☐ *Engineering Design* ☒ *Maintenance, Operation, & Construction*

Issuing Department: GAS SYSTEM MAINTENANCE AND TECHNICAL SUPPORT
Manager: K. JOHNSON
Effective Date: 01 Feb 2000
Review Date: 01 Feb 2002

SUBJECT: Station Inspection, Testing, and Maintenance Procedures

Objective

This Standard provides procedures for the inspection, testing and maintenance of equipment within gas facilities owned by California Gas Transmission (CGT).

Scope

This Standard applies to main gas processing equipment normally found in CGT gas facilities and applies to all work conducted on CGT gas facilities. It does not apply to special and/or complex equipment (such as, gas compressors, standby electric generators, glycol reboilers, etc.) which are covered by detailed manufacturer's instructions and/or specific station Operation and Maintenance Instructions.

Applies To

GSM&TS Maintenance and Operations employees; DCS employees when maintaining CGT facilities.

Rescission

All previous instructions, oral or written, that may be contrary to this Standard.

Related Standard

CGT Standard 4430, "Gas Facilities Requirements"

CES Standard C-T&CS-S0351, "District Regulator Station Maintenance"

Originator

CGT Standard Technical Committee 21 on Station Equipment

Business Risk

Improper inspection and maintenance of any CGT gas facility could jeopardize the safe and efficient operation of that facility or result in non-compliance with Federal or State regulations. Non-compliance with applicable Federal and State regulations may subject PG&E to fines and negative publicity.

Responsibility for Implementation

The Area Superintendents of Gas System Maintenance & Technical Support or their designated representatives are responsible for ensuring compliance with this standard.

Contact for Further Information

[redacted] Senior Gas Engineer
System Integrity, Gas System Maintenance & Technical Support
[redacted]

Exhibits or Appendices

Supplement 1 - Main Gas Regulator/Monitor Inspection Procedure

Supplement 2 - Inspection Schedule

Exhibit 1 - *Technical Maintenance Equipment Card*; Form F4432A

Exhibit 2 - *CGT Station Maintenance Report*; Form F4332B

Exhibit 3 - Example of completed *CGT Station Maintenance Report*

References

CPUC General Order 112-E, "Rules Governing Design, Construction, Testing, Maintenance and Operation of Utility Gas Gathering, Transmission and Distribution Piping"

Pipeline Safety Regulations, 49 CFR Part 192,Transportation of Natural and Other Gas by Pipeline, Subpart M, Maintenance

CGT Standard 4110, "Leak Survey and Repair of Gas Transmission and Distribution Facilities"

CGT Standard 4252, "RTU Maintenance Instructions" (Under development)

CGT Standard 4332, "Removal and Control of Liquids from Gas Pipelines; Maintenance and Operations of Associated Gas Conditioning Equipment"

CGT Standard 4420, "Gas Transmission Clearance Procedure"

CGT Standard 4431, "O&MIs for Major Gas Facilities"

CGT Standard 4433, "Gas Pressure Relief Devices, Responsibility for Capacity Verification"

CGT Standard 4350, "Odorization of Natural Gas" (Under development)

GS&S F-11, "Valve Lubrication and Maintenance Requirements"

GS&S H-70, "Pressure Relief Devices"

GTS Standard 4292, "Vault Inspection Procedures"

S.P. 463-9, "Recording Pressures in Distribution Systems"

CES/GS/CS Standard C-T&CS-S0213 (CGT Standard 4414), "Work in Confined Spaces"

Code of Safe Practices, latest edition, PG&E, Safety Health & Claims Dept.

CGT Clearance Procedure Training Manual

Deviations

Approval to deviate from the requirements of this standard must be obtained in writing from the Director, Station Engineering, or Director, System Integrity, GSM&TS.

Approvals and Authorizations

1-24-00

Kirk Johnson Date

Manager, Gas System Maintenance and Technical Support

Definitions

Annually: At intervals not exceeding 15 months, but at least once each calendar year.

Boot or diaphragm regulator: Pilot-operated regulator which utilizes a pressure-loaded, elastomeric flow element within the valve. The elastomeric element, commonly called a boot, tube, sleeve, or diaphragm, serves as both the actuator and valve plug. These types of valves include: Mooney Flowgrid, Fisher Model 399, Grove Flexflo, and American Meter Axial Flow regulators.

Main Gas Regulator/Monitor: Pressure regulating device which controls gas pressure for delivery into transmission or Distribution Feeder Main (DFM) lines. The main gas regulator is the primary pressure regulating device controlling the downstream pressure. The main gas monitor is the backup pressure regulating device which will take over pressure control if the main gas regulator fails to limit the delivery pressure. A main gas regulator/monitor may be controlled by a controller or pilot, or be self-contained (not requiring controller or pilot).

