UO Standard # and Title	Maximum Allowable Operating Pressure, Requirements for Distribution Systems and Transmission and Gathering Lines
Standard Committee Member	[redacted]
Sponsoring Officer(s)	Shan Bhattacharya/Michael Katz
Project Coordinator	Standards Technical Committee 11 on Pipelines, CGT/Susan Chwistek

TALKING POINTS SUMMARY

Whom does this standard affect?	This standard affects personnel in California Gas Transmission and Distribution who design, operate and maintain natural gas transmission and distribution pipelines and mains.
What are the UO standard's mandatory requirements?	Procedures and instructions given in the standard are to be followed when establishing, revising, confirming, and documenting maximum allowable operating pressures (MAOP) of transmission and distribution pipelines.
Is this UO standard new or revised? If this is a revised standard, what will change?	Revised. The format, organizational references and contact name for Distribution have been updated.
When is this UO standard to be implemented?	This revision will be effective 10/01/00.
What will this standard accomplish?	It will continue to assure Gas Transmission and Distribution compliance with Sections 619, 621, and 623 of Title 49, Part 192 of the Code of Federal Regulations (49 CFR 192). It is cost neutral in this regard.
How is this UO standard going to be implemented?	A letter of notification superseding the previous revision of the standard and attaching a copy of the current revision will be sent to impacted and interested parties.

TITLE: **Maximum Allowable Operating Pressure, Requirements for Distribution Systems and Transmission and Gathering Lines**

Purpose

This standard specifies requirements for establishing, revising, confirming and documenting the Maximum Allowable Operating Pressure (MAOP), the Maximum Operating Pressure (MOP), and Future Design Pressure (FDP) of transmission, gathering, and distribution pipelines and mains. The requirements of this standard apply to all California Gas Transmission pipelines, and to all distribution system piping.

This standard does not cover guidelines for determining setpoints on overpressure protection devices. See instead California Gas Transmission Standard S 4125.1, "Setpoints, Overpressure Protection Devices," for instructions.

Standard Sponsor

Standards Technical Committee 11 on Pipelines, California Gas Transmission.

Contacts

California Gas Transmission: Susan Chwistek, SYC3@pge.com / 8-583-4312

Distribution Engineering & Planning: [redacted]

Rescission

DCS Standard D-S0430/GTS Standard S4125, dated August 1, 1998.

Implementation Responsibilities

The managers of Gas System Maintenance and Technical Support and Gas System Operations and UO Engineering and Planning and Operations, Maintenance and Construction managers, or designated representatives, are responsible for implementing the design, operating and reporting requirements of this standard.

Compliance Implementation and effectiveness are measured by responsible managers/superintendents. Periodic audits can be conducted by internal company departments. The California Public Utilities Commission also conducts compliance reviews on the requirements in this standard.

Requirements Requirements begin on Page 5 of this standard.

Date Issued/Updated:
Effective: October 2000
Revision Date: October 2002

Signed,

Shan Bhattacharya
Vice President
Engineering & Planning

Signed,

Michael A. Katz
Vice President
California Gas Transmission

Exhibits

Exhibit 1, Form F4125, "Request to Revise MAOP/MOP, Transmission and Gathering Lines"

Reference Documents

49 CFR 192.619, 192.621, 192.623, Subpart K

General Order 112 E, Subpart B, Section 126

California Gas Transmission Standard S 4125.1, "Setpoints, Overpressure Protection Devices" (under development)

California Gas Transmission Standard S 4460, "Operating Maps and Diagrams"

Gas Rate Schedule G-NT

Gas Standard A-34, "Piping Design and Test Requirements"

Gas Standard A-34.1, "General Requirements, Work Reportable to the CPUC"

Gas Standard A-34.2, "General Requirements, Uprating Procedures Low Pressure to High Pressure"

Gas Standard H-70, "Pressure Relief Devices"

PG&E Drawing 086868, "Pipeline — Data Sheet, MAOP of Lines Operating at or Over 20% SMYS" (Issued by California Gas Transmission)

Definition of Terms

Distribution Feeder Main (DFM). See the definition for Transmission Line.

Distribution Main is a pipeline that serves as a common source of supply for more than two service lines operating at 60 psig or less.

Distribution System includes distribution mains and service lines.

Future Design Pressure (FDP) is the pressure to which proposed and future additions or changes to existing facilities are to be designed and tested.

Gathering Line is a pipeline that transports gas from a current production facility to a transmission line or distribution main.

High Pressure Distribution System is a system which operates at a pressure greater than 25 psig, but not greater than 60 psig. Service regulators with the characteristics listed in Section 192.197 (a) of 49 CFR are required on each customer meter set.

