PACIFIC GAS AND ELECTRIC COMPANY
San Bruno Gas Transmission Line Incident
Data Response

PG&E Data Request No.:	NTSB_014-006		
PG&E File Name:	San Bruno GT Line Incident_DR_NTSB_014-006		
Request Date:	September 15, 2010	Requesting Party:	NTSB
Date Sent:	September 16, 2010	Requestor:	NTSB (Rick Downs)
Resubmitted Date:	October 8, 2010	Requestor:	NTSB (Rick Downs)

QUESTION 6

Provide Alarm Policy for Gas Control.

ANSWER 6

Please see attached document "PG&E GAS SCADA SYSTEM" Alarm Limits Policy and Procedures.

PG&E GAS SCADA SYSTEM

Alarm Limits

Policy and Procedures

The Policy and Procedures described in the following text were developed to ensure the safe operation of PG&E's natural gas system and to maintain its integrity. The responsibility for establishing alarm settings, changing alarm settings, and responding to alarms is described herein. In some cases, the procedure will refer to references in the Appendices for an appropriate action. Throughout this document, all underlined terms will have definitions which are listed on the final pages.

Alarm Policy

All transmission system pressure points (including station inlet and outlet piping) will have established Hi-Hi and Lo-Lo alarms.

All high pressure distribution system (60 psig and below) pressure points will have established Hi-Hi, [No Hi alarms are set], Lo, and Lo-Lo alarms.

All low pressure distribution system (inches water column) pressure points will have established Hi-Hi, Hi, Lo and Lo-Lo alarms.

Hi-Hi flow alarms will be set for selected transmission system flow points. Lo-Lo flow alarms will be set on lines that do not normally shut-in and on selected single feed transmission system lines. Distribution Hi-Hi and Lo-Lo flow alarms will be set based on discussions between Gas Control and the responsible Field M&C Personnel.

Gas quality Hi-Hi and Lo-Lo alarms will be determined by the Gas Quality Response Team Lead.

All Gas SCADA system digital points will have established alarm limits and will be managed by the Gas SCADA System Digital Alarm Policy and Procedures (See **Appendix A**).

All new or revised Hi-Hi and Lo-Lo limits must be authorized as outlined in the SCADA Alarm Settings table (See **Appendix B**). Additions or changes to High Pressure Distribution System Lo alarm settings and Low Pressure Distribution System Hi and Lo alarm settings must also be authorized. All revisions to the Hi-Hi and Lo-Lo alarm settings must follow the Gas SCADA, Alarm Change Procedure (See **Appendix C**, *Gas SCADA Alarm Change Procedure*).

As data points are added or deleted to either the transmission or distribution systems, the SCADA Engineer will follow established procedures (See **Appendix D**, *Gas SCADA Policy and Implementation of Alarm Limit Settings for New Gas SCADA Points*). With certain exceptions Hi and Lo alarms will be set at the discretion of the Transmission Coordinators and/or Gas System Operators to monitor the normal operating range of the system. Exceptions are noted in the Alarm Settings, below.

Alarm Settings

Pressure

Hi–Hi and Lo-Lo Alarm Limits

Transmission System

All transmission system pressure points (including inlet and outlet piping at transmission stations) will have established Hi-Hi and Lo-Lo alarms. Hi-Hi alarms will not be set above the lower of Maximum Allowable Operating Pressure (MAOP) plus 3 pounds per square inch (psi) or Maximum Operating Pressure (MOP) plus 3 pounds per square inch (psi). Lo-Lo alarm limits will not be set below the Minimum Required Pressure (MRP) less 3 psi (Transmission systems frequently run at the MOP or MRP. Hi-Hi alarms are set 3 psi above MOP and Lo-Lo alarms are set 3 psi below MRP. (See **Appendix E**, *L-300 Operating Parameters and Hi-Hi Alarm Settings*, for L-300 alarm setpoints affected by elevation change).

High Pressure Distribution Systems (60 psig and below)

Hi-Hi pressure alarms will be set at Maximum Allowable Operating Pressure (MAOP) The Lo-Lo pressure alarms limits will be set at the Minimum Required Pressure (MRP) less 2 psi. All Hi-Hi, Lo and Lo-Lo alarms are established by the Principal Engineer of Gas Measurement/Gas Quality Engineering, or designee, and may not be changed at operator discretion. There are no longer Hi alarms set for High Pressure Distribution Systems.

Low Pressure Distribution Systems (inches water column)

Unless otherwise noted (See **Appendix B**, *SCADA Alarm Settings table*), the Low Pressure Distribution System alarms will be set as follows:
Hi-Hi pressure alarms will be set at 12 inches water column.
Hi pressure alarms will be set at 10.5 inches of water column.
Lo pressure alarms will be set at 5 inches of water column.
Lo-Lo pressure alarms will be set at 4 inches water column.