Regulator Stations: Facilities which contain pressure control devices and their appurtenances, within the transmission system, which limit and control pressures in transmission lines or DFMs. Appurtenances, in this case, are any subordinate devices necessary for the pressure regulator to function properly, e.g., pilots, controllers, valve positioners, pressure transducers, etc.

General Procedures

1. Prior to entering a CGT facility, obtain the proper approvals from the District or Division responsible for maintaining the facility. Any person entering a CGT facility shall be knowledgeable about the operations of that facility or must be accompanied by a local CGT employee.
2. If gates or doors alarm a Gas Control Center, contact the appropriate Gas Control Center to inform them of your presence.
3. Where applicable, a clearance will be obtained, in accordance with the CGT Standard 4420, to perform inspection, testing or maintenance that will impact the operation of these facilities. DCS personnel shall follow the "GSO New/Standard System Clearance Requirements" when performing work requiring a clearance on CGT equipment, facilities, or pipelines.

4. Prior to entering any pit or vault, observe the necessary precautions regarding barricading, sources of ignition, and checking for combustible gases in accordance with CES/GS/CS Standard C-T&CS-S0213, "Work in Confined Spaces" and applicable sections of the PG&E *Code of Safe Practices*.
5. All station equipment should be free of leakage, in good mechanical condition, and capable of being operated by authorized persons at any time. The piping shall be checked for any obvious gas leaks.

   Station piping shall be surveyed annually for gas leakage using a portable combustible gas indicator or a hydrogen flame ionization unit. Any loose connections should be tighten and any component that may be contributing to a leak should be repaired. If the gas leak is considered hazardous, the repairs shall be conducted immediately or the condition made safe.

   If gas is found in a vault, the equipment in the vault must be inspected for leaks. Any leaks found must be repaired.
6. Station housekeeping shall be performed to ensure a safe and healthful environment. Station housekeeping includes removal of debris, weeds, and water (either in pits or yards); upkeep of painted surfaces (on mechanical piping and structures), and maintenance of security fences, vaults, and enclosures.
7. Attempts should be made to complete a scheduled inspection on the same day. If a partial inspection is performed due to system diagnosis, scheduling or other needs, the partial inspection shall be documented as to the work that was done. The work performed at that time does not need to be repeated at the next scheduled inspection.
8. At the completion of every inspection, make certain that all valves and equipment are returned to the normal operating position and are functioning correctly. Notify the Gas Control Center and the appropriate people detailed in the clearance procedure that the work is complete and the station is back in operation.

Inspection Frequencies

The maximum interval between complete inspections shall not exceed those prescribed under this section. In instances where unusually severe service condition or extremely heavy equipment usage exists, the inspection frequencies may need to be increased.

Actuator, Valve

Manual Gear Operators

Annually, when servicing valve, inspect gear housing for damage and wear. Inspect weather seal and replace if necessary. Every 5 to 10 years, open and inspect enclosed gear housing. Inspect for damage and lubricate gearing. Note: If roughness and/or a grinding noise is detected whenever operating a manual gear-operated valve, open and inspect enclosed gear box operator. Inspect for damaged parts and lubricate gearing.

Power-Actuator

A. Diaphragm/Chamber Actuator - Annually inspect the diaphragm assembly for leakage by applying gas pressure through the static or pilot connections. Pressure applied must not exceeding normal diaphragm operating pressure.

   If pressure loss occurs, 1) soap test the diaphragm flange before disassembling the diaphragm, and 2) visually examine diaphragm(s) for pliability, abrasion, rupture, or separation. Replace diaphragm(s) as needed.

B. Pneumatic Piston Actuators - Annually, stroke the valve and observe the operation, checking for smoothness of operation. If harsh or jerky operation is detected, investigate for internal wear or damage. Check for excessive wear or binding of linkages. If low torque output is suspected, check gas supply pressure, and/or conduct a cylinder bypass leak test to evaluate the condition of the cylinder and seals. If the manual override is hydraulic, drain and replace the hydraulic fluid (with Marinus biodegradable fluid) every 5 to 10 years.

C. Pneumatic Gas Motor-Driven Actuators - Monthly (or more frequently if required) check that the motor lubricator is filled with oil and working properly. Periodically, depending on oil usage, drain oil sump located in the exhaust vent stack. Annually, stroke the valve and observe its operation, checking for smoothness of operation. If harsh or jerky operation is detected, investigate for internal wear or damage. Check for excessive wear or binding of gearing.

D. Vane-Type Actuators - Annually, stroke the valve and observe its operation, checking for smoothness of operation. If harsh or jerky operation is detected, investigate for internal wear or damage. Check for lack of hydraulic fluid in the operator. Every 5 to 10 years, drain and replace the hydraulic fluid (with Marinus biodegradable fluid) in the operator to remove any accumulation

of condensate, slag, and mill scale. Refer to the manufacturer's literature for instructions.

E. Electric Motor-Driven Actuators - Annually, stroke the valve and observe its operation, checking for smoothness of operation. If harsh or jerky operation is detected, investigate for internal wear or damage. Check for excessive wear or binding of gearing.

