



UO Standard S4432

ISSUING DEPARTMENT: **GSM&TS**
UO SPONSOR: **VP - CGT**

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PAGE NO.: **1** OF **5**

TITLE: CGT Station Inspection, Testing, and Maintenance Procedures

Purpose

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

This UO 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.

Recision

This UO standard supersedes CGT Standard 4432, "Station Inspection, Testing, and Maintenance Procedures," Revision 1, dated February 1, 2000.

Safety

Improper inspection and maintenance of any CGT gas facility could jeopardize public and employee safety. Work shall be performed in compliance with Pacific Gas and Electric Company's (the Company's) Utility Standard Practice (USP) 22, "Safety and Health Program," and the Code of Safe Practices.

Implementation Responsibilities

The vice president (VP) of CGT is responsible for approving, distributing, and revising this standard.

The VP delegates authority to the director of Gas System Maintenance and Technical Support (GSM&TS) to revise and reissue the attachments to this standard.

The director of GSM&TS is responsible for the implementation and content of this standard.

Superintendents and supervisors with the responsibilities for the regulator station maintenance are responsible for ensuring that employees follow the requirements of this standard.

Compliance The director of GSM&TS is responsible for ensuring compliance with this standard

 The GSM&TS managers, superintendents, and supervisors are responsible for ensuring that all employees associated with station maintenance are aware of and comply with this standard

 Employees involved with station maintenance are responsible for understanding and complying with this standard

Procedures The procedures of this standard are detailed in Attachment 1

Definition of Terms **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)

Major Gas Facilities: Facilities that modulate gas pressure and flow, or process the gas, within the gas transmission system. These facilities may be unmanned, manned part or full-time, or remotely operated. Facilities shall include

- System control points, such as terminals and gas load centers
- Compressor stations
- Pipeline pressure-limiting stations
- Gas processing facilities

- Line rupture control valves (LRCVs)
- Gas metering and regulating facilities serving electric generating plants
- Underground gas storage field facilities
- Other facilities handling large volumes of gas and containing one or more of the following equipment controller-operated equipment, or 10-inch or larger control valves

Regulator Stations: Facilities that contain pressure control devices, including monitors and reliefs, and their appurtenances, which limit and control pressures in transmission lines or DFMs For this document, the term “regulator station” includes pressure limiting stations and line rupture control valves 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

Date Issued/Updated

Effective June 2005

Review Date June 2010

Signed,

Robert T Howard
Vice President
California Gas Transmission

Reference Documents

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

49 CFR Part 192, "Transportation of natural and other gas by pipeline: minimum Federal safety standards," Subpart M, Maintenance

CGT Recommended Practice 4332, "Removal and Control of Liquids from Gas Pipelines: Maintenance and Operations of Associated Gas Conditioning Equipment"

CES/GS/CS Standard C-T&CS-S0213, D-S0213, "Work Procedures in Confined Spaces"

UO Standard D-S0350/CGT Standard S4110, "Leak Survey and Repair of Gas Transmission and Distribution Facilities"

DCS/GTS Standard D-S0446/S4292, "Vault Inspection Procedure"

UO (DCS) Standard D-S0456, "Recording Pressures in Distribution Systems"

UO Standard S2333, "Material Problem Reporting (MPR)"

UO Standard S4050, "CGT Security Measures for Gas Facilities"

UO Standard S4133, "Corrosion Control of Gas Transmission Facilities"

UO Standard S4220, "Gas Valve Maintenance Requirements"

CGT Standard 4271, "Gas Saver Circuitry for Pneumatic Valve Actuators"

UO Standard S4306, "Gas Transmission Measurement Quality Assurance"

UO Standard S4350, "Odorization of Natural Gas"

CGT Standard 4414, "Confined Space Entry Program"

UO Standard S4420, "Gas Transmission Clearance Procedure"

UO Standard S4431, "Operation and Maintenance Instructions Requirements for Major Gas Facilities"

UO Standard S4433, "Gas Pressure Relief Devices - Responsibility for Annual Inspection and Verification of Capacity"

UO Standard S5351, "District Regulator Station Maintenance"

Gas Standard H-70, "Pressure Relief Devices"

Code of Safe Practices

CGT Clearance Manual

Attachments

Attachment 1, "General Procedures, Inspection Schedule, and Forms"

Attachment 2, "Inspection and Testing of Station Components"

Attachment 3, "Main Gas Regulator/Monitor Inspection Procedure"

