2024 – Nov 6 – Editorial Section
Approved revisions to guide material under §§192.195 and 192.199. **Ready for 3rd LB.**

PRIMARY: 192.195, 197, 199, 203
SECONDARY: 192.183, 185, 187, 189, 201, 303
PURPOSE: Review existing GM and revise as necessary, to address the issues raised by the recent event in the over-pressurization that occurred in MA including the Preliminary Report issued by NTSB, by the NTSB Reports listed below, and by the American Gas Association document listed below, as well as AGA Gas Engineering and Operations Practices (GEOP) Series: Distribution System Design, Revised 2004, Book D-1, Volume III Chapter 13 Regulator Station Design.

1. Over-Pressure of Peoples Gas Light & Coke Co. Low Pressure Distribution System, Chicago, IL 1/17/92
2. Boston Gas Company Natural Gas Overpressure, Explosion and Fires East Boston, MA 9/23/83
3. Missouri Power & Light Company – Natural Gas Fires Centralia, MO 1/28/82
4. Low Pressure Natural Gas Distribution System, Burlington IA, 11/6/69
5. Low Pressure Natural Gas Distribution System, Gary, IN, 6/3/69
6. AGA Leading Practices to Reduce the Possibility of a Natural Gas Over-Pressurization Event: November 26, 2018 Section 1 Design.

RESPONSIBLE GROUP: Design Task Group

Note: *Revisions are shown in yellow highlight and red font.*

Section 192.195

1 GENERAL

1.1 Inlet and outlet pressure rating considerations.

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1.2 Prevention of overpressuring downstream pressure-carrying components.
Recognized methods of preventing overpressuring the downstream pressure-carrying components of control equipment include the following.

(a) Selecting equipment rated to withstand inlet pressure on the downstream side. This is particularly important if the equipment employs internal sensing or control and the adjacent downstream piping is not otherwise protected.
(b) Connecting the control or sensing line to the downstream pressure system where overpressure protection has been provided.
(c) Protecting the downstream pressure carrying components by installing a relief valve, regulator, back-pressure valve, or other suitable device in the control or sensing line.

1.3 Project Constructability Review.
Before issuing plans for work on or in the vicinity of an installation or facility containing pressure regulating and overpressure protection equipment, a constructability review of the project should be performed by personnel knowledgeable in gas pressure control and overpressure protection within the gas system where work is planned.

The constructability review should include affected stakeholders based on the scope of work (e.g., Engineering (design), Construction (installation), Operations (commissioning start-up), Gas Control). Plans may include construction drawings, construction timeline, work plans and procedures, isolation and purge plans, and contingency and response plans. Review may also include pressure limiting and overpressure protection device sizing calculations.

The following information should be considered, developed, and reviewed before issuing a plan set for construction.

(a) Pressure regulating and over pressure protection equipment location, type, and size.
(b) Pressure sensing, control, bleed, instrument, and vent line locations, sizes, and material types for pressure limiting and overpressure protection equipment. Include damage prevention measures to be installed such as marker tape.
(c) Bypass piping location, size, and material type.
(d) Gas system MAOP both upstream and downstream.
(e) Existing and proposed pipe information (e.g., location, size, material type, year installed, wall thickness/DR, grade).
(f) Gas flow direction (one-way feed or two-way feed).
(g) Existing and proposed valve information (e.g., size, type, position (open, closed), operation direction, accessibility) and location.

1.~~3~~4 *Flow reversals.*
Flow reversals might alter operating pressures along a transmission line from their historical norms and patterns. A review of control equipment and set points should be conducted to confirm the adequacy of existing equipment under the new operating parameters.

1.~~4~~5 *Reference.*
See guide material under §192.739.

2 OVERPRESSURE PROTECTION
For pressure systems fed by a single pressure limiting station, consider using a device capable of full pressure relief (~~i.e., all~~ e.g., gas passing a failed regulator is blown to the atmosphere) or a slam-shut device (i.e., device that stops flow from a regulator) for overpressure protection. For pressure systems fed by multiple pressure limiting locations, consider using at least one pressure relief device in the system for overpressure protection.

2.1 Facilities that might at times be bottle-tight. ...

2.2 High-pressure distribution systems. ...

2.3 Low-pressure distribution systems. ...

2.4 Transmission lines. ...

2.5 Gathering lines. ...

2.6 Pressure monitoring.
Consider ~~the use of monitoring technology such as~~ using recording equipment, telemetering, or SCADA for information on condition of pressure regulating equipment and early warning of system failures. Evaluation of data can provide insight on how the pressure regulating equipment is operating including indication of problems caused by debris, water, or improper seal/seating. Evaluation of data can also provide insight into the adequacy of the pressure regulating equipment for the actual gas demand from the station. Considerations for monitoring technology include the following.
(a) Selection of monitoring locations.
(b) Establishment of a process for collection of data.
(c) Establishment of a process for timely review of pressure data.
(d) Calibration of equipment.
(e) Review of system characteristics such as polling frequency and data averaging.
(f) Alarm setpoints and response.

2.~~6~~7 ~~*Other considerations*~~ *Bypass piping*.
When bypass piping is included in the station design to facilitate maintenance or inspection of automatic overpressure protection devices, consideration should be given to the following.
(a) Providing a regulator on the bypass piping.
(b) Arranging the bypass piping for series regulators so that only one regulator at a time is bypassed.
(c) Location of bypass relative to overpressure protection device sensing and control lines.
(~~c~~ d) When only a manually operated bypass valve is installed:
(1) Providing upstream and downstream pressure gauges within sight of a person operating the manual valve, ~~and~~

(2) Specifying a manual valve that is marked with the flow direction and the operating direction to close it, and
(3) Locking and tagging valve closed when not in use.