Pressure

Hi and Lo Alarm Limits

Transmission System

Hi and Lo pressure alarms will be set to monitor the normal operating range of the system being monitored. Hi pressure alarms will be set at or below the MOP. Lo pressure alarms will be set above the MRP. During cold weather Design Day events, Lo pressure alarms will be set as outlined in the Design Criteria Alarm Policy (See **Appendix F**, for the *Design Criteria Alarm Policy (Cold Weather Alarms)*).

High Pressure Distribution Systems (60 psig and below)

Lo pressure alarms will be set at the MRP. There are no longer seasonal adjustments for Lo alarm settings. All Lo alarms are established by the Principal Engineer of Gas Measurement/Gas Quality Engineering, or designee, and may not be changed at operator discretion. *There are no longer Hi alarms set for High Pressure Distribution Systems.*

Low Pressure Distribution Systems (inches of water column)

Hi pressure alarms will be set at 10.5 inches water column (See **Appendix G**, *Temporary Exceptions to Alarm Setpoint Criteria*). Lo pressure alarms will be set at 5 inches water column. There are no seasonal adjustments for the Hi and Lo alarm settings. Hi and Lo alarms are established by the Principal Engineer of Gas Measurement/Gas Quality Engineering, or designee, and may not be changed at operator discretion.

Flow

Hi–Hi and Lo-Lo Alarm Limits

Transmission System

Hi-Hi flow alarms will be set for selected transmission flow set points. Lo-Lo alarm flow limits will be set on lines which do not normally shut in and on selected single feed transmission lines. Hi-Hi and Lo-Lo alarms will be set resulting from a discussion and agreement between Gas Control , TSP, and the responsible Field M&C Personnel.

Distribution Systems

Hi-Hi and Lo-Lo alarms will be set resulting from a discussion and agreement between Gas Control , GT&D Gas Engineering Personnel, and the responsible Field M&C Personnel.

Gas Quality

Hi-Hi and Lo-Lo Alarm Limits

Gas quality Hi-Hi and Lo-Lo alarm limits will be set based on the recommendation by the Gas Quality Response Team Lead.

Temporary Alarm Settings during Clearance Work

Hi-Hi and Lo-Lo Alarm Limits (Pressure, Flow, Gas Quality)

During clearances it may be necessary to temporarily change Hi-Hi and Lo-Lo alarm limits to settings other than those normally specified (See **Appendix H**, *Alarm Setpoints During Clearance Work*).

Alarm Review

Alarm limits will be reviewed during October of each year. Upon completion of the review, Gas Control will implement the requested alarm limits in mid-November.

Transmission System

Hi-Hi and Lo-Lo Alarm Limits (Pressure and Flow)

Alarm limits will be reviewed during October of each year. Gas Control will provide the responsible Field M&C and GT&D Personnel with the current alarm limits. Gas Control will request that the responsible Field M&C and GT&D Personnel review their transmission pressure and flow limits. Once reviewed, they will either concur with the current settings or request new alarm settings. Gas Control will review the requested changes to the transmission Hi-Hi and Lo-Lo pressure and flow limits and make changes to the limits as required.

Design Criteria

Hi-Hi and Lo-Lo Alarm Limits (Pressure and Flow)

Alarm limits will be reviewed during October of each year. Gas Control will provide the responsible Transmission System Planning Engineers with the current alarm limits. Gas Control will request that the responsible Transmission System Planning Engineers review their transmission pressure and flow limits. Once reviewed, they will either concur with the current settings or request new alarm settings. Gas Control will review the requested changes to the transmission Hi-Hi and Lo-Lo pressure and flow limits and make changes to the limits as required.

Distribution System

Hi-Hi, Lo and Lo-Lo Alarm Limits (Pressure and Flow)

Alarm limits will be reviewed during October of each year. Gas Control will provide the responsible Field M&C and GT&D Personnel with the current alarm limits. The responsible Field M&C and GT&D Personnel will review the limits and concur or request to change the limits. Gas Control will implement the requests in mid-November of each year. Again, all Hi-Hi, [No Hi alarms are set], Lo and Lo-Lo alarms are established by the Principal Engineer of Gas Measurement/Gas Quality Engineering, or designee, and may not be changed at operator discretion.

Gas Quality

Alarm limits will be reviewed during October of each year. Gas Control will provide the Gas Quality Response Team Lead with the current alarm limits. Gas Control will request that the Gas Quality Response Team Lead review their Gas Quality alarm limits. Once reviewed, they will either concur with the current settings or request new alarm settings. Gas Control will review the requested changes to the Gas Quality Hi-Hi and Lo-Lo alarm limits and make changes to the limits as required.

