

Gas Reliability



Paul Metro

Chief Engineer - Gas Safety

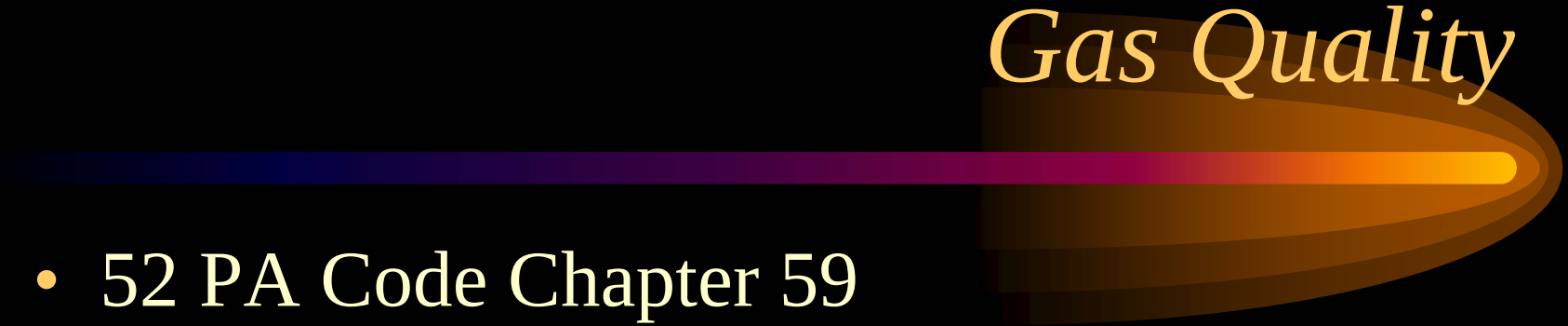
Pennsylvania Public Utility
Commission

Natural Gas Reliability



- Gas Quality
- Gas Safety
- Gas Supply

Gas Quality



- 52 PA Code Chapter 59
- Establishes BTU Content
- Establishes Pressure Requirements
- Low Pressure Distribution Systems
- High Pressure Transmission Systems

Gas Quality-Testing

- Testing
 - § 59.30. Heating value and purity of gas.
- (a) Testing apparatus. The accuracy of testing apparatus, as well as the method of making heating-value tests, shall be subject to the approval of the Commission.
- (b) Tests. Each public utility shall make or obtain the determinations as may be necessary to ascertain the heating value of the gas introduced into its distribution system and shall maintain an average heating value not less than the minimum authorized. If compression, processing or other factors tend to affect the heat content of all or any portion of its gas, determinations of heating value shall be made of gas drawn from different parts of the distribution system at points remote from the point where the gas enters the distribution system, with the frequency and in the manner as may be necessary to assure compliance with this section.
- (c) Records of tests. Each public utility shall adopt a standard printed form for recording the results of heating value tests. Each determination of heating value shall be recorded originally upon the form adopted for that purpose. If heating value is determined by an approved type of recording calorimeter, the charts removed from a calorimeter shall be sufficient to comply with the requirements of this section. If manufactured or mixed gas is served, the average heating value determined by these tests shall be recorded.

Gas Quality - Heating Value

- **Heating value.** The heating value of gas shall be as follows:
- **(1) Natural gas.** If a public utility supplies natural gas, its heating value may not fall below 950 Btu total heating value per cubic foot, under standard conditions of temperature and pressure.
- **(2) Manufactured or mixed gas.** Manufactured or mixed gas shall conform with all of the following:
 - **(i)** If a public utility supplies manufactured or mixed gas, its heating value shall have a monthly average of not less than 520 Btu total heating value per cubic foot under standard conditions of temperature and pressure. The minimum heating value of manufactured gas shall never fall below 500 Btu.
 - **(ii)** To obtain the heating value of gas, the results of the tests of heating value made under standard practice on each day during the calendar month shall be averaged, and the average of the daily averages shall be taken as the monthly average.

