PACIFIC GAS AND ELECTRIC COMPANY
CUSTOMER ENERGY SERVICES (CES)

CES STANDARD

STANDARD: C-T&CS-S0351
PAGE NO.: 1 OF 2
EFFECTIVE DATE: 10-94
REVIEW DATE: 10-96

ISSUING DEPARTMENT: T&CS, DISTRIBUTION
CES OFFICER: V. P. T&CS

TITLE: District Regulator Station Maintenance

Purpose:

This Standard provides requirements which establish uniform procedures for inspecting, testing, maintaining and associated record keeping of District Regulator Stations.

This Standard supports CES Policy "Gas and Electric Maintenance and Operation" and complies with General Order 112D requirements.

This Standard supersedes Standard Practice 464-2.

This Standard does not apply to District Regulator Stations that are major control facilities (major control facilities are covered in Standard Practice 464-1).

Definition of Terms:

District Regulator Stations: Facilities which contain pressure control devices and their appurtenances, within the transmission and distribution system, which limit and control pressures in distribution mains that serve more than one service.

Implementation:

The Vice President of Technical and Construction Services is responsible for approving, revising, and distributing this Standard.

The CES Division Managers are responsible for establishing and maintaining procedures to comply with this Standard.

Date Issued/Updated:

Effective Date: October 1, 1994
Review Date: October 1, 1996

Signed,

James H. Pope
Vice President, T&CS

TITLE: District Regulator Station Maintenance

Reference Documents:

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

S. P. 570-22, "Inspection and Calibration of Test Gauges"

S. P. 464-1, "Major Control Facilities: Inspection, Operation and Maintenance"

Construction Document 086389 (F-11), "Valve Lubrication and Maintenance Requirements"

Construction Document 087927 (H-14), "Typical District Regulator Sets"

Construction Document 088036 (H-70), "Pressure Relief Devices"

Accident Prevention Rules book

Attachments:

1. Procedural Details
2. District Regulator Station Inspection, Testing and Maintenance Work

TITLE: District Regulator Station Maintenance

Attachment 1, Effective 10-94

Inspection, Testing and Maintenance of District Regulator Stations

Purpose:

To provide procedural details for the inspection, testing and maintenance of District Regulator Stations.

Inspection Schedules

District Regulator Stations shall be inspected according to the following schedules:

1. Farm tap (HPR) type District Regulator Stations:
   A. Class A Inspection at least once each calendar year.
   B. Class B Inspection for cause.
2. All other District Regulator Stations:
   A. Class A Inspection at least once each calendar year.
   B. Class B Inspection once in the first calendar year after initially placing the station in operation, maximum every four years thereafter.
   C. Class B inspection on relief valves once in the first calendar year after initially placing the station in operation, for cause thereafter.
3. An annual "anniversary month" shall be established for the inspection and maintenance of each regulator station covered by paragraphs 1. and 2. above and 1 on page 2. The "anniversary month" is the calendar month in which the inspection and maintenance is scheduled. Except as permitted by paragraph 5 below, the "anniversary month" shall be the month in effect as of the date of the revision of this Standard Practice and shall be the same month each subsequent year.
4. The inspection and maintenance required by paragraphs 1. and 2. above and 1. on page 2. shall be scheduled for the anniversary month. If circumstances do not permit performance of the work during the month in which it is scheduled, it may be performed in the month prior to or following the scheduled month, but not less than once each calendar year.
5. A new anniversary month for scheduled maintenance may be established by performing the required inspection and maintenance during a month which is earlier than the anniversary month. A new anniversary month may not be established by performing the scheduled maintenance during a month following the established anniversary month.

District Regulator Station Maintenance

These schedules establish minimum maintenance requirements and maximum time intervals. When conditions require more frequent inspections, a shorter interval shall be established by the supervisor. Where practicable, inspections shall be scheduled to coincide with other work to be performed. The various steps of test, inspection, and maintenance shall be combined when possible.