Alarm Response

Alarm Response, Transmission

(Pressure, Flow and Gas Quality)

All alarms will be acknowledged. In the case of Hi-Hi and Lo-Lo alarms the acknowledgment of the alarm and notification procedure below will be followed. In the case of Hi and Lo alarms the operator will analyze the system in alarm and determine if the alarm can be explained by system or loading conditions. Notification of responsible Field M&C Personnel is not necessary if the operator's analysis of the alarm indicates that the alarm is due to normal system conditions. If the operator's analysis of the alarm suggests equipment failure or facility problems, the operator will follow the same actions as outlined below for Hi-Hi and Lo-Lo alarms (See **Appendix I**, *Operating Policy for Frequent SCADA Alarms Related to Equipment Problems*).

Required Actions – During the first 10-minute period after alarm acknowledgment
Transmission Coordinators (TCs), and Gas System Operators (GSOs) will acknowledge, analyze and respond to all alarms.

- Brentwood Gas Control will establish communications with System Gas Control regarding the active alarm.
- Brentwood Gas Control and System Gas Control will analyze the upstream and downstream points to help determine the system condition and the cause of the active alarm.
- Upon completion of the analysis, a corrective action will be taken which may include a remote operation, contacting the responsible Field M&C Personnel, and continued monitoring.

Required Actions- During the second 10-minute period.

- The TC and the GSO will communicate and coordinate the next steps.
- Communicate next steps with responsible Field M&C Personnel and/or GT&D Gas Engineering Personnel.

If the TC, GSO, and the responsible Field M&C Personnel and/or GT&D Gas Engineering Personnel cannot agree on a course of action, the TC or GSO will contact their operations on-call representative. The Gas System Operations on-call supervisor will discuss and agree on a course of action that will be communicated to the TC or GSO on shift.

Further Actions Required.

- Abnormal Incident Report if required by the Senior TC.

Alarm Response, Distribution

(Pressure and Flow)

High Pressure Distribution (60 psig and below)

All alarms will be acknowledged. In the case of Hi-Hi and Lo-Lo alarms the acknowledgment of the alarm and notification procedure below will be followed. In the case of Lo alarms the operator will analyze the system in alarm and determine if the alarm can be explained by system or loading conditions. Notification of responsible Field M&C Personnel is not necessary if the operator's analysis of the alarm indicates that the alarm is due to normal system conditions. If the operator's analysis of the alarm suggests equipment failure or facility problems, the operator will follow the same actions as outlined below for Hi-Hi and Lo-Lo alarms.

Low Pressure Distribution (Inches of Water Column)

All Low Pressure distribution system alarms will require notification to the responsible Field M&C Personnel. A second notification must be made if a Lo pressure alarm continues to move toward a Lo-Lo alarm state.

Required Action – During the first 10-minute period after alarm acknowledgment

Transmission Coordinators (TCs), and Gas System Operators (GSOs) will acknowledge, analyze and respond to all alarms.

- Brentwood Gas Control will establish communications with System Gas Control regarding the active alarm.
- Brentwood Gas Control and System Gas Control will analyze the upstream and downstream points to help determine the system condition and the cause of the active alarm.
- Upon completion of the analysis, the responsible Field M&C Personnel will be notified, and monitoring will resume.

Required Action- During the second 10-minute period.

- Continue to monitor the system in alarm.

If the TC, GSO, and the responsible operating personnel cannot agree on a course of action, the TC or GSO will contact their operations on-call representative. The Gas System

Operations on-call supervisor will discuss and agree on a course of action which will be communicated to the TC or GSO on shift.

Definitions

Low Pressure Distribution Systems are gas systems measured in inches of water column. Unless otherwise noted, the Hi-Hi is set at 12" and the Lo-Lo is set at 4".

High Pressure Distribution Systems are gas mains operating at a pressure of 60 psig or less.

Transmission systems are gas pipelines operating at a pressure greater than 60 psig.

SCADA is an acronym for *Supervisory Control and Data Acquisition* and is a means of remotely monitoring and controlling PG&E's gas transmission and distribution systems. The term SCADA will be used to refer to both the ADACS and Citect systems. SCADA alarms identify data from field devices which are unusually high, low or when devices report a failed condition. Flashing messages, flashing buttons and/or a beeping sound notify the personnel monitoring the SCADA screens. Alarms can be set for analog points having a continuous range of values such as pressures and flows.

Gas Control currently consists of 2 gas system-monitoring facilities. System Gas Control is located in San Francisco and its remote operations center is located in Brentwood.

Field M&C Personnel include the GT M&C Supervisors (Districts) and/or the Area M&C T&R Personnel (Divisions).