Attachment 4, "Technical Maintenance Equipment Card," Form F4432A

Attachment 5, "Station Inspection Schedule"

Attachment 6, "Station Monthly Routine - Sample"

Attachment 7, "CGT Station Maintenance Report," Form F4432B

Attachment 8, "Example of Completed CGT Station Maintenance Report"

Attachment 1 – General Procedures, Inspection Schedule, and Forms

General Procedures

- 1 Before entering any CGT facility, employees must be familiar with the requirements of UO Standard S4050, “CGT Security Measures for Gas Facilities” Employees must 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 the Brentwood Gas Control Center, contact the Brentwood Gas Control Center to inform them of your presence
- 3 Where applicable, a clearance will be obtained, in accordance with CGT Standard 4420, “Gas Transmission and Clearance Procedure,” in order to perform any inspection, testing, or maintenance that will impact the operation of these facilities OM&C T&D employees shall follow the “GSO New/Standard System Clearance Requirements” when performing work requiring a clearance on CGT equipment, facilities, or pipelines
- 4 Before 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, D-S0213, “Work Procedures in Confined Spaces,” and applicable sections of the 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 aboveground fittings/connections can be leak checked using a CGI or soapy water Any loose connections should be tightened 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 immediately
- 6 Station housekeeping shall be performed to ensure that a safe and healthful environment is present 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 Brentwood Gas Control Center, and the appropriate people detailed in the clearance procedure, that the work is complete and the station is back in operation

General Inspection Schedule

Annually, regulator stations shall have a complete maintenance performed and documented for all major components

Unmanned major gas facilities shall be inspected a minimum of twice a month. The “Station Monthly Routine” form (see Attachment 6) identifies and describes the items to inspect.

The maximum duration between complete inspections of individual components is identified in Attachment 5, “Station Inspection Schedule,” which provides a summary of frequency of inspection for equipment typically found in CGT gas facilities. In instances where unusually severe service condition or extremely heavy equipment usage exists, the inspection frequencies may need to be increased. For detailed inspection requirement for the particular component, refer to the referenced document listed in the attachment.

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 OM&C T&D.)

Records and 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 Attachment 4).
2. A record of regulator inspection and maintenance shall be prepared and filed in the local operating office using the “CGT Station Maintenance Report,” Form F4432B (Attachment 7), or other appropriate forms listed in the reference document and in Attachment 7. 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. Attachment 8 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.”
4. Develop and use a “Station Monthly Routine” form to document the monthly or weekly inspection/maintenance of unmanned major gas facilities. Attachment 6 can be used as an example in developing a Station Monthly Routine specific to the individual facility.
5. Complete a “Material Problem Report (MPR)” and work request whenever there is an equipment failure. The MPR allows for the tracking/trending of equipment problems, which will assist in evaluation of vendors’ hardware. Normal wear of consumable goods (i.e., filter elements, pilot seats, etc.) should not be reported.

Attachment 2 – Inspection and Testing of Station Components**Actuators, Valves****1. Manual Gear Operators**

Annually, when servicing valve(s), inspect the gear housing for damage and wear. Inspect weather seals and replace if necessary. Inspect for any oil leakage. There is no need to periodically open and inspect enclosed gear housing.

Note: If roughness and/or a grinding noise are detected when operating a manual gear-operated valve, open and inspect the enclosed gearbox operator. Inspect for damaged parts and lubricate the gears.

2. Power-Actuators**A. Diaphragm/Chamber Actuator**

Annually inspect the diaphragm assembly for leakage by applying gas pressure through the static or pilot connections. The amount of pressure applied must not exceed the 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 rough 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 the 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 10 years.

Grove Arcron ball valve packages use a pneumatic piston actuator and a pneumatic valve seat loading/unloading system. The seat loading/unloading switch needs to be checked annually to be sure that when the valve is in the closed position, the valve seats are loaded with upstream pressure and when the valve is off the closed stop, the valve seats are loaded with downstream pressure.

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 the 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 the gears.

D. Vane-Type Actuators

Annually stroke the valve and observe its operation, checking for smoothness of operation. If rough or jerky operation is detected, investigate for internal wear or damage. Check for lack of hydraulic fluid in the operator. Every 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 the gears.