Low Pressure Distribution System is a system which operates at a pressure of 3-1/2 inches water column (w.c.) through 10-1/2 inches w.c. Service regulators are not required on each customer meter set.

Maximum Allowable Operating Pressure (MAOP) is the maximum pressure at which a pipeline, pipeline segment or component is qualified to operate in accordance with the requirements of 49 CFR Part 192.

Maximum Operating Pressure (MOP) is the maximum pressure at which a gas pipeline system may be operated in accordance with the criteria established in this standard.

Semi-High Pressure Distribution System is a system which has traditionally operated at a pressure greater than 10-1/2 inches w.c. but not more than 25 psig. Service regulators with the characteristics listed in Section 192.197 (a) of 49 CFR Part 192 are required on each customer meter set.

Service Line is a pipeline that transports gas from a common source of supply to a customer meter set.

Specified Minimum Yield Strength (SMYS) is the minimum yield strength in psi prescribed by the specification under which pipe is purchased from the manufacturer or as specified in 49 CFR Part 192.

Standard Delivery Pressure is 7 inches w.c.

Definition of Terms (cont'd)

System is that portion of a pipeline which, as a unit, is protected by overpressure protection devices (e.g., regulator and monitor) in a manner that will prevent the lowest maximum allowable operating pressure of any component of the system from being exceeded.

Transmission Line as defined in this standard is any pipeline that operates over 60 psig and is not a gathering line. Transmission lines are grouped as backbone transmission, local transmission and distribution feeder main (DFM).

- Backbone transmission lines transport gas over long distances from the interconnection points with gathering systems, interstate pipelines and storage fields.
- Local transmission lines interconnect with backbone transmission or sources of supply.
- DFMs branch off backbone or local transmission lines and transport gas to large volume customers or to distribution systems which operate at pressures at or below 60 psig.

Water Column (w.c.) is a unit of pressure. At 60° F, 7 inches w.c. is equivalent to approximately ¼ psig.

MAOP - Establishing

Low Pressure Distribution Systems

1. For systems or portions of systems installed, replaced or rehabilitated ***on or after*** July 1, 1970, the MAOP is established by a test conducted in accordance with the requirements of Gas Standard A-34.
2. For systems or portions of systems installed ***before*** July 1, 1970, the MAOP is established as 150% of the standard delivery pressure. (For standard delivery pressure of 7 inches w.c., the MAOP is 10-1/2 inches w.c.)

Semi-High and High Pressure Distribution Systems

1. For systems or portions of systems installed, replaced, or rehabilitated ***on or after*** July 1, 1970, the MAOP is established by a test conducted in accordance with the requirements of Gas Standard A-34.

MAOP - Establishing (cont'd)

2. For systems or portions of systems installed ***before*** July 1, 1970:

   a. The MAOP is established by the highest operating pressure for the five years ending July 1, 1970, which can be documented (e.g., pressure chart, station or foreman's log, dispatcher's order, etc.), unless the system was subsequently uprated in accordance with Subpart K of 49 CFR Part 192, or pressure tested after July 1, 1965, in accordance with the requirements of Gas Standard A-34.

   b. If there is no pressure record available to document the operating pressure of a system during the 5 years before July 1, 1970, the MAOP may alternatively be established by the documented pressure of the system when the most recent leak survey made in the period between July 1, 1970, and March 1, 1979, demonstrated the system to be safe while operating at the documented pressure (documented pressure at time of survey or before and after survey). If a leak survey was made but there is no record of the pressure at the time of the survey (or before and after the survey), the MAOP is established as the pressure of record, if knowledgeable personnel can certify that the pressure at the time of the survey was the same as the pressure of record. MAOPs established in this manner must have been verified during the next leak survey.

3. If records described in Paragraphs 2. a. or 2. b. are not available, the MAOP must be established by a test conducted in accordance with the requirements of Gas Standard A-34.

Transmission and Gathering Lines

1. For lines installed, replaced or rehabilitated ***on or after*** July 1, 1970, the MAOP is established by a test conducted in accordance with the requirements of Gas Standard A-34.

2. For lines installed ***before*** July 1, 1970, the MAOP is established by the highest actual operating pressure for the five years ending July 1, 1970, which can be documented (e.g., pressure chart, station or foreman's log, dispatcher's order, etc.), unless the system was subsequently uprated in accordance with Subpart K of 49 CFR Part 192, or pressure tested after July 1, 1965, in accordance with the requirements of Gas Standard A-34.