Note: Valve actuators have the potential for developing oil leaks. If oil is found on the ground adjacent to the operator, determine and remedy the cause. For minor spills/leaks, clean up the area and properly dispose of the contaminants. For extensive leaks, contact the local Environmental Monitor for instructions.

Controllers

Pneumatic Controllers

Calibration - Annually, conduct a two-point check: actual line pressure at the time of calibration and zero pressure. If the readings are inaccurate, follow manufacturer's instructions to re-calibrate.

Tuning - Annually review the controlling process (pressure/flow) chart. Tune the controller if there is evidence of instability or sluggishness in the control process.

Electronic Controllers

Follow the calibration and tuning diagnostics described under "Pneumatic Controllers" section. In addition, visually inspect the controller annually for the following:

- abnormalities such as loose, broken, or stressed ribbon cable.
- damaged circuitry.
- heat stress parts.
- excessive dirt or dust buildup that may impede air flow and inhibit proper heat dissipation.

Dehydrators

Refer to CGT Standard 4332 for instructions.

Drips, Pipeline

Annually, check offset and drop-leg drips, bottom-tapped drains, and siphon drips equipped with manually controlled dump valves. They shall also be drained periodically to prevent excessive accumulation of liquids in the pipeline. Frequency shall be determined by historical liquid volume experienced at each location and corrosivity of the liquids.

	Offset and drop-leg drips equipped with automatically controlled liquid dump valves and liquid storage tanks shall be inspected periodically for proper operation and according to inspection requirements specified in the environmental and safety plan for the facility. Refer to CGT Standard 4332.
Filter/Separators	Annually, check the filter drain for dirt, liquids, or other debris. Perform a filter/strainer differential pressure test with an indicating gage or manometer at the inlet and outlet. Based on known or estimated flowrate, compare differential pressure with published specifications. Replace filter element, if measured differential is higher than specification.
Gas Saver Circuit	Annually, verify that the Gas Saver Circuits (GSC) on monitor valves and standby regulators are functioning properly. The GSC may quickly be evaluated using the following procedures: • Under normal (standby) condition, check that valve positioner is not venting supply gas, the output port(s) of the valve positioner is zero, and the pneumatic end-of-travel limit switch is tripped. • Shut off the supply gas to the GSC by closing the hand valve at the monitor/standby regulator. Partially stroke the monitor/ standby regulator valve by manually overriding the valve actuator (using handwheel or hydraulic pump override) until the valve paddle just disengages the pneumatic end-of-travel limit switch. Open the hand valve to re-supply the power gas to the GSC. The GSC should then supply gas to the valve positioner which in turn moves the valve to the original position and trips the limit switch. • Use the controller to partially stroke the valve. The GSC should supply gas to the valve positioner whenever the controller output is between 3 and 15 psig. This test may be done in conjunction with the Class A diagnostic check of the valve. If the results of any one of these steps are negative, trouble shoot the problem and calibrate the GSC. Refer to CGT Standard 4271.
Gas Supply Racks	Annually, 1) perform Class A diagnostics on the pressure regulators and relief valves, and 2) check and service, as required, filters and dehydrators. Every four years, perform Class B inspection of the pressure regulators and relief valves. See Supplement 1 for details.
Meters, Operational and Fiscal	Under development.

Odorizer	At a minimum, inspect all odorizers, except farm tap odorizers, monthly. Farm tap odorizers shall be checked, tested and serviced at least annually. Refer to CGT Standard S 4350 (under development).
Pilot	The pilot used with regulators, monitors, and relief valves shall be inspected and maintained at the same frequency as the Class B inspection requirements for boot/diaphragm regulators. The supply gas to each pilot must be filtered. If the pilot filter is exhibiting an unusually heavy buildup of debris, increase the frequency of inspection for the filter.
Positioner, Valve	Annually check each valve positioner when conducting valve/actuator test. Using the valve controller, transmit to the positioner controller output signals equivalent to full open, 50% open, and full close positions. Check the position of the valve against the full open, 50% open and full closed controller output signal. Calibrate the valve positioner as needed. Check linkages between the positioner and valve for smoothness of operation and excessive wear.
Pressure Recorders	Annually conduct a two-point check: full scale and zero pressure. If the readings are inaccurate, follow manufacturer's instructions to re-calibrate.
Pressure Transducers	Annually, conduct a two-point check: full scale and zero pressure. If the readings are inaccurate, follow manufacturer's instructions to re-calibrate.
Regulator / Monitor, Main Gas	Inspection, testing and maintenance of **boot and diaphragm regulators** shall comply with CES Standard C-T&CS-S0351, *District Regulator Station Maintenance*. Main gas regulators, monitors, and relief valves (**non-boot or diaphragm regulators**) shall be inspected and tested annually. The work to be performed on the main gas regulators is specified in Supplement 1, "Main Gas Regulator/Monitor Inspection Procedure". Controller-operated standby regulators and monitor valves shall be checked and partially operated once a month (for 1/4 turn valves) or semi-annually (for globe style regulators).
Relief Valves	A. Annually, the relief devices shall be inspected and tested to determine that they are: 1. In good operating condition; 2. Set to function at the correct pressure (Note: the setpoint must be verified by physically testing that the relief valve

begins to operate and re-seats or re-seals at the proper pressure settings.); and