Gas Quality - Heating Value

- **Manufactured Gas Con't.**
- **(iii) Each public utility serving manufactured or mixed gas shall provide and maintain a calorimeter with necessary accessories of an approved type for the regular determination of the heating value of the gas sold, unless other provision is made with the approval of the Commission.**
- **(iv) The calorimeter required for measuring manufactured or mixed gas shall be installed in a laboratory or other building so located as to insure that thoroughly mixed, stabilized and representative samples of the gas delivered to customers are used for the tests.**
- **(v) Each public utility serving manufactured or mixed gas shall determine the heating value of the gas distributed to its customers daily or more frequently if necessary, or if required by the Commission.**

Gas Quality - Gas Purity

- *Purity of gas.* The purity of gas distributed in this Commonwealth shall conform with the following:
 - (1) Gas shall be substantially free from dangerous or objectionable quantities of impurities such as hydrogen sulphide, nitrogen or other combustible or noncombustible constituents which, if the gas is completely burned, yield noxious or toxic products of combustion.
 - (2) Hydrogen sulphide in the gas shall be considered negligible if a strip of white filter paper, moistened with a solution containing 5.0% by weight of lead acetate, is not distinctly darker than a second paper freshly moistened with the same solution, after the first paper has been exposed for one minute in an apparatus of approved form, through which the gas is flowing at the rate of approximately 5 cubic feet per hour, the gas not impinging directly from the jet upon the test paper.
 - (3) No gas sold shall contain more than 30 grains total of sulphur per 100 cubic feet and not more than five grains of ammonia per 100 cubic feet.

Gas Quality - Low Pressure Distribution Systems

- **§ 59.29. Gas pressure requirements for low-pressure distribution systems.**

- (a) *Maximum pressure.* The maximum pressure specified for a low pressure system may not be greater than a pressure which will not cause the unsafe operation of connected and properly adjusted gas utilization equipment or 14 inches of water column (8.1 ounces), whichever is less, at the outlet of the service meter of a low pressure customer.
- (b) *Minimum pressure.* The minimum pressure at the outlet of a service meter of a low pressure customer may not be less than a pressure which will not cause the unsafe or inadequate operation of a connected and properly adjusted gas utilization equipment or 2 inches of water column (1.2 ounces), whichever is greater, unless due to insufficient capacity of the service line owned by the customer.
- (c) *Changing pressure.* A public utility may change the distribution pressure for any system, but if a change is made, all appliances of a customer located within the system shall, if necessary, be readjusted by and at the expense of the utility.

Gas Quality - High Pressure

- **§ 59.31. Service from production or transmission lines.**

- (a) *Conditions of service.* Service to applicants directly from production or transmission lines which are not part of the distribution system from which customers are normally supplied shall be furnished under conditions stated in the tariff rules and regulations of the utility.
- (b) *Excess pressure protection.* If the pressure from lines governed by this section is reduced to standard service pressure for use by the customer, the installation shall be provided with adequate over-pressure protection to prevent the pressure from exceeding two pounds per square inch in the event of regulator failure.
- (c) *Cost of equipment.* The utility may require a customer served directly from a line governed by this section to provide and install the regulator and excess pressure protective device necessary to render service, or the utility may provide such equipment and make a reasonable charge for the equipment and its installation.
- (d) *Location of equipment.* If a customer is served directly from a line governed by this section, the regulator and meter shall be located as closely as possible to the point where the line is tapped.

Gas Safety

- **§ 59.33. Safety.**

- (a) *Responsibility.* Each public utility shall at all times use every reasonable effort to properly warn and protect the public from danger, and shall exercise reasonable care to reduce the hazards to which employes, customers and others may be subjected to reason of its equipment and facilities.
- (b) *Safety code.* The minimum safety standards for all gas transmission and distribution facilities in this Commonwealth shall be those issued under the pipeline safety laws as found in 49 U.S.C.A. § § 60101—60503 and as implemented at 49 CFR Parts 191—193 and 199, including all subsequent amendments thereto future Federal amendments to 49 CFR Parts 191—193 and 199, as amended or modified by the Federal government, shall have the effect of amending or modifying the Commission's regulations with regard to the minimum safety standards for all gas transmission and distribution facilities. The amendment or modification shall take effect 60 days after the effective date of the Federal amendment or modification, unless the Commission publishes a notice in the *Pennsylvania Bulletin* stating that the amendment or modification may not take effect.

Gas Safety

- **§ 59.33. Safety Con't.**

(c) *Enforcement.* Each public utility shall be subject to inspections as may be necessary to assure compliance with this section. The facilities, books and records of each public utility shall be accessible to the Commission and its staff for the inspections. Each public utility shall provide the Commission or its staff the reports, supplemental data and information as it shall from time to time request in the administration and enforcement of this section.