MAOP - Design Requirements for New or Replaced Lines

Distribution Systems

1. Except as provided in Paragraph 2, new, replaced or rehabilitated mains and services in low-pressure, semi-high and high pressure distribution systems shall be designed and tested to qualify for a future MAOP of 60 psig.
2. Cut, test, and transferred services in low-pressure distribution systems that will remain low-pressure shall be leak tested at 10 psig. This includes:
   a. services which must be extended with new pipe in order to tie into the new main, and
   b. repaired services (i.e., services with segments that have been repaired or replaced with new pipe).

Transmission and Gathering Lines

1. New, replaced or rehabilitated sections of line shall be designed and tested in accordance with the requirements of Gas Standard A-34 to qualify the pipeline to be operated up to the FDP of the system, as listed in the latest version of PG&E Drawing No. 086868.
2. In existing systems where the MAOP is less than the FDP, new additions to that system shall have a design pressure at least equal to the FDP.

MAOP - Revising

Distribution Systems

If any distribution system requires an MAOP greater than the established MAOP, it must be uprated in accordance with the requirements of Gas Standard A-34.2 or Subpart K, 49 CFR Part 192, as appropriate. Any system with an MAOP lower than 60 psig for which uprating is planned should be considered for an MAOP of 60 psig.

Transmission and Gathering Lines

1. If any transmission or gathering line requires an MAOP greater than the established MAOP, it must be uprated in accordance with the requirements of Subpart K, 49 CFR Part 192.

2. Any increase or decrease of the MAOP of existing transmission or gathering lines shall be reviewed and approved by the Pipeline Engineering and Station Engineering sections in Gas System Maintenance and Technical Support (GSM&TS) and the Transmission System Planning and System Gas Control sections in Gas System Operations (GSO). Form F4125 (Exhibit 1) shall be used for requesting and documenting this review and approval.

3. Any revision to the MAOP which will directly affect delivery pressures to a UO distribution system, or which changes the pressure designation for a non-core end-use customer (as specified in the Rates section of Gas Rate Schedule G-NT), shall be reviewed with the appropriate UO area headquarters gas engineer. Transmission System Planning shall coordinate this review.

   a. The UO area headquarters gas engineer's review shall be documented on Form F4125 (Exhibit 1).

   b. The UO area headquarters gas engineer shall be responsible for notifying the Account Services and the Tariffs and Compliance Departments when necessary to evaluate and address any non-core end-user customer impacts.

4. The responsible GSM&TS pipeline engineer, facility engineer or project manager, or UO area headquarters gas engineer, as appropriate, shall ensure that affected operating and maintenance instructions (O&MIs) and operating diagrams are updated to show the revised MAOP, and that overpressure protection device settings and capacities are reviewed and if necessary, revised (see Gas Standard H-70 and CGT Standard S 4125.1).

MAOP - CPUC Notification of Revision

The CPUC shall be notified of a proposed increase in the MAOP in accordance with the requirements of Gas Standard A-34.1.

MOP - Establishing

The MOP of a gas pipeline system shall be determined by the responsible operating department in accordance with the criteria provided below.

Low Pressure Distribution Systems

The MOP of a system shall not exceed the lower of the following:

1. A pressure which would cause the unsafe operation of any approved, connected, and properly adjusted low-pressure appliance.

2. 150% of standard delivery pressure. (For a standard delivery pressure of 7 inches w.c., the MAOP is 10-1/2 inches w.c.).

Semi-High and High Pressure Distribution Systems

The MOP of a system shall not exceed the lowest of the following:

1. 60 psig (25 psig for systems having cast iron pipe with unreinforced bell and spigot joints).
2. the established MAOP.
3. the MAOP of any connected system of lower MAOP, unless required regulation and overpressure protection is provided between them.
4. a pressure limited by operating conditions, or the condition of the system.

Transmission and Gathering Lines

The MOP shall not exceed the lowest of the following:

1. the lowest established MAOP for any pipe segment in the pipeline system.
2. the MAOP of any connected system of lower MAOP, unless required regulation and overpressure protection is provided between them.
3. a pressure limited by operating conditions, or the condition of the system.
4. the pressure rating of any valve, fitting, piece of equipment, or facility installed in, or connected to, any pipe segment in the pipeline system.

MOP - Revising (Transmission and Gathering Lines Only)

1. System Gas Control shall be notified of temporary revisions of the MOP made to accommodate pipeline maintenance or repair activities. Form F4125 (Exhibit 1) is not required to document temporary revisions.
2. Any permanent change to the MOP of existing transmission or gathering lines shall be reviewed by the Pipeline Engineering and Station Engineering sections in GSM&TS, and the System Gas Control and Transmission System Planning sections in GSO, before making the change. Form F4125 (Exhibit 1) shall be used for requesting and documenting this review.
3. Any revision to the MOP which will directly affect delivery pressures to

a UO distribution system, or which changes the pressure designation for a non-core end-use customer (as specified in the Rates section of Gas Rate Schedule G-NT), shall be reviewed with the appropriate DCS Area Headquarters Gas Engineer. Transmission System Planning shall coordinate this review.

a. The UO area headquarters gas engineer's review shall be documented on Form F4125 (Exhibit 1).

b. The UO area headquarters gas engineer shall be responsible for notifying the Account Services and the Tariffs and Compliance Departments when necessary to evaluate and address any non-core end-use customer impacts.