3. Properly installed and protected from dirt, liquids, and other conditions that might prevent proper operations.

B. Boot/diaphragm relief valves require a Class B internal inspection every four years. (Follow the requirements of CES Standard C-T&CS-S0351, *District Regulator Station Maintenance*.) For all other types of relief valves, Class B internal inspections are not required except "for cause".

C. Relief capacities shall be verified annually. In addition, capacity shall be verified immediately when changes are made which could affect the ability of the relief device to protect the connected system. The appropriate Pipeline or Facility Engineer should to be notified that a capacity verification needs to be conducted. (Refer to CGT Standard 4433 for Capacity Verification for Relief Devices.)

SCADA Equipment

Conduct routine inspection and service of the RTU equipment per instructions detailed in CGT Standard 4252, "RTU Maintenance Instructions" (under development).

Annually (or more often if operating in severe environmental conditions) visually inspect the RTU for the following

- abnormalities such as loose, broken, or stressed ribbon cable.
- damaged circuitry.
- heat stressed parts.
- excessive dirt or dust buildup that may impede air flow and inhibit proper heat dissipation. Clean (or replace) dust filter and interior as required.

Annually test the main and backup power supply. Verify that RTU can operate off the backup power.

Separators, Gas-Liquid

Gas-Liquid separators shall be monitored at least monthly to ensure proper operation. Perform maintenance of Gas-Liquid separators according to the equipment manufacturer's recommendations.

Valves, Block

Annually check and operate all station valves including valves required to isolate the station in an emergency.
Power-actuated plug, ball, and gate valves may require a more frequent inspection/maintenance schedule. Refer to GS&S Standard F-11, "Valve Lubrication and Maintenance Requirements".

Vaults

Annually inspect all vaults which house pressure regulating and pressure limiting equipment, and are over 200 cubic feet in internal volume. Refer to GTS Standard 4292.

Inspection Schedule

Supplement 2, "Inspection Schedule", provides a summary of frequency of inspection for equipment typically found in CGT gas facilities. For detailed information, refer to the referenced document listed in the table.

The Pipeline Maintenance (PLM) Program shall be used and updated for scheduling and tracking of the station maintenance. (The Gas FM scheduling program may be used for CGT facilities maintained by DCS.)

Records/Forms

1. A "Technical Maintenance Equipment Card" - Form F4432A, shall be prepared for each major component (e.g., control valve, controller, valve positioner, etc.) in a control loop. The Equipment Card shall be filed in the local operating office. (See Exhibit 1.)
2. A record of regulator inspection and maintenance shall be prepared and filed in the local operating office, using "CGT Station Maintenance Report," Form F4432B (Exhibit 2) or other appropriate forms listed in the reference document and in Supplement 2. (The District Regulator Data Sheet (62-6271) and District Regulator Station Maintenance Record (62-6321) forms shall be used to document equipment and maintenance of the boot and diaphragm regulators.) Exhibit 3 is a sample of a completed CGT Station Maintenance Report. Continuous maintenance records shall be retained for 5 years or for the life of the facility, whichever is less.
3. Documentation of inspections, partial or full, shall be done at the time and location the inspection is performed. This can either be done on the CGT Station Maintenance Report, or in a log book or other media and transferred later the same day to the CGT Station Maintenance Report.

SUPPLEMENT 1
MAIN GAS REGULATOR/MONITOR INSPECTION PROCEDURE

The following procedures apply to the inspection, testing and preventive maintenance work required for **non-boot or diaphragm regulators and monitors**. Examples of non-boot and diaphragm valves are: ¼-turn ball or plug valve regulators; linear globe-style control valves, and pilot-operated pressure loading regulators (such as, the Fisher 1098 and Rockwell 441). NOTE: Inspection, testing and maintenance of **boot and diaphragm regulators** shall comply with CES Standard C-T&CS-S0351, *District Regulator Station Maintenance*.

At any stage of inspection, steps shall be taken to correct deviations from proper operation. The main gas regulator is considered operating properly when:

A. The regulator is controlling the set pressure in a stable manner throughout the normal range of flows and during normal inlet pressure variations; and

B. All components are adequate from the standpoint of reliability, capacity, and safety.

If acceptable operation, as describe above, is not obtained, the problem shall be determined and immediately corrected. Retesting shall be done to ensure that proper operation has been achieved.

Class A Diagnostics - External

Main Gas Regulator Operating Tests:

A. Check regulating devices for pressure settings and controllability. Test working and standby regulators or control valves for lockup and ability to control minimum flow. If lockup is not achievable, evaluate the station and system's dynamics and operations to determine if lockup is necessary or achievable.