All District Regulator Stations shall be entered in the Facility Maintenance master file (GAS FM Review List), showing the maintenance to be performed and the established intervals. It is necessary to enter maintenance activities as performed to ensure up-to-date GAS FM output schedules. The GAS FM monthly schedules and backlog reports shall be reviewed by qualified personnel.

Inspection Procedures

1. Prior to entering any pit or vault, observe the necessary precautions regarding barricading, sources of ignition, and checking for combustible gases in accordance with applicable PG&E Accident Prevention Rules.
2. Inspection procedures are divided into two categories designated "External" (Class A) and "Internal" (Class B). The work to be performed under each classification is listed in Attachment 2. Class A inspections can usually be performed with the set in service. Class B inspections will require taking the unit out of service and disassembly of its component parts to allow inspection. Performance of Class B inspections will include a complete Class A inspection.
3. Attempts should be made to complete a scheduled inspection on the same day. However, if a partial inspection is performed due to system diagnosis, scheduling or other needs, the partial inspection is to be documented as to the work done. If a partial inspection is made, the work performed at that time need not be repeated at the next scheduled inspection. However, the maximum interval between complete inspections shall not exceed those prescribed under "Inspection Schedules" on page 1.
4. The inspection, testing and preventive maintenance work described under "Inspection Schedules" on page 1 is detailed in the Appendix with corresponding letter-number designations on Form No. 626321, "District Regulator Station Maintenance Record."
5. At any stage of inspection, steps shall be taken to correct deviations from proper operation. A District Regulator Station is considered operating properly when:
   A. The regulator is controlling the set pressure in a stable manner throughout the normal range of flows and normal inlet pressure variations;
   B. All components are adequate from the standpoint of reliability, capacity, and safety; and
   C. All station equipment is free of leakage, in good mechanical condition, and capable of being operated by authorized persons at any time.

   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.
6. Regulator station housekeeping, which includes freedom from debris, weeds, water (either in pits or yards), condition of paint (on mechanical piping and structures), security of fencing, vaults and enclosures shall all be maintained as required for good operating practice.

District Regulator Station Maintenance

Pressure Relief and Pressure Limiting Equipment

1. Each pressure relief or limiting device or related group of such devices must be checked for adequate overpressure capability in compliance with Section 192.201 of CPUC General Order 112D, and paragraph B. below. Adequate overpressure confirmation must be made at least once each calendar year in accordance with schedules established under paragraphs 3, 4, and 5 on page 1.

   Overpressure confirmation is achieved by checking for proper operating settings of monitor regulators, automatic shutoffs and reliefs. The adequacy of relief valves must also be confirmed by either:

   A. Physically testing for capacity to limit pressure to the required level, or

   B. Making an office review and calculation to verify that under operating conditions, the relief valve has the proper setting and capacity to limit pressure to the required level.

2. Such a review shall also be made when equipment changes or load or pressure conditions alter the capacity of the regulator or the capability of the relief valve to limit pressure buildup.

3. Relieving capacity installed in conjunction with parallel regulators shall be adequate for:

   A. A simultaneous "fail open" condition of both the working and standby regulator runs for stations constructed or reconstructed after July 1972.

   B. A "fail open" condition of the regulator run with the largest capacity for stations constructed prior to August 1972.

4. Whenever physical tests and/or calculations indicate that relief capacity is inadequate, immediate action will be taken to ensure the installation of equipment adequate to provide the necessary protection against overpressuring.

Records

1. A "District Regulator Station Data Sheet," Form 626271, shall be prepared for each District Regulator Station and filed in the local operating office. Station numbers shall be assigned and a data sheet prepared to cover each stage of regulation.

2. A record of district regulator inspection and maintenance shall be prepared and filed in the local operating office, using "District Regulator Station Maintenance Record," Form 626321. Where a relief valve is used for overpressure protection, a record shall be maintained of the annual capacity check of these facilities required by G.O. 112D, Section 192.743. A continuous maintenance record shall be retained for 5 years or for the life of the facility, whichever is less.