GT&D Operations Personnel includes personnel directly associated with gas operations, such as Gas Control (System Gas Control and Brentwood Gas Control) and Station Operations (Topock Compressor Station, Hinkley Compressor Station, Los Medanos Storage Field and McDonald Island Storage Field).

GT&D Gas Engineering Personnel includes groups who lend direct support to gas operations. They include Gas Quality Response Team members, Transmission System Planning Engineers, Principal Engineer of Gas Measurement/Gas Quality Engineering, or designee, and the Sr. Gas Engineers.

GT&D Personnel includes everyone within GT&D Operations Personnel and GT&D Gas Engineering Personnel.

Design Day A statistical planning criteria used to ensure reliable gas service under unusually cold winter temperatures. Cold Winter Day (CWD) planning criteria includes serving all core and non-core customer loads with core customers using 70% of their

projected Abnormal Peak Day demand. Abnormal Peak Day (APD) planning criteria includes serving all core customers with all non-core customers fully curtailed.

Design Criteria (DC) established by TSP to identify alarm changes necessary during cold weather events.

4/28/08

Date 4/28/08

Manager, Gas Control

Redacted to Maintain Privacy

Appendix A - Gas SCADA System Digital Alarm Policy & Procedures

Gas SCADA system digital points are those points that communicate a system or equipment status (on-off, open-closed, normal-failed, etc). A digital point in the alarm state may be an indicator of a serious abnormal system condition or it may be a piece of information about the system that requires no response.

The Policy and Procedures outlined below were developed to ensure the safe operation and to maintain the integrity of PG&E's natural gas system by categorizing and documenting the response to gas SCADA digital alarms.

Policy

The response to each active digital alarm will be defined by the responsible maintenance supervisor.

System Gas Control will maintain a database of each digital alarm and it's associated response.

Additions, deletions, or changes to the digital alarms or alarm responses will follow the same procedure established for analog SCADA alarms.

As alarms occur, the gas control center will acknowledge and analyze each alarm and follow the response outlined by the responsible maintenance group.

Procedures

Digital alarms will be divided into the following categories:

1. Power
2. Data communications
3. Fire
4. Security
5. Digital operating alarms, no maintenance response required

The responsible maintenance supervisor (GSM District Superintendent or OM&C Gas Operating Supervisor) will define the response to each digital alarm in his/her area of responsibility.

Alarm Response and Required Action

Alarm response will defined as:

- **I=Immediate notification**
- **ND=Next day notification**
- **NWD=Next working day notification**
- **IR=Immediate response**

Immediate notification and *immediate response* alarms require that the responsible maintenance group be notified immediately. Immediate notification alarms are those that the maintenance group has deems significant enough to warrant their attention at any time of the day or night. Depending on the nature of the alarm, the maintenance supervisor may elect not to call out personnel immediately. If an alarm is categorized as *immediate response*, it is of a serious enough nature to require a response to the site by maintenance personnel.

Next day alarms require that the responsible maintenance supervisor be contacted during daylight hours at the next opportunity, but no later than the day following the day in which the alarm was initially received.

Next working day alarms require that the responsible maintenance supervisor be contacted on the next working day (normally Monday) either by phone, voice mail, e-mail, or maintenance memo.

The Senior Transmission Coordinator may request an immediate response if it is deemed necessary, and may choose to escalate the decision to the OP&C on-call supervisor if the responsible maintenance supervisor is not in agreement.

Alarm Review

During October, of each year, the digital alarm responses will be reviewed by each responsible maintenance supervisor. Upon completion of the review, Operations Planning and Control will implement the requested revisions and update the digital alarm response database spreadsheet.

Appendix B - SCADA Alarm Settings

PVID	Alarm Setting			
	Hi-Hi	Hi	Lo	Lo-Lo
Transmission (above 60 psig)	not set above MOP plus 3 psi*	set at or below the MOP at the discretion of the TC/Gas System Operator (GSO)	set at the discretion of the TC/GSO except during winter design criteria period*	not set below MRP less 3 psi*
HP Distribution (60 psig and below)	*set at the MAOP***	N/A	*set at the MRP***	*not set below MRP less 2 psi***
LP Distribution (inches of water column)	*set at 12" w.c. *****	*set at 10.5" w.c. *****	*set at 5" w.c. *****	*set at 4" w.c. *****
Transmission Flow	set for selected points only*	set at the discretion of the TC/GSO	set at the discretion of the TC/GSO	set for selected points only, ie for lines which do not normally shut-in and selected single feeds*
Distribution Flow	set at the responsible O&M group's request*	set at the discretion of the TC/GSO	set at the discretion of the TC/GSO	set at the responsible O&M group's request*
Gas Quality	set as recommended by the gas quality emergency response team***	set at the discretion of the TC/GSO	set at the discretion of the TC/GSO	set as recommended by the gas quality emergency response team***