B. Cause the monitor and the backup regulator, if present, to operate and take over pressure control at its setpoint. (Temporarily raise the main gas regulator setpoint to cause the monitor to control; lower the setpoint of the lead regulator to cause the backup regulator to control.) Observe the controllability of the monitor and backup regulators.

C. Clear (blow out) and inspect all control vent lines and check vent screens.

Main Gas Regulator/Monitor Maintenance:

For Plug or Ball Type Valve Assembly - Refer to GS&S Standard F-11 and manufacturer's recommendation for lubrication and maintenance.

Class B Inspection - Internal

Class B Internal inspection is not required except "for cause". "For cause" may include, inability to fully stroke the valve, excessive mechanical noise or vibration, rough operations, inability to maintain setpoint, etc.

Follow the manufacturer's procedures for conducting an internal inspection. The manufacturer's recommended spare parts shall be on-hand prior to regulator teardown unless the regulator can be taken out of service for an extended period.

After regulator re-assembly, conduct the operating tests specified in Class A diagnostics.

Equipment service	type	Inspection Frequency	Standard	Form(s)	Comments
Actuators, Valve					
	pneumatic piston	annually	CGT 4432	CGT Station Maintenance Report F4432	stroke valve: examine for leaks & mechanical condition
	pneumatic motor	TBD/annually	CGT 4432	CGT Station Maintenance Report F4432	refill lubricator based on usage; stroke valve: examine for leaks & mechanical condition
	vane-type (hydraulic)	annually	CGT 4432	CGT Station Maintenance Report F4432	stroke valve and examine for mechanical condition; check oil level; 5 to years replace hydraulic fluid
	electrical motor	annually	CGT 4432	CGT Station Maintenance Report F4432	stroke valve: examine for mechanical condition
Chromatograph, Gas		semi-annually	CGT 4310	See CGT 4310	calibrate
		monthly	CGT 4310	See CGT 4310	check for accurracy with calibrated gas
		weekly	CGT 4310	See CGT 4310	inspect
		daily (when practical)	CGT 4310		check if working
Controllers					
	electronic controllers	annually	CGT 4432	CGT Station Maintenance Report F4432	
	pneumatic controllers	annually	CGT 4432	CGT Station Maintenance Report F4432	alignment check
Dehydrators		monthly	CGT 4332	Dehydration Station Inspection Report (form 62-3085a/b)	Refer to CGT Standard 4332
Drips, Pipeline		periodically	CGT 4332	Pipeline Patrol and Work Report (form 62-4648)	Frequency of draining depends on historical liquid volume experienced at each location. Refer to CGT Standard 4332
Filters		annually	C-T&CS-S0351	CGT Station Maintenance Report F4432	differential check

Equipment service	type	Inspection Frequency	Standard	Form(s)	Comments
Gas Saver Circuit		annually	CGT 4432	CGT Station Maintenance Report F4432	GSC is used to minimize bleed gas at valve positioner. Check operation, calibrate as required.
Gas Supply Racks			CGT 4432	CGT Station Maintenance Report F4432	
dehydrators		annually	CGT 4432	CGT Station Maintenance Report F4432	
filters		annually	CGT 4432	CGT Station Maintenance Report F4432	
regulators		annually	CGT 4432	CGT Station Maintenance Report F4432	Class A Inspection - Annually; Class B Inspection - 4 years
reliefs		annually	CGT 4432	CGT Station Maintenance Report F4432	Class A Inspection - Annually; Class B Inspection - 4 years
Meters, Operational & Fiscal					
orifice		semi-annually	IP457-4		fiscal meter only. (JWB is drafting standard)
ultrasonic		semi-annually	CGT 4324		inspection and diagnostics
other		T.B.D.			
Flow computer					
Mercury	Mercor EC AMR	annually	IP457-5	calibrat'n/chklist Form B	calibration; new installation require followup calibration. See IP.
Mercury	Mercor EC AMR	as required	IP457-5	periodic inspect'n Form C	inspection; new installation require followup inspection. See IP.
Total Flow	Flow Computer	semi-annually	CGT 4331	None	calibration (data inputted in device)
Total Flow	Flow Computer	semi-annually	CGT 4331	None	inspection (data inputted in device)
Positioners (pneumatic / I/P)		annually	CGT 4432	CGT Station Maintenance Report F4432	stroke valve: check calibration (3-15#)
Pressure Recorders		annually	CGT 4432	CGT Station Maintenance Report F4432	2-point check - 0 & current field pressure.