4. The responsible GSM&TS pipeline engineer, facility engineer, or project manager, or UO area headquarters gas engineer, as appropriate, shall ensure that affected operating and maintenance instructions (O&MIs) and operating diagrams are updated to show the revised MOP, and that overpressure protection device settings and capacities are reviewed and if necessary, revised (see Gas Standard H-70 and CGT Standard S 4125.1).

FDP - Establishing (Transmission and Gathering Lines Only)

1. Transmission System Planning (GSO) shall establish the FDP for transmission and gathering lines in consultation with the Pipeline Engineering section in GSM&TS.

2. As a general rule, for pipelines with nominal diameters up to 24", the FDP should be established at 275 psig, 720 psig, or 1440 psig to match ANSI ratings of 150, 300 and 600, respectively. The FDP selected will depend on current and projected operating needs and conditions.

3. The FDP should be established on a project-specific basis for nominal diameters greater than 24" or for very large jobs where it is more cost effective to optimize the pipe for the job and class location.

Annual Update of MOP, MAOP and FDP

1. The director, System Integrity, in GSM&TS shall be responsible for annually updating the MOPs and MAOPs listed in PG&E Drawing No. 086868 to reflect changes or additions that have been made during the year.

2. The manager, Transmission System Planning, in GSO shall annually confirm the FDPs listed in PG&E Drawing No. 086868. This confirmation shall be made on or before January 15, to the director, System Integrity.

3. The director, GSM&TS, shall issue and distribute an updated copy of PG&E Drawing No. 086868 annually on or before March 15.

Records

1. Except as noted, all original records (e.g., charts, strength test pressure reports, completed F4125 forms, letters, etc.) shall be kept in the job file.

   Note: If there is no job associated with an MAOP or MOP change, as in the case of an MAOP lowered due to class location change and documented only by Form F4125, the original record shall be kept in the "MAOP" file described in Paragraph 2 below.

2. The Records section in GSM&TS (for CGT facilities) and UO area headquarters (for distribution facilities) shall establish and maintain "MAOP" files which consolidate ***copies*** of records documenting the MAOP and MOP of a pipeline (or segment of pipeline), main or pipeline facility.

3. All records (originals and copies contained in the "MAOP" files) that document the MAOP and MOP of pipelines and mains shall be retained for the life of the pipeline, main or pipeline facility.

REQUEST TO REVISE MAOP/MOP
TRANSMISSION AND GATHERING LINES

Instructions: Requester, complete Parts I, II and III and route this form and any required attachments as directed in Part IV below.

PART I REQUESTER INFORMATION

Request Date:	Date Approval Needed:	
Requester:	Location:	Telephone:

PART II PIPELINE DESCRIPTION

Line No. (or description)	
Current MAOP:	Current MOP:
Proposed MAOP:	Proposed MOP:
MP to MP	MP to MP

PART III REASON FOR REVISING MAOP/MOP

	Uprating (attach job description and sketch)
	Lower MAOP due to Class Location Change
	Lower MAOP due to equipment limitation (attach explanation)
	Other (attach description)

Order No.	

Write "None" if there is no job associated with the proposed change.

PART IV APPROVALS - ROUTE IN ORDER SHOWN

MAOP/MOP Change Approved by (or delegate):	Name (please print)/Signature	Date
☆ Dir., Pipeline Engineering		
◷ Dir., Station Engineering		
◷ Area Superintendent		
◷ Dir., Transmission. System. Planning:		
• DCS Area Gas HQ Eng. Review (when required)*:		
*Note: DCS Area Gas HQ Eng. to contact other UO Depts (e.g., Tariffs and Compliance) as necessary.		
◷ Dir., System Gas Control		
◷ **Mail to:**	**Director, System Integrity 375 N. Wiget Lane, Walnut Creek**	

Distribution:

Original Requester - Keep with Job File or MAOP File (see "Records" DCS/GTS Standard S0430/S4125)

Copies: System Gas Control; Gas Control Center; Area Superintendent; Director, Transmission System Planning; Director, Pipeline Engineering; Director, Station Engineering; Director, System Integrity; UO Area Headquarters Gas Engineer; GSM&TS Mapping

Form No. F4125
6/98