3. Documentation of inspections, partial or full, is to take place at the time and location the inspection is performed. This documentation can either be on the District Regulator Station Maintenance Record, or, in a log book or other media and transferred later the same day to the District Regulator Station Maintenance Record.

4. Pressure recording charts used in district regulator pressure tests shall be filed in the local operating office and retained for a minimum period of one year.

5. Calibration records of permanent pressure recording devices at District Regulator Stations shall be retained in accordance with S.P. 463-9.

District Regulator Station Maintenance

Test Schedule and Control

Supervisors shall schedule and review the inspection and maintenance of District Regulator Stations as required to comply with this Standard Practice.

TITLE: District Regulator Station Maintenance

Attachment 2, Effective 10-94

Testing and Maintenance Instruction for District Regulator Stations

Purpose:

To provide testing and maintenance instruction for District Regulator Stations Inspection.

Class A Inspection - External

1. Pressure checks:
   A. This paragraph applies to District Regulator Stations with a permanent pressure recorder. Include a 2-point check (zero and operating pressure) with a test gage (test gage must meet the requirements of Standard Practice 570-22) in conjunction with each Class A inspection. Include a 3-point calibration with a test gage (zero, operating pressure and upper range) every four years. The chart must be properly identified as to test gage used, pressure readings, location, date, reason for test and special comments as required. Chart must be initialed by person performing the test.
   B. For non-Farm tap type District Regulator Stations make a nominal 24-hour recorded pressure check. Include a zero check at the start and at the finish of each recording. When done in conjunction with a Class B inspection, this test should be performed after the maintenance work is complete and the station returned to service. The recording must be properly identified as to location, date, reason for test and special comments as required. The chart must be initialed by the person performing the test.
   C. Make a filter/strainer differential pressure test with an indicating gage or manometer at the inlet and outlet. Check the filter drip for dirt, liquids, or other debris. Inspect the filter element for cause.
2. Make visual inspection to determine:
   A. Vault covers open and close properly and are not a hazard to the general public or to PG&E personnel.
   B. Ground level around vault provides adequate drainage and is not a hazard to the general public or to PG&E personnel.
   C. Presence of gas in vault, using combustible indicator. Test fittings and connections for leakage, using combustible gas indicator or liquid soap.
   D. Ventilating ducts and gratings are clear and operating. Relief stacks are clear.
   E. Vault structure, ladders, hooks and related equipment are in good mechanical condition.
   F. Piping and related equipment including regulators and overpressure protection devices are in good mechanical condition.

G. Locking devices are present and operate properly.

3. Operating tests:

A. Check regulating devices for pressure settings and control, and test working and standby regulator or control valve 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.

B. Cause monitor regulators or control valves to operate and take over pressure control at the setpoint.

C. Test relief valve for ability to operate at overpressure set point.

D. Test automatic shutoff for ability to operate at over and under pressure set points.

E. Verify proper level of sealant in liquid seal reliefs.

F. Clear and inspect all control vent lines.

4. Valves:

Check and operate all regulator station valves and valves required to isolate station in an emergency. (Refer to Construction Document 086389 (F-11) for maintenance schedules.) Where required, lubricate.

5. Equipment position:

At the completion of every inspection, make certain that all valves and equipment are returned to the normal operating position.

Class B Inspection - Internal

1. Pilot regulators:

A. Inspect pilot regulator filters, strainers, and dehydrators; clean or replace screens, elements, or filters.

B. Inspect pilot valve and seat for scoring or wear.

C. Remove restricting devices and filters, and examine or test for obstructions or foreign matter.

D. Test pilot regulators for mechanical operation:

Proper rangeability, freedom and movement of linkage, and condition of diaphragm.