Equipment service			type	Inspection Frequency	Standard	Form(s)	Comments
Pressure Transducers				annually	CGT 4432	CGT Station Maintenance Report F4432	2-point check - 0 & current field pressure.
Regulator							
	Self-contained (e.g., HPRs)						
		spring/weight		annually	CGT 4432	CGT Station Maintenance Report F4432	*Class A Annually; Class B for cause.*
	Pilot-operated						
		boot/diaphragm (Mooney, 399, Flexflo, etc.)		annually - class A up to 4 years - class B	C-T&CS-S0351	District Regulator Station Maintenance Record 62-6321	For a new regulator, internal inspection yearly until a maximum of 4 yr freq is justified.
		globe (Fisher 1098, Rockwell 441, etc.)		annually	CGT 4432	CGT Station Maintenance Report F4432	*Class A Annually; Class B for cause.*
	Controller-operated						
		1/4-turn valve					
			ball (Grove B-5, etc.)	Annually. Also, see standby/freq-used regulator below for other requirements.	CGT 4432	CGT Station Maintenance Report F4432	*Class A Annually; Class B for cause.*
			plug (Rockwell, etc.)	Annually. Also, see standby/freq-used regulator below for other requirements.	CGT 4432	CGT Station Maintenance Report F4432	*Class A Annually; Class B for cause.*
			v-notch ball	annually	CGT 4432	CGT Station Maintenance Report F4432	*Class A Annually; Class B for cause.*
		linear (Fisher, Masoneilan,etc.)	globe	annually	CGT 4432	CGT Station Maintenance Report F4432	*Class A Annually; Class B for cause.*
		standby reg & monitor	1/4 turn ball & plug	once a month	F-11	District's Week/Monthly Checklist	Inspect & partially operate
		standby reg & monitor	all types	semi-annually	F-11	District's Week/Monthly Checklist	Inspect, partially operate, service & lubricate (if req'd)

Equipment	service	type	Inspection Frequency	Standard	Form(s)	Comments
	frequently used regulator	plug	as often as weekly	F-11	District's Week/Monthly Checklist	lubricate & inspect
	frequently used regulator	ball	as often as weekly	F-11	District's Week/Monthly Checklist	lubricate & inspect
Relief Valves			annually	C-T&CS-S0351 & F-70	CGT Station Maintenance Report F4432	maintenance, testing, & capacity review required
SCADA RTU			annually	CGT 4432	CGT Station Maintenance Report F4432	Clean, inspect power supply/battery
Strainers / Separators			annually	C-T&CS-S0351	CGT Station Maintenance Report F4432	
Valve (Manual)						
	Isolation & block	plug	annually	F-11	Valve Maintenance Record FF11	inspect, service, lubricate (if req'd), & operate.
	Isolation & block	ball	annually	F-11	Valve Maintenance Record FF11	inspect, service, lubricate (if req'd), & operate.
	isolation & block	gate	annually	F-11	Valve Maintenance Record FF11	inspect, service, & operate.
Valve (Power-operated)						
	Isolation & block	all types	recommend twice/year; minimum once a year	F-11	Valve Maintenance Record FF11	inspect, service, lubricate (if req'd), & operate.
	Security Valves (auto-shutoff)		annually	C-T&CS-S0351	CGT Station Maintenance Report F4432	
Vault			annually	CGT 4292	Vault Inspection Record 75-300 (9/75)	containing regulating/limiting eqt & >200 cu ft.

Form: F4432A
5/30/99

PACIFIC GAS & ELECTRIC COMPANY

CGT Standard 4432 Exhibit 1

TECHNICAL MAINTENANCE EQUIPMENT CARD

LOCATION NO. _____
SCADA(PVID) NO. _____
EQUIPMENT: _____

PLM NO. _____
LOCATION _____
CARD NO. _____

ITEM							EQUIPMENT LIST			
INSTRUMENT DESIGNATION							NO.	DESCR.	NO.	DESCR.
MFG. CODE										
MODEL NO.										
SERIAL NO.										
MANUAL [1] CAT [2]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]				
DWG. [1] FOR. PRT. [2]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]				
INPUT [1] I.D. [2]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]				
INPUT [1] STATIC [2]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]				
OUTPUT [1] SIZE [2]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]				
PROPORTIONAL BAND										
RESET							RELATED JOBS			
SPEED							PLM NO.	DESCRIPTION		
SETPOINT										
ORIFICE [1] CASE [2]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]				
SPRING [1] VANES [2]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]				
RESTRICTION										
FILTER ELEMENT										
DEHYDRATOR										
STD. NO.										

SHUTDOWN REQUIRED NO ☐ YES ☐

REMARKS:

JOB NO.	JOB DESCRIPTION	PLM FREQ.	CLEARANCE NUMBER		PLM DUE
1.					
2.					
3.					
4.					