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**1. Pneumatic Controllers (Including Becker Pilots)**

- A. Calibration** - Annually, conduct a 3-point check: full-scale, mid-travel, and zero. If the readings are inaccurate, follow the manufacturer's instructions to recalibrate.
- B. Tuning** - Annually review the controlling process (pressure/flow) chart. Tune the controller if there is evidence of instability or sluggishness in the control process. Use the 1/4-amplitude dampening method for getting the preferred system response.

2. Electronic Controllers

Follow the calibration and tuning diagnostics described under the "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 stressed parts
- Excessive dirt or dust buildup that may impede air flow and inhibit proper heat dissipation

Dehydrators

Refer to CGT Recommended Practice 4332, "Removal and Control of Liquids from Gas Pipelines, Maintenance and Operations of Associated Gas Conditioning Equipment" for maintenance instructions for dehydrators.

Drips, Pipeline

Annually, check the 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 UO Standard S4133, "Corrosion Control of Gas Transmission Facilities," for recommended intervals of checking drips.

Filters, Separators, and Strainers

Annually, check the filter drain for dirt, liquids, or other debris. Perform a differential pressure test on each filter/separator/strainer with an indicating gauge or manometer at the inlet and outlet. Based on the known or estimated flowrate, compare the differential pressure with published specifications. Replace the filter element, or clean the strainer, if the measured differential is higher than specifications. The above information also applies to combination filter/separator units.

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 the 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 pounds per square inch gauge (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, troubleshoot the problem and calibrate the GSC. Refer to CGT Standard 4271, "Gas Saver Circuitry for Pneumatic Valve Actuators"

Gas Supply Racks

Annually, 1) perform Class A diagnostics on the pressure regulators (including monitors) and relief valves, and 2) check and service, as required, filters, dehydrators, and filter/separator combinations. If liquid is found when checking the filter or dehydrator drains, replace the desiccant in dehydrator. Perform Class B inspection of the regulators, monitors, and relief valves for cause only. See Attachment 3 for details.

Meters, Operational and Fiscal

Refer to UO Standard S4306, “Gas Transmission Measurement Quality Assurance”

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 UO Standard S4350, “Odorization of Natural Gas”

Pilot

Any pilot used with regulators, monitors, and relief valves shall be internally inspected 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.

Class A diagnostic inspection and calibration checks of these pilots shall be conducted annually at the same time the main gas regulator/monitor/relief is maintained.

Positioner, Valve

Annually check each valve positioner when conducting a valve/actuator test. Using the valve controller, transmit to the positioner controller output signals equivalent to full open, 50% open, and fully closed positions. Check the position of the valve against the full open, 50%, open and fully closed controller output signal. Calibrate the valve positioner as needed. Check linkages between the positioner and the valve for smoothness of operation and excessive wear.

Pressure Recorders

Annually, conduct a three-point check: full scale, mid-travel, and zero pressure. If the readings are inaccurate, follow the manufacturer’s instructions to recalibrate.

Pressure (and Differential Press) Transducers/Transmitters

Annually, conduct a three-point check: full scale, mid-travel or normal operating pressure, and zero pressure. If the readings are inaccurate, follow the manufacturer’s instructions to recalibrate.

Regulator/Monitor, Main Gas

Inspection, testing, and maintenance of **boot and diaphragm regulators** shall comply with UO Standard S5351, “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 Attachment 3, “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 semiannually (for globe-style regulators).

Relief Valves

- 1 Annually, the relief devices shall be inspected and tested to determine that they are
 - A In good operating condition
 - B 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)
 - C Properly installed and protected from dirt, liquids, and other conditions that might prevent proper operation
- 2 Boot/diaphragm relief valves require a Class B internal inspection once in the first calendar year after initially placing the station in operation, and for cause thereafter (Follow the requirements of UO Standard S5351, “District Regulator Station Maintenance”) For all other types of relief valves, Class B internal inspections are not required except “for cause ”

Relief capacities shall be verified annually In addition, capacity shall be verified immediately when changes are made that 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, “Gas Pressure Relief Devices - Responsibility for Annual Inspection and Verification of Capacity ”

SCADA Equipment

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 backup power supply Verify that the power to the RTU can automatically transfer and 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 UO Standard S4220, “Gas Valve Maintenance Requirements ”

Vaults

Annually, inspect all vaults that house pressure-regulating and pressure-limiting equipment, and are over 200 cubic feet in internal volume Refer to DCS/GTS Standard D-S0446/4292, "Vault Inspection Procedure"

Attachment 3 – 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 UO Standard S5351, “District Regulator Station Maintenance”. However, for boot and diaphragm regulators owned by CGT, Class B inspections are required every 4 years

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

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

1. 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 for the 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 UO Standard S4220 and the manufacturer’s recommendation for lubrication and maintenance

2. 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 operation, inability to maintain setpoint, etc

Follow the manufacturer's procedures for conducting an internal inspection. The manufacturer's recommended spare parts shall be onhand before 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.