*alarm settings can be changed only with the concurrence from Ops Sprvsr, Sr TC, Trans Sprvsr, or the Mgr of Gas Contrl.
***must be approved by the Principal Engineer of Gas Measurement/Gas Quality Engineering, or the designee*
****alarm settings can be changed only with the concurrence of gas quality emergency response team*

This table lists the parameters used to establish various pressure, flow, & gas quality alarm setpoints in the gas SCADA system, the authority for initial establishment of alarm settings, and the approval required for making changes to those settings. Changes should be made following the GSO SCADA Alarm Change Procedure (Appendix B)

Appendix C - GSO SCADA Alarm Change Procedure

To make an alarm database change, in both Citect & ADACS, the person initiating the change is responsible for the steps listed below. Any Senior Transmission Coordinator or Transmission Coordinator can initiate a change.

Step	Purpose
1. Only the following in Gas Control can approve an alarm change: Senior TC, Manager of Gas Control, SGC Transmission Supervisor, and the Brentwood Operations Supervisor. Also, any alarm changes to the Distribution System (60# and under), must be approved by the Principal Engineer of Gas Measurement/Gas Quality Engineering, or the designee.	*This ensures that GSO supervision has reviewed & authorized the alarm change.*
2. SGC will notify the Brentwood Gas Control Center via the Gas Logging System to make an alarm change. The communication should include the PV/Tag name or ID, point description, desired settings & the name of the approver. *Remember, in ADACS, not every PVID in SGC is the same as in the field!*	*Brentwood Gas Control Center receives instruction from SGC on which alarm points must be changed in ADACS and Citect.*
3. SGC will change their alarm settings on the SGC ADACS VAX and Citect. Brentwood will update their respective BNO/BSO ADACS VAXes and Citect. Please use the Policy, Procedures and Responsibilities Letter in the SCADA Alarm Policy Binder* as a guide when making changes.	*This updates the actual SCADA alarm points in ADACS and Citect, per the agreed settings in step 1.*
4. SGC will update the Alarm Exceptions tab, located as a tab within the Master SCADA Alarm Database. This can be found in the E-Library or at the following path: *\\go301\sharefiles\OPC\OPC_HLP\eBinder\Binder 7 SCADA PIU, RTU, Telecom\SCADAAlarmUpdate.xls.* SGC will make any changes to the Alarm Exceptions tab, noting the date, initials of the person making and/or approving the change, and any pertinent comments. The Alarm Exceptions tab is to be used *with* the Master SCADA Alarm Database. Since the Master SCADA Alarm Database is updated by the SCADA Alarm Coordinator, and they may not be on shift, one should always check any outstanding exceptions which may not be reflected in the Master SCADA Alarm Database. The SCADA Alarm Coordinator is responsible for transferring ALL permanent alarm changes from the Exceptions tab to the Master SCADA Alarm Database.	*This maintains a record of all changes. The Alarm Exceptions tab is an online reference to all SCADA alarm settings which have not been implemented into the Master SCADA Alarm Database. The SCADA Alarm Coordinator is the only person that updates the Master SCADA Alarm Database. Members of SGC will update the Alarm Exceptions Sheet, located as a tab in the Master SCADA Alarm Database, when the SCADA Alarm Coordinator is not on shift. When the SCADA Alarm Coordinator returns on shift, they are responsible for updating the Master SCADA Alarm Database with any permanent changes.*
5. The Alarm Exceptions tab is also used for managing any *temporary alarms* which will *not* be placed into the Master SCADA Alarm Database. These include changes associated with clearance work, Design Criteria settings, and emergency conditions. All changes documented should include the date, time, initials of the person making and/or approving the change, and any pertinent comments.	*Provides information on temporary alarms included within the Alarm Exceptions tab. TCs will add temporary alarm changes to the Alarm Exceptions tab, both when they are in effect, and then when they are returned to normal. The SCADA Alarm Coordinator is responsible for clearing these temporary alarm changes, removing them from the Alarm Exceptions tab, once their state has returned to normal.*
6. SGC will cut and paste the GLS entry, pertaining to the alarm change, into the body of an e-mail, and send it to the Gas Control Manager, the Transmission Supervisor, GT&D GSO All Transmission Coordinators, the Brentwood Operation supervisor, GSO BOPS1, and any other responsible personnel (i.e. Field M&C Personnel, GE Personnel Support**.)	*Provides an electronic communication to all pertinent parties about any alarm changes.*
7. SGC is required to print the e-mail message sent and file it under the Alarm Exceptions tab, located within the SCADA Alarm Information Binder.	*Maintains a hard copy of all communications associated with alarm changes.*

* The SCADA Alarm Policy located in Binder 7 contains the official GSO alarm policy. As you can see, each step in the procedure has a purpose. Please follow the procedure carefully. The Master SCADA PIU Alarm Database is updated on a regular basis.

