	1136	1095	-0.7%	1098	-0.5%	0.0
	225	1115	1082	1148	1122	0.6%	1109	-0.5%	0.0
	Lead 1								
1/23/2003	3	1065	1044	1097	1076	1.0%	1070	0.5%	0.0

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	4	1078	1046	1110	1082	0.4%	1080	0.2%	0.0
	5	1090	1057	1123	1096	0.6%	1084	-0.6%	0.0
	6	1103	1070	1136	1122	1.7%	1103	0.0%	-0.5
	222	1115	1082	1148	1121	0.5%	1113	-0.2%	-0.5
	Lead 2								
1/24/2003	7	1065	1044	1097	1066	0.1%	1064	-0.1%	0.0
	8	1078	1046	1110	1095	1.6%	1088	0.9%	-0.8
	9	1090	1057	1123	1079	-1.0%	1083	-0.6%	0.5
	10	1103	1070	1136	1097	-0.5%	1098	-0.5%	0.0
	223	1115	1082	1148	1127	1.1%	1122	0.6%	0.0
	Lead 1								
9/21/2004	3	1065	1044	1097	1072	0.7%	1075	0.9%	-0.5
	4	1078	1046	1110	1078	0.0%	1068	-0.9%	0.0
	5	1090	1057	1123	1091	0.1%	1086	-0.4%	0.5
	6	1103	1070	1136	1099	-0.4%	1106	0.3%	0.5
	222	1115	1082	1148	1110	-0.4%	1112	-0.3%	0.0
	Lead 2								
9/22/2004	7	1065	1044	1097	1070	0.5%	1061	-0.4%	0.0
	8	1078	1046	1110	1079	0.1%	1071	-0.6%	0.0
	9	1090	1057	1123	1093	0.3%	1083	-0.6%	0.5
	10	1103	1070	1136	1079	-2.2%	1095	-0.7%	1.5
	223	1115	1082	1148	1111	-0.4%	1109	-0.5%	0.0
	Lead 3								
3/21/2006	11	1065	1044	1097	1057	-0.8%	1062	-0.3%	0.0
	12	1078	1046	1110	1090	1.1%	1070	-0.7%	0.0
	13	1090	1057	1123	1105	1.4%	1089	-0.1%	1.0
	14	1103	1070	1136	1105	0.2%	1095	-0.7%	0.0
	224	1115	1082	1148	1112	-0.3%	1109	-0.5%	0.0
	Lead 4								
3/22/2006	58	1065	1044	1097	1085	1.9%	1061	-0.4%	0.0
	59	1078	1046	1110	1072	-0.6%	1072	-0.6%	0.0
	60	1090	1057	1123	1088	-0.2%	1083	-0.6%	0.0
	61	1103	1070	1136	1113	0.9%	1095	-0.7%	0.0
	225	1115	1082	1148	1127	1.1%	1115	0.0%	0.0
	Lead 1								
12/11/2007	3	1065	1044	1097	1061	-0.4%	1061	-0.4%	0.0
	4	1078	1046	1110	1086	0.7%	1068	-0.9%	0.0
	5	1090	1057	1123	1093	0.3%	1086	-0.4%	0.0
	6	1103	1070	1136	1113	0.9%	1102	-0.1%	0.0

Date Tested	Lead / Valve No.	Set Point (psig)	As Found Min (psig)	As Found Max (psig)	As Found Lift 1 (psig)	As Found Drift %SP	As Left (psig)	As Left %SP	Flats Adjust
	222	1115	1082	1148	1112	-0.3%	1110	-0.4%	0.0
	Lead 2								
12/12/2007	7	1065	1044	1097	1058	-0.7%	1058	-0.7%	0.0
	8	1078	1046	1110	1086	0.7%	1081	0.3%	0.0
	9	1090	1057	1123	1083	-0.6%	1079	-1.0%	0.0
	10	1103	1070	1136	1099	-0.4%	1097	-0.5%	0.0
	223	1115	1082	1148	1112	-0.3%	1114	-0.1%	0.0
	Lead 3								
8/25/2009	11	1065	1044	1097	1080	1.4%	1062	-0.3%	0.0
	12	1078	1046	1110	1103	2.3%	1075	-0.3%	0.0
	13	1090	1057	1123	1118	2.6%	1089	-0.1%	0.0
	14	1103	1070	1136	1090	-1.2%	1106	0.3%	1.3
	224	1115	1082	1148	1036	-7.1%	Gag	####	6.0
	Lead 4								
8/27/2009	58	1065	1044	1097	1086	2.0%	1059	-0.6%	0.0
	59	1078	1046	1110	1091	1.2%	1085	0.6%	1.3
	60	1090	1057	1123	1119	2.7%	1090	0.0%	-0.5
	61	1103	1070	1136	1127	2.2%	1098	-0.5%	0.0
	225	1115	1082	1148	1134	1.7%	1110	-0.4%	0.0
	Lead 1								
8/28/2009	6	1103	1070	1136	1129	2.4%	1104	0.1%	0.0
	222	1115	1082	1148	1116	0.1%	1116	0.1%	1.0
	Lead 1								
3/22/2011	3	1065	1044	1097	1071	0.6%	1071	0.6%	0.0
	4	1078	1046	1110	1077	-0.1%	1078	0.0%	2.0
	5	1090	1057	1123	1104	1.3%	1093	0.3%	1.0
	6	1103	1070	1136	1119	1.5%	1104	0.1%	0.0
	222	1115	1082	1148	1096	-1.7%	1114	-0.1%	2.0
	Lead 2								
3/24/2011	7	1065	1044	1097	1084	1.8%	1071	0.6%	0.0
	8	1078	1046	1110	1101	2.1%	1069	-0.8%	0.0
	9	1090	1057	1123	1110	1.8%	1086	-0.4%	0.0
	10	1103	1070	1136	1118	1.4%	1111	0.7%	0.0
	223	1115	1082	1148	1126	1.0%	1120	0.4%	0.0

Unit 2 Summary

125 MSSV Tests
46 Tests As Left Adjusted
19 Tests As Found greater than or equal to 2 percent
3 Tests As Found out of Tolerance greater than or equal to 3 percent