2. Control and vent lines:

A. Disconnect and clear loading, supply, static, vent and gage lines.

B. Pressure test the vent lines and upper diaphragm for leaks on low pressure regulator stations that are below grade. The pressure test can be done with an air, nitrogen or natural gas medium at 1 to 2 psi held for several minutes. Confirm integrity of components by soap testing or with a pressure gage.

C. Remove restricting devices and filters, and examine or test for obstructions or foreign matter.

3. Main components:

The paragraphs that follow prescribe maintenance requirements for main regulators, standby regulators, monitors and relief valves as applicable. Automatic shutoffs need not be disassembled unless they do not maintain consistent shut off pressures.

A. Plug or Ball Type Valve Assembly - Refer to Construction Document 086389 (F-11) and manufacturer's recommendation for lubrication guidance.

District Regulator Station Maintenance

B. All others - Disassemble and inspect in accordance with manufacturers guidelines.

C. Diaphragm and Chamber - Inspect diaphragm assembly for leakage, by applying gas pressure not exceeding normal diaphragm operating pressures, through the static or pilot connections. Use an indicating gage to detect test pressure loss.

1. If pressure loss occurs, soap test bolt circle flange before disassembling diaphragm head to complete inspection.
2. Visually examine diaphragms for pliability, abrasion, rupture, or separation. Replace leather with synthetic diaphragms.

D. After assembly, complete the operating tests as specified in Class A inspection.

4. Equipment position:

At the completion of every inspection, make certain that all valves and equipment are returned to the normal operating position.

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PAGE NO.: 1 OF 4
ISSUING DEPARTMENT: T&CS, DISTRIBUTION
EFFECTIVE DATE: 10-94
CES OFFICER: V. P. T&CS
REVIEW DATE: 10-96

TITLE: District Regulator Station Maintenance Record

Attachment 3, Effective 10-94

Regulator Station Maintenance and Data Forms

Pacific Gas and Electric Company
District Regulator Station Maintenance Record
626321 (9/94)
Distribution
Page 1 of 2

Gas FM Station No _____ Division _____
Stage *(Use separate sheet for each Stage of Regulation)* _____ Well Map _____
Location _____ Grid Sheet _____

CES Standard C-T & CS-S035* Attachment 2 Paragraph No		*Use a separate column for each Main Regulator, Standby Regulator, Monitor, Relief Valve or Automatic Shutoff*						
	DATE	mo./day/yr						
	EMPLOYEE	initial						
	MAIN COMPONENT*							
A1A	Pressure Chart, 2pi +/3pi cal'd	2, 3						
A1B	Pressure Chart, 24 hr	y, n						
A1C	Filter Differential	WC						
A2A	Vault Covers	g / f						
A2B	Ground Around Vault	g / f						
A2C	Gas Leak Test	% LEL						
A2D	Ventilating System & Relief Stacks	g / f						
A2E	Vault Structure & Equipment Condition	g / f						
A2F	Regulators, OPP & Fixing Condition	g / f						
A2G	Locking Devices	y, n						
A3A	Pressure Setting	PSI, WC						
	Pretrieure Setting at Minimum Flow	PSI, WC						
	Lockup Pressure	PSI, WC						
A3B, C, D	Overpressure Setting	PSI, WC						
	Underpressure Setting	PSI, WC						
A3E	Control Vent Leak	y, n						
A4	Valves Checked	y, n						
A5	Return All Equipment, Valves and Locks to Normal Operation and Position	y, n						
B1A	Pilot Regs	Filters	y, n, R, N					
		Strainers	y, n, R, N					
		Dehydrators	y, n, R, N					
B1B		Valve & Seat	y, n, R, N					
B1C		Restricting Device	y, n, R, N					
B1D		Mechanical Operation	y, n, R, N					
		Reliability	y, n, R, N					
		Diaphragm	y, n, R, N					
B2A	Control Lines	Loading Supply & Static	y, n, R, N					
B2B		Pressure Test Vent	y, n, R, N					
B2C		Restricting Orifices & Filters	y, n, R, N					
B3A		Plug or Ball-type Valve Assembly	y, n, R, N					
B3D		Others	y, n, R, N					
B3C		Diaphragm	y, n, R, N					
B4		Return All Equipment, Valves and Locks to Normal Operation and Position	y, n					

All items to be filled out. Enter yes, no good, fair, poor, pressure or % LEL. Replaced, New, or N/A (not applicable). Add additional items as need for specific installations.