** See Page 7 of the Gas SCADA - System Alarm Limits - Policy and Procedures Document (Alarm-Policy20.doc) for Terms and Definitions.

APPENDIX D - Gas SCADA Policy and Implementation of Alarm Limit Settings for new Gas SCADA Points

◊ **When new points are added to any Gas SCADA node, the operations supervisor for that node will be specifically provided with a list of the points added to the computer as well as the as-implemented alarm settings for each point.**

◊ **Generally new points to Gas SCADA will not have any HI-HI, HI, LO, or LO-LO alarm limit settings. The GSO Operations Supervisor responsible for monitoring that data point(s) will be notified about the new point(s) so that he/she can establish or confirm the correctness of the alarm settings.**

Sample notification message:

Bob:

The following new points have been implemented on SAC:

PVID	Description
400	XXX-STA L999 U/S PRESS
401	XXX-STA L999 D/S PRESS

Note that no alarm limits have been set for the new points.

Note: MOP and alarm settings in grey boxes apply to flow from North to South

Appendix E - OPERATING PARAMETERS AND HI-HI ALARM SETTINGS

L300A

Location	Elevation (feet)	Elevation difference (feet)	Pressure change due to elevation difference (psi)	MAOP (psig)	MOP due to elev difference (psig)	HI-HI Alarm Setting MOP+ 3psi (psig)
Topock	593				865	868
		87	1.8			
Low Spot	506			857		
		2045	41.2			
PLS-1	2551				825	828
PLS-1	2551				779	782
		1840	34.9			
Low Spot	711			815		
		1426	27.1			
PLS-2	2137				787	790
PLS-2	2137				682	685
		370	5.9			
Low Spot	1767			658		
		518	8.3			
PLS-2AX	2285				679	682
PLS-2AX	2285				572	575
		75	1.0			
Low Spot A	2210			573		
		0	0.0			
Hinkley	2210				573	576
Hinkley	2210				860	863
		24	0.5			
Low Spot	2186			851		
		166	3.8			
PLS-3	2372				857	860
PLS-3	2372				766	769
		1932	35.9			
Low Spot	440			803		
		0	0.0			
PLS-4	440				803	806

L300B

Location	Elevation (feet)	Elevation difference (feet)	Pressure change due to elevation difference (psi)	MAOP (psig)	MOP due to elev difference (psig)	HI-HI Alarm Setting MOP+ 3psi (psig)
Topock	593				865	868
		87	1.8			
Low Spot	506			857		
		2045	41.2			
PLS-1	2551				825	828
PLS-1	2551				779	782
		1840	34.9			
Low Spot	711			815		
		1426	27.1			
PLS-2	2137				787	790
PLS-2	2137				682	685
		370	5.9			
Low Spot	1767			658		
		288	4.6			
PLS-2BX	2055				683	686
PLS-2BX	2055				573	576
		0	0.0			
Low Spot B	2055			573		
		155	2.0			
Hinkley	2210				570	573
Hinkley	2210				860	863
		24	0.5			
Low Spot	2186			851		
		186	3.8			
PLS-3	2372				857	860
PLS-3	2372				766	769
		1932	35.9			
Low Spot	440			803		
		0	0.0			
PLS-4	440				803	806

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Note: MOP and alarm settings in grey boxes apply to flow from North to South

Appendix E - OPERATING PARAMETERS AND HI-HI ALARM SETTINGS

L300A

Location	Elevation (feet)	Elevation difference (feet)	Pressure change due to elevation difference (psi)	MAOP (psig)	MOP due to elev difference (psig)	HI-HI Alarm Setting MOP+ 3psi (psig)
PLS-4	440				754	757
		152	2.7			
Low Spot	288			757		
		0	0.0			
PLS-5	288				757	760
PLS-5	288				668	671
		70	1.0			
Low Spot	218			669		
		303	4.5			
Kettleman	521				664	667
Kettleman	521				839	842
		51	1.0			
Low Spot	470			840		
		377	7.8			
PLS-6A	847				832	835
PLS-6A	847				620	623
		717	10.2			
Low Spot A	130			631		
		52	0.7			
PLS-7A	182				630	633
PLS-6AX has been removed						
PLS-7A	182				555	558
		174	2.2			
Low Spot	8			558		
		0	0.0			
Milpitas	8				558	561