NOTE: RECORD MAINTENANCE, DATE & INITIALS ON REVERSE SIDE

DATE	REMARKS	MAN-HOURS	INITIALS	DATE	REMARKS	MAN-HOURS	INITIALS

CGT STATION MAINTENANCE REPORT
GAS SYSTEM MAINTENANCE AND TECHNICAL SUPPORT

TYPE OF STATION _____ LOCATION _____ DATE _____

FORM TO BE USED AT REGULATOR STATION, PRESSURE LIMITING STATION, AND TERMINALS. REFER TO CGT STANDARD S 4432. YEAR _____

VALVES & CONTROL SYSTEMS						AS FOUND SETPOINT		AS LEFT SETPOINT			CHECKED/CALIBRATED OR SERVICED OF CONTROL SYSTEMS							
TYPE OF VALVE	VALVE NUMBER	GENERAL CONDITION (Leaks, etc.)	VALVE SERVICED	VALVE STROKED	VALVE ACTUATOR INSPECTED	SETPOINT	ACTUAL CONTROL POINT	SETPOINT	ACTUAL CONTROL POINT	DATE / INITIALS	CONTROLLER / PILOT		POSTIONER		CONTROL SYSTEM / TRANSDUCERS		GAS SAVER CIRCUIT	
(reg, man, relief, other)			Y/N	Y/N	Y/N						check/cal	serviced	check/cal	serviced	check/cal	serviced	check/cal	serviced

MAIN GAS EQUIPMENT			
FILTER / SEPARATOR / OTHER			COMMENTS
Description	Checked	Replaced	

GENERAL STATION CONDITION	
Fencing & Gates	
Yard/Landscaping	
Piping & Valves	
Vaults	
Building	

NOTES:

1) THIS FORM SHALL BE USED WHENEVER MAINTENANCE IS PERFORMED AT A FACILITY WHICH HAS CONTROLLER-OPERATED PRESSURE REGULATING, PRESSURE RELIEF AND/OR PRESSURE MONITORING EQUIPMENT.
2) THIS FORM SHALL BE RETAINED FOR RECORDKEEPING PURPOSES IN THE DISTRICT'S HISTORY FILE.
3) CONTROL VALVES WITH MULTIPLE FUNCTIONS (I.E., PRESSURE CONTROL WITH FLOW OR BACK-PRESSURE CONTROL, ETC.) SHOULD HAVE A SEPARATE ENTRY FOR EACH CONTROL FUNCTION.
4) THE APPROPRIATE COLUMNS SHALL BE DATED BY THE INDIVIDUAL PERFORMING THE MAINTENANCE WORK AND A LOG OF THE WORK PERFORMED SHALL BE ENTERED AND INITIALLED AS REQUIRED IN THE REMARKS SECTION ON PAGE 2.
5) ANY CLARIFICATION OF MAINTENANCE PERFORMED OR COMMENTS SHALL BE ENTERED IN THE REMARKS SECTION ON PAGE 2 PRECEDED BY AN APPROPRIATE CROSS-REFERENCE.

CGT STATION MAINTENANCE REPORT
GAS SYSTEM MAINTENANCE AND TECHNICAL SUPPORT

TYPE OF STATION _____ LOCATION _____ DATE _____

GAS SUPPLIES

G.S. NUMBER	DEHYDRATOR		FILTER		REGULATORS / RELIEFS				_____ psig SUPPLY		_____ psig SUPPLY		DATE INITIALS	GENERAL CONDITION (LEAKS, ETC.) Include information on additional stages, if appropriate
					1st stage		2nd stage		1st stage		2nd stage			
	Checked	Replaced	Checked	Replaced	Checked	Serviced	Checked	Serviced	As Found	As Left	As Found	As Left		
					Regs									
					Reliefs									
					Regs									
					Reliefs									

SCADA EQUIPMENT Service &/or Calibration			
RTU	Power Backup	Battery Check	

TRANSDUCERS	TWO POINT CHECK				
	As Found		As Left		DATE / INITIAL
	low	high	low	high	

REMARKS: _____

REVIEWED BY: _____

Form F4432B
3/99

CGT STATION MAINTENANCE REPORT
GAS SYSTEM MAINTENANCE AND TECHNICAL SUPPORT

TYPE OF STATION *Regulator Station* LOCATION *Gold Hill* DATE *6/22/99*

FORM TO BE USED AT REGULATOR STATION, PRESSURE LIMITING STATION, AND TERMINALS. REFER TO CGT STANDARD S 4432. YEAR *1999*