LOCATION NO _____
SCADA (PVID) NO _____
EQUIPMENT _____

**TECHNICAL MAINTENANCE
EQUIPMENT CARD**

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] ID [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 <input type="checkbox"/>		YES <input type="checkbox"/>		REMARKS				
JOB NO	JOB DESCRIPTION			PLM FREQ	CLEARANCE NUMBER	PLM DUE				
1										
2										
3										
4										
							NOTE: RECORD MAINTENANCE DATE & INITIALS ON REVERSE SIDE			

Station Inspection Schedule

Service	Equipment Type	Inspection Frequency	Standard	Form(s)	Comments
Actuators, Valve					
	Pneumatic piston	Annually	CGT 4432	CGT Station Maintenance Report F4432B	Stroke valve examine for leaks and mechanical condition
	Pneumatic motor	TBD/annually	CGT 4432	CGT Station Maintenance Report F4432B	Refill lubricator based on usage, stroke valve examine for leaks and mechanical condition
	Vane-type (hydraulic)	Annually	CGT 4432	CGT Station Maintenance Report F4432B	Stroke valve and examine for mechanical condition, check oil level, every 10 years replace hydraulic fluid
	Electncal motor	Annually	CGT 4432	CGT Station Maintenance Report F4432B	Stroke valve examine for mechanical condition
Chromatograph, Gas					
		Biannually	CGT 4310	See CGT 4310	Calibrate
		Monthly	CGT 4310	See CGT 4310	Check for accuracy 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 F4432B	

Station Inspection Schedule

Service	Equipment Type	Inspection Frequency	Standard	Form(s)	Comments
	Pneumatic controllers (including Becker pilot)	Annually	CGT 4432	CGT Station Maintenance Report F4432B	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. Frequency to be incorporated in UO S4133
	Filters	Annually	C-T&CS-S0351	CGT Station Maintenance Report F4432B	Differential check
	Gas Saver Circuit	Annually	CGT 4432	CGT Station Maintenance Report F4432B	GSC is used to minimize bleed gas at valve positioner. Check operation, calibrate as required
	Gas Supply Racks		CGT 4432	CGT Station Maintenance Report F4432B	
	Dehydrators	Annually	CGT 4432	CGT Station Maintenance Report F4432B	
	Filters	Annually	CGT 4432	CGT Station Maintenance Report F4432	

Station Inspection Schedule

Service	Equipment Type		Inspection Frequency	Standard	Form(s)	Comments
	Regulators		Annually	CGT 4432	CGT Station Maintenance Report F4432	Class A Inspection - Annually, Class B Inspection for cause
	Reliefs		Annually	CGT 4432	CGT Station Maintenance Report F4432	Class A Inspection - Annually, Class B Inspection for cause
Meters, Operational & Fiscal						
	Orifice		Various	UO S4306		Refer to UO S4306 for specific requirements including maintenance intervals
	Ultrasonic		Biannually	CGT 4324		Inspection and diagnostics
	Other		T B D			
Flow computer						
	Mercury	Mercor EC AMR	Annually	IP457-5	Calibration/ checklist Form B	Calibration, new installation requires follow-up calibration See IP
	Mercury	Mercor EC AMR	As required	IP457-5	Periodic inspection Form C	Inspection, new installation requires follow-up inspection See IP
	Total Flow	Flow Computer	Biannually	CGT 4331	None	Calibration (data inputted in device)
	Total Flow	Flow Computer	Biannually	CGT 4331	None	Inspection (data inputted in device)
Positioners (pneumatic / I/P)						
			Annually	CGT 4432	CGT Station Maintenance Report F4432	Sstroke valve check calibration (3-15#)