L300B

Location	Elevation (feet)	Elevation difference (feet)	Pressure change due to elevation difference (psi)	MAOP (psig)	MOP due to elev difference (psig)	HI-HI Alarm Setting MOP+ 3psi (psig)
PLS-4	440				754	757
		152	2.7			
Low Spot	288			757		
		0	0.0			
PLS-5	288				757	760
PLS-5	288				668	671
		70	1.0			
Low Spot	218			669		
		303	4.5			
Kettleman	521				664	667
Kettleman	521				839	842
		51	1.0			
Low Spot	470			840		
		392	7.9			
PLS-6B	862				832	835
PLS-6B	862				620	623
		666	9.5			
Low Spot B	196			631		
		0	0.0			
PLS-6BX	196				631	634
PLS-6BX	196				631	634
		17	0.2			
Low Spot B	179			631		
		0	0.0			
PLS-7B	179				631	634
PLS-7B	179				597	600
		171	2.4			
Low Spot	8			600		
		0	0.0			
Milpitas	8				600	603

4/24/03

Appendix F – Design Criteria Alarm Policy

The Design Criteria Temperature Forecast is located at each workstation in System Gas Control. This program provides warnings when local temperature forecasts are expected to create local customer demands on pipelines which reach, or exceed, Design Criteria levels.

This program references a temperature forecast and should be checked a minimum of two times a day, once at 0730 and again at 1030 hrs. Please place a copy of each of these in our Design Criteria folder, located behind the TC-1 desk.

TSP provides the alarm settings and suggested Design Criteria regulation data, which is displayed on specific SCADA screens. Lo alarms will be set at TSP determined values, not at operator discretion, during the period the design criteria is enacted.

Design Day Process:

1) Open the Temperature Forecast by opening the Design Criteria folder and clicking on the Design Criteria Temperature Forecast icon.
2) Review column two (Next Day Design) and column three (7 Day Design Criteria).
3) The "COLD" alarm appears when an area is 70% of APD or greater. The "CWD" and "APD" alarms are triggered when a location is 75% of APD and 100% of APD, respectively. When any of these three alarms appear, under the Next Day Design Criteria alarm column, follow the instructions in the Design Day Action Plan.
4) Design Criteria alarms will remain in effect until the 7 Day Design Criteria column (Column three) is no longer flagged "COLD, CWD, or APD".
5) Design Day Action Plan can be triggered by either the Design Criteria Temperature Forecast or TSP defined Hi-Hi flow alarms (90% of CWD).

Design Day Action Plan:

a) Go to the ADACS screen "ALMMEN" which displays links to various geographic areas where Normal and Design Criteria alarm settings and recommended pressure control set points can be found. On Citect, select the Alarms tab, and then the Alarm Settings drop down menu. Each of the geographic areas are listed here.

b) Find the location(s) that matches the alarm (COLD, CWD, APD). All of the data points that are listed in the impacted area will need to be set at Design Criteria settings. Utilizing the Gas Logging System, the Brentwood Gas Control Center will be advised of the changes that are necessary for each location. SGC will also advise the Brentwood Gas Control Center on the

GLS to notify all responsible supervision, including the TSP Area Engineer(s) (located on the SCADA Design Criteria Alarm screens).

c) Once all required alarm changes are completed, System Gas Control will print out the effected Design Criteria SCADA screen(s), which will include the time and date of the change(s).
d) System Gas Control will update any Design Criteria alarm changes within the Alarm Exceptions tab, located in the online SCADA Alarm Database and also file a hard copy of the Design Criteria screenshots in the Alarm Exception Log (Binder 7), to maintain a paper trail.
e) Once Design Criteria areas have returned to normal, SGC will restore alarms to their normal settings and advise the Brentwood Gas Control Center to do the same, via the GLS. ***Keep in mind that ONLY the 0730 forecast may be used to determine whether the alarm settings can be changed back to normal.*** They will also advise Brentwood Gas Control Center to notify all responsible supervision, including the TSP Area Engineer(s), of this event.
f) Remove all alarm changes from the Alarm Exception tab, located in the online SCADA Alarm Database.

Alarm Response:

Key LO alarms will be established during Design Day events. The response to a Design Day LO alarm is identical to the response for a LO-LO alarm as outlined in the Alarm Policy. LO-LO alarms are set based on the minimum required pressure (MRP) of the piping immediately downstream of the SCADA site. If a LO-LO alarm is breached, service to the customers connected to the piping immediately downstream of the SCADA site may be in jeopardy. Design Day LO alarms are set based on the MRP of the entire piping network downstream of a SCADA site. If a Design Day LO alarm is breached, service to customers at the end of the system served by that SCADA site may be in jeopardy.