On back of this form show work done, other than inspection and testing:
1. Pressure setting changes and reason
2. Parts replacement and reason
3. Component replacement*
4. Leak repairs or equipment repair
5. All maintenance work such as pumping pits, touchup painting, filter blowdown or cleanout, etc.

*Component replacement is also to be posted on "District Regulator Data Sheet"

Figure 1a.
District Regulator Station Maintenance Record
Front Side
Code 626321

TITLE: District Regulator Station Maintenance Record

Regulator Station Maintenance and Data Forms

Pacific Gas and Electric Company
District Regulator Station Maintenance Record

Date	Comments

Figure 1b.
District Regulator Station Maintenance Record
Back Side

TITLE: District Regulator Station Maintenance Record

Regulator Station Maintenance and Data Forms

Pacific Gas and Electric Company
District Regulator Data Sheet

626271 (9/94)
Distribution
Page 1 of 2

Gas Fld Station No _____ Nos. of Associated Stations _____

Division ____ _____

Location _____ Well Map _____ Plat Sheet _____

Inspection Schedule *(Circle Month)* JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Function *(Circle One)* 1st Stage 2nd Stage 3rd Stage MONITOR

Job No. References _____

Installation Date _____ Date of Last Major Alteration _____

Pressure and Load Information

Inlet Pressure: MAOP _____ Norm _____ Outlet Press MAOP _____ Norm _____ Load Mo/Hr Max _____ Min _____

Regulators

		REDUCING		MONITORING		RELIEF VALVE or AUTOMATIC SHUTOFF
		Working	Standby	Working	Standby	
MANUFACTURER						
Serial Number						
Size, Model & Type						
Inlet Pressure Rating						
Head (Diaphragm) Size						
Valve Size & Type						
Valve Seat Matl & Hardness or Description						
Weight Loaded	Range					
	Internal/External					
Spring Loaded	Range					
Pilot	Size					
	Make					
	Model					
	Spring Range					
	Orifice Size					
	Filter Type					

Line Filter

SIZE	GWP	MAKE	MODEL	FILTER ELEMENT TYPE

Pressure Recording Device

COMPANY No	SERIAL No	MFR. No	MODEL	RANGE	CHART No	CHART ROTATION 1D 3D 7D 31D	No. PENS

Cascoiler

COMPANY No	SERIAL No	MFR. No	MODEL	RANGE	CHART No	CHART ROTATION 1D 3D 7D 31D	CYCLE

Station Valves

INLET	SIZE	TYPE	MAKE	FIG NO	FLGD SCRD	RATED GWP
OUTLET	SIZE	TYPE	MAKE	FIG NO	FLGD SCRD	RATED GWP
BYPASS	SIZE	TYPE	MAKE	FIG NO	FLGD SCRD	RATED GWP

Enclosure

Above Ground ( ) Pit ( ) Pit Volume _____ Cu. Ft. Type Construction _____ Type Closure _____

Figure 2a.
District Regulator Data Sheet
Front Side
Code 626271

TITLE: District Regulator Station Maintenance Record

Regulator Station Maintenance and Data Forms

Pacific Gas and Electric Company
District Regulator Data Sheet

SCHEMATIC

NOTE: Use this form for future installations or major reconstructions. For existing installations existing sketches may be attached if suitable.

Figure 2b.
District Regulator Data Sheet
Back Side