Station Inspection Schedule

Service	Equipment Type	Inspection Frequency	Standard	Form(s)	Comments
		Annually	CGT 4432	CGT Station Maintenance Report F4432	3-point check - 0, mid-travel, full
Pressure Recorders					
		Annually	CGT 4432	CGT Station Maintenance Report F4432	3-point check - 0, mid-travel or normal operating pressure, full
Pressure Transducers					
Regulator					
Self-contained (e.g., HPRs)					
	Spring / weight	Annually	CGT 4432	CGT Station Maintenance Report F4432	<i>Class A diagnostic Annually, Class B for cause</i>
Pilot-operated					
	Boot / diaphragm (Mooney, 399, Flexflo, etc.)	Annually - class A up to 4 years - class B	UO S5351	District Regulator Station Maintenance Record 62-6321	For a new regulator, internal inspection yearly until a maximum of 4 year frequency is justified
	Globe (Fisher 1098, Rockwell 441, etc.)	Annually	CGT 4432	CGT Station Maintenance Report F4432B	<i>Class A diagnostic annually, Class B for cause</i>
Controller-operated					
	1/4-turn valve				
	Ball (Grove B-5, etc.)	Annually Also, see standby/frequency-used regulator below for other requirements	CGT 4432	CGT Station Maintenance Report F4432B	<i>Class A diagnostic annually, Class B for cause</i>

Station Inspection Schedule

Service	Equipment Type	Inspection Frequency	Standard	Form(s)	Comments	
	Plug (Rockwell, etc)	Annually Also, see standby/frequency-used regulator below for other requirements	CGT 4432	CGT Station Maintenance Report F4432B	Class A diagnostic annually, Class B for cause	
	V-notch ball	Annually	CGT 4432	CGT Station Maintenance Report F4432B	Class A diagnostic annually, Class B for cause	
	Linear (Fisher, Masonellan, etc)	Globe	Annually	CGT 4432	CGT Station Maintenance Report F4432B	Class A diagnostic annually, Class B for cause
	Standby regulator and monitor	1/4 turn ball & plug	Monthly	UO S4420	District's Week/Monthly Checklist	Inspect and partially operate
	Standby regulator and monitor	All types	Biannually	UO S4420	District's Week/Monthly Checklist	Inspect, partially operate, service, and lubricate (if required)
	Frequently used regulator	Plug	As often as every 2 weeks	UO S4420	District's Week/Monthly Checklist	Lubricate and inspect
	Frequently used regulator	Ball	As often as every 2 weeks	UO S4420	District's Week/Monthly Checklist	Lubricate and inspect
Relief Valves		Annually	UO S5351 and F-70	CGT Station Maintenance Report F4432	Maintenance, testing, and capacity review required	

Station Inspection Schedule

Service	Equipment Type	Inspection Frequency	Standard	Form(s)	Comments
SCADA RTU		Annually	CGT 4432	CGT Station Maintenance Report F4432	Clean, inspect power supply / battery
Strainers / Separators		Annually	CGT 4432	CGT Station Maintenance Report F4432	
Valve (Manual)					
Isolation and block	Plug	Annually	UO S4420	Valve Maintenance Record FF11	Inspect, service, lubricate (if required), and operate
Isolation and block	Ball	Annually	UO S4420	Valve Maintenance Record FF11	Inspect, service, lubricate (if required), and operate
Isolation and block	Gate	Annually	UO S4420	Valve Maintenance Record FF11	Inspect, service, and operate
Valve (Power-operated)					
Isolation and block	All types	Recommend biannually, minimum annually	UO S4420	Valve Maintenance Record FF11	Inspect, service, lubricate (if required), and operate
Security valves (auto-shutoff)		Annually	C-T&CS-S5351	CGT Station Maintenance Report F4432	
Vault		Annually	CGT 4292	Vault Inspection Record 75-300 (9/75)	Containing regulating / limiting equipment and >200 cubic feet

Station Inspection Schedule

Service	Equipment Type	Inspection Frequency	Standard	Form(s)	Comments

Station Monthly Routine – Sample

Expectations:

- 1 Perform station inspection work and correct minor issues encountered
- 2 Log these issues and associated corrections in the Station Log Book
- 3 If any issues need additional action, submit a Work Request and note on Page 2 of this log
- 4 Complete this form each time you visit the station and submit it to the CGT district superintendent