VALVES & CONTROL SYSTEMS						AS FOUND SETPOINT		AS LEFT SETPOINT			CHECKED AND/OR SERVICED OF CONTROL SYSTEMS							
TYPE OF VALVE	VALVE NUMBER	GENERAL CONDITION (Leaks, etc.)	VALVE SERVICED	VALVE STROKED	VALVE ACTUATOR INSPECTED	SETPOINT	ACTUAL CONTROL POINT	SETPOINT	ACTUAL CONTROL POINT	DATE INITIALS	CONTROLLER / PILOT		POSTIONER		CONTROL SYSTEM		GAS SAVER CIRCUIT	
(reg, mon, relief,other)			Y/N	Y/N	Y/N						checked	serviced	checked	serviced	checked	serviced	checked	serviced
reg	*4*		*Y*	*Y*	*Y*	*300*	*298*	*300*	*300*	[redacted] *6/22*	✓		✓		*N/A*		*N/A*	
mon	*5*		*Y*	*Y*	*Y*	*310*	*313*	*310*	*310*	[redacted] *6/22*	✓	✓	✓	✓	*N/A*		✓	
reg	*20*		*N/A*	*N/A*	*N/A*	*60*	*60.5*	*60*	*60*	[redacted] *6/22*	✓		*N/A*		*N/A*		*N/A*	
mon	*21*		*N/A*	*N/A*	*N/A*	*63*	*64*	*63*	*63.5*	[redacted] *6/22*	✓		*N/A*		*N/A*		*N/A*	
relief	*12*		*Y*	*N*	*N*	*210*	*208*	*210*	*210*	[redacted] *6/22*	✓		✓		*N/A*		*N/A*	
trimmer	*10R*		*Y*	*Y*	*Y*	*200*	*197*	*200*	*201*	[redacted] *6/22*	✓		✓		✓		*N/A*	
load valve	*10*		*Y*	*Y*	*Y*	*6/12*	*6.5/12.2*	*6/12*	*6.0/12.0*	[redacted] *6/22*	*N/A*	*N/A*	*N/A*		✓		*N/A*	

MAIN GAS EQUIPMENT			
FILTER / SEPARATOR / OTHER.			COMMENTS
Description	Checked	Replaced	
filter u/s V-4	✓	*N*	*element clean*
filter u/s V-20	✓	*N*	*element clean*
drip u/s V-2	✓	*N/A*	*less than 1 gallon found*

GENERAL STATION CONDITION	
Fencing & Gates	*Fencing is secure and gates are in good working order.*
Yard/Landscaping	*Need additional gravel near the front drive; otherwise yard in good condition.*
Piping & Valves	*No leaks or visual corrosion; schedule painting of above ground piping in Spring, 2000.*
Vaults	*All vaults and covers in good condition.*
Building	*In goood condition.*

NOTES:

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2) THIS FORM SHALL BE RETAINED FOR RECORDKEEPING PURPOSED IN THE DISTRICT'S HISTORY FILE.
3) CONTROL VALVES WITH MULTIPLE FUNCTIONS (I.E., PRESSURE CONTROL WITH FLOW OR BACK-PRESSURE CONTROL, ETC.) SHALL HAVE SEPARATE ENTRY FOR EACH CONTROL FUNCTION.
4) THE APPROPRIATE COLUMNS SHALL BE DATED BY THE INDIVIDUAL PERFORMING THE MAINTENANCE WORK AND A LOG OF THE WORK PERFORMED SHALL BE ENTERED AND INITIALLED AS REQUIRED IN THE REMARKS SECTION ON PAGE 2.
5) ANY CLARIFICATION OF MAINTENANCE PERFORMED OR REQUIRED COMMENTS SHALL BE ENTERED IN THE REMARKS SECTION ON PAGE 2 PRECEDED BY AN APPROPRIATE CROSS-REFERENCE DESIGNATION ((1), (2),(3), ETC.).

CGT STATION MAINTENANCE REPORT
GAS SYSTEM MAINTENANCE AND TECHNICAL SUPPORT

TYPE OF STATION *Regulator Station* LOCATION *Gold Hill* DATE *6/22/99*

GAS SUPPLIES														
G.S. NUMBER	DEHYDRATOR		FILTER		REGULATORS / RELIEFS				90 psig SUPPLY		20 psig SUPPLY		DATE INITIALS	GENERAL CONDITION (LEAKS, ETC.) Include information on additional stages, if appropriate
					1st stage		2nd stage		1st stage		2nd stage			
	Checked	Replaced	Checked	Replaced	Checked	Serviced	Checked	Serviced	As Found	As Left	As Found	As Left		
1	✓	✓	✓	✓	Regs ✓		✓		93/88	90/88	20/16	20/18	[redacted] 6/22	
1					Relief ✓		✓		98/95	95/95	22/22	22/22	[redacted] 6/22	
2	✓	✓	✓	✓	Regs ✓		✓		91/87	90/88	21/19	20/18	[redacted] 6/22	
2					Relief ✓		✓		95/97	95/95	22/23	22/22	[redacted] 6/22	

SCADA EQUIPMENT Service &/or Calibration			
RTU	Power Backup	Battery Check	
1234	✓	✓	

TRANSDUCERS	TWO POINT CHECK				
	As Found		As Left		DATE / INITIAL
	low	high	low	high	
PT-1	3.9	19.7	4.0	20.0	[redacted] 6/22
PT-2	4.1	20.1	4.0	20.0	[redacted] 6/22
PT-3	3.9	19.9	4.0	20.2	[redacted] 6/22

REMARKS: *Above ground piping needs painting in Spring 2000.*

REVIEWED BY: [redacted] 6/29/1999