Section 192.199

1 ~~RUPTURE DISKS~~ GENERAL *[Editorial note: Existing GM from 1 moved to ~~3~~4(a) below.]*

~~Rupture disks should meet the requirements for design as described in the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 (see §192.7).~~ The operator should consider the following guidance for the design of pressure relief and limiting stations.

2 CONTROL LINES

All control lines should be protected from falling objects, excavation, vehicles, or other foreseeable causes of damage. They ~~should~~ must be designed and installed so that damage to any one control line cannot render both the district regulator and overpressure protective device inoperative (§192.203(b)(9)). Control lines should not share a common connection point or tap or be routed in proximity such that the point could be severed or both lines damaged simultaneously.

(a) Consider the following damage prevention measures for buried control lines.
(1) Routing lines along with other pipeline facilities. Place pressure limiting and overpressure protection control lines on opposite sides of the pipeline.
(2) Plating over the lines.
(3) Placing warning tape over lines.
(4) For non-metallic lines use electronic location markers or tracer wire to aid in future locating.

(b) Consider the following damage prevention measures for above ground control lines.
(1) Routing lines along with other pipeline facilities.
(2) Using bollards, guardrails, or barricades to prevent vehicular damage.

3 SINGLE INCIDENT (§192.199(g))

3.1 General.
In complying with §192.199(g), the operator should evaluate each district regulating station as to the type and extent of risks that may be expected. Different locations may suggest the need for individual station design, installation considerations and the ability to perform maintenance, inspection and testing activities.

3.2 Examples.
Among the incidents that should be considered in the design of a district regulator station are the following.
(a) Explosions or fire in vault.
(b) Damage by vehicles.
(c) Damage by earthmoving equipment.
(d) Weather and environmental effects.
(e) Others that might result from site selection with respect to airport and railroad operations.

3.3 Protection.

Design and installation considerations include the following.

(a) General.
  (1) Protection for relief valve stacks.
  (2) Selection of the type of overpressure protection.
  (3) Evaluation of the need for redundant protection.
  (4) Inspection or maintenance activities that could compromise the integrity of normal overpressure protection. See guide material under §192.739.

(b) Vaults.
  (1) Use of ~~a single vault,~~ a double chamber vault~~,~~ or vaults separated by an appropriate distance with pressure limiting and over pressure protection devices in separate chambers or vaults.
  (2) Structural design. See guide material under §192.183.

(c) Above ground installations.
  (1) Location on property under control of the operator.
  (2) ~~Space~~ Provide sufficient space around building(s) for free movement of firefighting equipment.
  (3) Use of ~~a single-room building,~~ a double-room building or multiple aboveground structures ~~buildings~~ separated by an appropriate distance with pressure limiting and overpressure protection devices in separate structures.
  (4) Use of ventilated buildings made of noncombustible materials. The roof and sidewalls should be designed to relieve the force of an explosion.
  (5) Use of ~~posts,~~ bollards, guardrails, or barricades to protect equipment.

~~4~~ SELECTION OF EQUIPMENT *[Editorial note: 4 is all new, so not underlined. 4(a) is from 1 above and updated to the version of 1 published in Addendum 4.]*

Pressure limiting and relief equipment should be designed for inlet and outlet pressures, peak and minimum load demand, and service conditions. Conditions to consider could include the following.

(a) Rupture disks should meet the requirements for design as described in the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 (see listing in §192.7, not IBR for §192.199).

(b) Pressure drops that could result in a gas temperature which could cause ice to form on pipes and equipment downstream of pressure limiting equipment. Gas preheaters and pilot heaters can be used to raise gas temperature prior to the pressure reduction to maintain a downstream gas temperature above freezing.

(c) Liquids or debris in the gas stream can negatively affect equipment. Filters and strainers upstream of the pressure limiting equipment can be used to remove this material.

(d) Future load changes should be considered when designing pressure regulating equipment. Dual pressure regulating runs can be used to handle a wider range of loads.

(e) Evaluate the need for secondary overpressure protection. Secondary overpressure protection could be provided by a slam-shut device or a supplementary relief device.

(f) Consider the pressure system's susceptibility to any single failure or event that could simultaneously result in pressure regulating and overpressure protection equipment malfunction, including human error. For example, sensing and control lines should not share a common connection point or tap or be routed in proximity such that the point could be severed or both lines damaged simultaneously. Aspects of each individual subsystem, monitor, control, or relief valves should be independent and should not have any shared elements in design.

(g) Consider design pressure of the downstream system with respect to the upstream MAOP.

~~4~~ 5 SECURITY (§192.199(h))

Recommended methods for complying with §192.199(h) include the following.

(a) Securing the proper position of any valve under a relief valve that could make the relief valve inoperative or valves that could make the pressure regulating or limiting device ineffective, such as a bypass valve or a control line valve.

(b) Installing duplicate relief valves, each having adequate capacity to protect the system. Isolating valves or a three-way valve should be installed so that it is mechanically impossible to render more than one safety device inoperative at a time.

(c) See guide material under §192.739 for inspection or maintenance activities regarding labeling, visual inspections, stop valve inspections, and station schematics review.

~~5~~ 6 OTHER CONSIDERATIONS TO MINIMIZE DAMAGE BY OUTSIDE FORCES

See Guide Material Appendix G-192-13.

7 PROJECT CONSTRUCTABILITY REVIEW

See 1.3 of the guide material under §192.195.

Section 192.203

Instrument, control, and sampling pipe and components which extend to a remote location (adjacent room or building) should be identified by color code, signs, diagrams, or other appropriate means so that proper valves can be located and operated in an emergency. At locations where the identification of such piping is obvious, color coding, marking, diagrams, etc., may not be necessary. Also, see Guide Material Appendix G-192-13 and guide material under §§ 192.195, 192.199 and 192.739.