Activity	Month	Week	Week	Week	Week
General	ly	2	3	4	5
NOTIFY: Gas Control upon entering the station (request clearance to perform testing)					
ROADS: Inspect the road condition leading into the station for erosion or encroachment					
LOG: Log in the date, time, employee’s name, and reason for visit, along with any abnormal conditions found					
OPERATING DIAGRAM: Verify that the operational diagram is on site and up to date					
CLEARANCE - ROUTINE Verify that a copy of the “Station Routine Authorization Clearance” is on site and in good order					
Housekeeping					
BUILDING. Sweep out building, clear of trash, debris, and spider webs					
STATION YARD: Clean the station yard of weeds, trash, and debris					
PITS: Clean valve pits of trash, debris, and spider webs					
Safety					
SIGNAGE: Inspect that the “Station I D” sign, “Keep Out”, “No Smoking”, and “Hazard Warning” signs are in place and in good order					
EYE WASH STATION: Inspect eye wash station, ensure that it is in good working order, and that the water tank is full					
FIRE EXTINGUISHER: Check the fire extinguisher for pressure Check the last service date					
FIRST AID KIT. Inspect first aid kits and replenish as needed					
STATION. General overall inspection, looking for any unsafe or potentially unsafe equipment or conditions					
Electrical/Electronic					
LIGHTING Check for burned-out light bulbs and clean as needed					
SOLAR PANELS Inspect, check for broken panels, loose wiring, and clean panels as needed					
STAND-BY GENERATOR Check fluid levels, perform “Test Run” operation					
Mechanical					
VALVES Automatic, fill oilers					
MIST CONTROLLER Drain off excess oil from the mist collector and re-use for oilers					
Communications					
PHONE(S) Check to make sure they are operational Clean as needed					
RTU / SCADA Check for the operational TX and RX					
RADIO Check for the operational TX and RX					
Stock Parts					
CLEAN RAGS Verify that there are clean rags inside the building					
OIL Check to ensure there are at least 2 quarts of valve oiler oil inside the building					

Page 2

Activity	Week 1	Week 2	Week 3	Week 4
Operational				
AUTOMATIC VALVES (Monitors and regulators) Verify with Gas Control that they have operation and control points are correct	x	x	x	x
LRC (LINE RUPTURE CONTROL): Test forward and reverse flow trips	x	x	x	x
Environmental				
SPILLS: Inspect for spills, leakage, and potential leakage issues	x	x	x	x
Security				
ALARMS: Check security alarms to make sure they are operational Verify that Gas Control received the entry alarm	x	x	x	x
FENCE Inspect all fencing, gates, doors, and locks Report any tampering	x	x	x	x

Date _____

Name _____

Comments _____

**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 UO STANDARD S4432

YEAR _____

VALVES & CONTROL SYSTEMS						AS FOUND SETPOINT		AS LEFT SETPOINT		DATE / INITIALS	CHECKED/CALIBRATED OR SERVICED OF CONTROL SYSTEMS							
TYPE OF VALVE (reg mon relief other)	VALVE NUMBER	GENERAL CONDITION (Leaks etc)	VALVE SERVICED	VALVE STROKED	VALVE ACTUATOR INSPECTED	SETPOINT	ACTUAL CONTROL POINT	SETPOINT	ACTUAL CONTROL POINT		CONTROLLER / PILOT		POSITIONER		CONTROL SYSTEM / TRANSDUCERS		GAS SAVER CIRCUIT	
			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 ISSUES (if not OK, indicate condition found)	
Fencing & Gates	OK []
Yard/Landscaping	OK []
Piping & Valves	OK []
Piping Alm Comosion	OK []
Building/Cabinet	OK [] N/A []
Vaults	OK [] N/A []

- NOTES
- THIS FORM SHALL BE USED WHEN ANNUAL MAINTENANCE IS PERFORMED AT A FACILITY WHICH HAS CONTROLLER-OPERATED PRESSURE REGULATING PRESSURE RELIEF AND/OR PRESSURE MONITORING EQUIPMENT
 - THIS FORM SHALL BE RETAINED FOR RECORDKEEPING PURPOSES IN THE DISTRICT'S HISTORY FILE
 - 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
 - THE APPROPRIATE COLUMNS SHALL BE DATED BY THE INDIVIDUAL PERFORMING THE MAINTENANCE WORK AND A LOG OF THE WORK PERFORMED SHALL BE ENTERED AND INITIALED AS REQUIRED IN THE REMARKS SECTION ON PAGE 2
 - 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	DEHYD		FILTER		1st Stg REGS / RELIEFS				2nd Stg REGS / RELIEFS				3rd Stg REGS / RELIEFS				DATE/INITIAL	GENERAL CONDITION (LEAKS ETC) Include any additional information below, if appropriate
	Device Tag	Check	Replace	Check	Replace	Check	Service	As Found	As Left	Check	Service	As Found	As Left	Check	Service	As Found		