Appendix G – Temporary Exceptions to Alarm Setpoint Criteria

The following are temporary exceptions to the alarm setpoint criteria outlined in the Gas SCADA System Alarm Limits Policy and Procedures:

Site	PVID	Exception	Temporary Alarm Settings			
			Hi-Hi	Hi	Lo	Lo-Lo
Taraval and Wawona *San Francisco*	*12018*	*Temporary alarm settings to allow system to meet minimum delivery pressures during maximum load periods. Authorized by Gas Distribution Engineering and Planning Manager*	*12.0 inches water column*	*11.2 inches water column*	*5.0 inches water column*	*4.0 inches water column*
Presidio and Geary *San Francisco*	*12022*	*Temporary alarm settings to allow system to meet minimum delivery pressures during maximum load periods. Authorized by Gas Distribution Engineering and Planning Manager*	*12.0 inches water column*	*11.2 inches water column*	*5.0 inches water column*	*4.0 inches water column*

Appendix H –Alarm Setpoints During Clearance Work

Alarm setpoints defined for the purpose of monitoring outside of normal HI-HI/LO-LO alarm setpoints during clearance work: (pressure, flow and gas quality)

- Will be identified in the clearance process by the clearance supervisor and GSO Clearance Coordinator.

    1. Temporary setpoints will be identified in the clearance document.
    2. Temporary setpoints will be confirmed in the clearance review process by the GSO Clearance Coordinator.
    3. Temporary setpoints will be noted in the clearance cover letter instructions by the GSO Clearance Coordinator.
    4. If there is no SCADA available at the job location, there will be an attempt if feasible to use another SCADA site to provide monitoring capability in addition to the gauge locations.
    5. **ALARM SETPOINTS WILL NOT BE LEFT IN HI-HI OR LO-LO STATUS DURING A JOB. TEMPORARY SETPOINTS WILL BE DEFINED AND IMPLEMENTED FOR MONITORING.**
    6. Hi-Hi alarms will not be set above the lower of Maximum Allowable Operating Pressure (MAOP) plus 3 pounds per square inch (psi) or Maximum Operating Pressure (MOP) plus 3 pounds per square inch (psi).

Appendix I – Operating Policy for Frequent SCADA Alarms Related to Equipment Problems

Repetitive alarms related to SCADA and/or Telecom equipment failures can be distracting, carrying the potential of masking valid pipeline alarms throughout the system. This policy addresses the procedure to be followed for problematic data points that have been analyzed and determined to be Telecom or SCADA equipment problems, as opposed to gas pressure, flow or quality problems.

Contact Procedures

1. If the GSO receives a data outage/problem at a facility that is determined critical by the Senior Transmission Coordinator, contact the responsible supervisor to facilitate repairs immediately. If the problem cannot be repaired immediately, the Senior TC will require the responsible supervisor to station personnel at the facility until all of the necessary repairs are made. If the station or facility is determined non-critical, the request for repairs may be submitted for regular work hours or at the discretion of the responsible supervisor.

2. When a GSO receives a data outage/problem at a particular RTU, they will refer to the RTU Response Binder to determine whether the response is ***Immediate***, ***Next Day***, or ***Next Working Day***. If the response is ***Immediate***, the GSO will respond within 15 minutes of the data failure. During the first 15 minutes, the GSO should perform troubleshooting of the site, by resetting the RTU, checking for power failures, and searching for communication failures (i.e. mountain tops). After 15 minutes, a call must be made to the responsible supervisor to initiate the restoration process by contacting maintenance personnel.

3. If an RTU is designated as ***Next Day***, the responsible personnel will make a call out after 08:00 hours. If an RTU is designated as ***Next Working Day***, the responsible personnel will be notified after the start of the next actual workday.

Failed Alarm Management

1. If an RTU (PIU) fails intermittently, the RTU may be placed in *alarm inhibit* by the GSO. The RTU will continue to be polled for the latest information, but will not alert the operator with an audible PIU failure alarm. The alarm shows on the operator summary as ALARMRESERV until the RTU is placed back to normal. The GSO will notify System Gas Control that data from the RTU may be suspect.

Should the RTU fail completely, follow the RTU outage policy in the Gas Control Centers. This decision will require communication with, and concurrence of System Gas Control.

2. A single data point that is frequently alarming (e.g. a single bad pressure transducer at a station) can be placed in *off alarm check.* The point **must** be placed in *off alarm check* while it is in the alarm state. This will retain the alarm condition in the operator summary.

3. Send an electronic work request for problems requiring action by field personnel. Utilize the **GSM Work Request** or send a Division Work Request via e-mail if required. The GSO will prioritize the request appropriately, as per the RTU Response Binder.

4. Data points that are used in calculations by SCADA (e.g. for pipeline inventory calculations) may be placed off scan and estimated values inserted. Data points may be taken off scan only with the approval of the Senior TC, Operations Supervisor, Transmission supervisor, or Manager.

5. The *alarm inhibit*, *off alarm check* and *off scan* will be returned to normal when repaired. A point placed in *alarm inhibit*, *off alarm check* or *off scan* will be logged in the shift summary and remain until the repair has been completed.