(d) *Records.* Each public utility shall keep adequate records as required for compliance with the code in subsection (b). The records shall be accessible to the Commission and its staff.

Gas Safety



- Gas Safety Metrics
- Emergency Dispatch - within 15 minutes
- Emergency Response - within 60 minutes
- Damage Prevention
- Risk Assessment
- Unaccounted for Gas - Less than 4%
- Leak Reduction\Leak per Miles

Gas Safety

- Damage Prevention
- Pennsylvania One Call System - Call Before You Dig
- 6,000 Gas Line Hits per Year - Average
- 30,000 Line Hits per Year - Gas, Electric, Water, Sewer, Telephone, Cable
- Result in 3 Reportable Incidents per Year - Average
- Reportable Incidents defined as loss of gas and death, injury, or \$50,000 of damage

Gas Safety

- Risk Assessment - Reduce line hits through focused inspections, investigations, and enforcement while reducing inspections in other non-problem areas such as regulator station inspections, drug and alcohol inspections
- Since Risk Assessment implementation - no Reportable Incidents due to line hits

Gas Safety



- Risk Assessment Strategies
- Damage Prevention, Corrosion, Operator Qualification
- Through re-focused inspections reduce gas interruptions and outages
- Distribution Integrity Management

Gas Safety

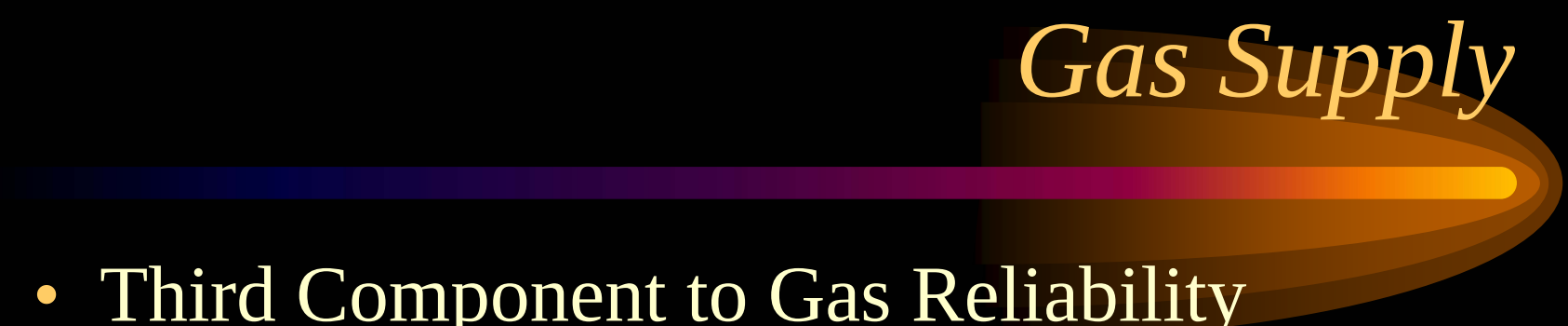


- Unaccounted for Gas - Gas lost through leaks, company use, metering problems
- Average Unaccounted for in Pennsylvania - 4%
- Reduce Unaccounted for through reduction in leaks
- Pipeline Replacement

Gas Safety

- Pipeline Replacement
- Pennsylvania has 3,600 miles of cast iron and 9,000 miles of unprotected bare steel pipes
- Bare Steel and Cast Iron pipes account for 5% of distribution pipe and 95% of leaks
- Reliability and Safety Issue
- Replacement Costs - \$13 Billion over 20 Years

Gas Supply



- Third Component to Gas Reliability
- Gas Contracts
- Peak Day Supplies
- Peak Day Requirements

Gas Supply

- Peak Day Requirements = Peak Day Supply
- Linear Regression to determine Peak Day Requirements - based upon consecutive 3 day peak
- Peak Day Requirements based upon firm customer interruptions once in 20 years
- Peak Day Requirements for non-interruptible (firm) customers

Gas Supply

- Peak Day Supply
- Local, Storage, and Interstate Pipeline Supplies
- Firm Contracts to ensure reliable supplies
- Reviewed Annually - minimize excess capacity
- Hedging Supplies and to Stabilize Costs
- Variable Contract Length - short and long term

Gas Reliability



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