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

TRANSDUCERS	As Found			As Left			DATE / INITIAL
	Operating Pressure (psig)						
	0%	50%	100%	0%	50%	100%	
3-POINT CHECK							

REMARKS _____

REVIEWED BY _____

**CGT STATION MAINTENANCE REPORT
GAS SYSTEM MAINTENANCE AND TECHNICAL SUPPORT**

TYPE OF STATION Regulator Station LOCATION Gold Hill

DATE 6/22/04

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

YEAR 2004

VALVES & CONTROL SYSTEMS						AS FOUND SETPOINT		AS LEFT SETPOINT		DATE / INITIALS	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		CONTROLLER / PILOT		POSITIONER		CONTROL SYSTEM / TRANSDUCERS		GAS SAVER CIRCUIT	
(reg mon relief other)			Y/N	Y/N	Y/N						check/cal	serviced	check/cal	serviced	check/cal	serviced	check/cal	serviced
reg	4		Y	Y	Y	300	298	300	300	RTA 6/22	✓		✓		N/A		N/A	
mon	5		Y	Y	Y	310	313	310	310	RTA 6/22	✓	✓	✓	✓	N/A			✓
reg	20		N/A	N/A	N/A	60	60.5	60	60	RTA 6/22	✓			N/A	N/A		N/A	
mon	21		N/A	N/A	N/A	63	64	63	63.5	RTA 6/22	✓			N/A	N/A		N/A	
relief	12		Y	N	N	210	208	210	210	RTA 6/22	✓		✓		N/A		N/A	
trimmer	10R		Y	Y	Y	200	197	200	201	RTA 6/22	✓		✓		✓		N/A	
load valve	10		Y	Y	Y	6/12	6.5/12.2	6/12	6.0/12.0	RTA 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
drp u/s V-2	✓	N/A	less than 1 gallon found

GENERAL STATION CONDITION ISSUES (if not OK, indicate condition found)	
Fencing & Gates	OK [X]
Yard/Landscaping	OK [X] <i>Need additional gravel near the front drive otherwise in good condition</i>
Piping & Valves	OK [X]
Piping Atm Corrosion	OK [X]
Building/Cabinet	OK [X] N/A []
Vaults	OK [] N/A [X]

NOTES

- THIS FORM SHALL BE USED WHEN ANNUAL MAINTENANCE IS PERFORMED AT A FACILITY WHICH HAS CONTROLLER-OPERATED PRESSURE REGULATING, PRESSURE RELIEF AND/OR PRESSURE MONITORING EQUIPMENT
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**CGT STATION MAINTENANCE REPORT
GAS SYSTEM MAINTENANCE AND TECHNICAL SUPPORT**

TYPE OF STATION Regulator Station LOCATION Gold Hill DATE 6/22/04

GAS SUPPLIES																	GENERAL CONDITION (LEAKS, ETC) Include any additional information below, if appropriate		
G S NUMBER		DEHYD		FILTER		1st Stg REGS / RELIEFS				2nd Stg REGS / RELIEFS				3rd Stg REGS / RELIEFS				DATE/INITIAL	
G S I		Check	Replace	Check	Replace	Check	Service	As Found	As Left	Check	Service	As Found	As Left	Check	Service	As Found			As Left
PCI-1		✓		✓		✓		92.5	95.0									RTA 6/22/04	
PCV-2						✓		89.8	90.0									RTA 6/22/04	
PCV-3										✓		20.2	20.1					RTA 6/22/04	
PCV-4										✓		18.4	18.0					RTA 6/22/04	
PRV-1						✓		100.5	100.0									RTA 6/22/04	
PRV-2										✓		24.3	25.0					RTA 6/22/04	

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

TRANSDUCERS	As Found			As Left			DATE / INITIAL
	Operating Pressure (psig)			Operating Pressure (psig)			
	0%	50%	100%	0%	50%	100%	
3-POINT CHECK							
PT-1	0.1	400.3	800.5	0	400	800	RTA 6/22/04
PT-2	0.0	399.8	799.4	0	400	800	RTA 6/22/04
PT-3	0.0	149.9	299.9	0	150	300	RTA 6/22/04

REMARKS _____

REVIEWED BY [REDACTED] 7/2/04