METHODS OF OVER-PRESSURE PROTECTION

OGA 2015 Regulator Fundamentals Seminar
Methods of Over-Pressure Protection

Monitor Regulation & Shut Off / Slam Shut

Relief Devises
Part 192-Transportation of Natural and Other Gasses by Pipeline:

Minimum Federal Safety Standards FOR OVER-PRESSURE PROTECTION

- 192.195 Protection against **accidental** over pressuring
- 192.199 Requirements for **design** of pressure relief and limiting devices
- 192.201 Required **capacity** of pressure relieving and limiting stations
- 192.739 Pressure limiting and regulating stations: **Inspection and testing**
- 192.743 Pressure limiting and regulating stations: **Capacity of relief devises.**
Pressure Limiting & Relief Device Types

- **Pressure relief**
  - Oil seal
  - Weights / springs
  - Pilot
  - Internal relief

- **Pressure limiting**
  - Monitor regulation
  - Slam-shut
  - Series regulation
Pressure Relief: Weights & Springs
Pressure Relief Valves

Diagram showing the relationship between pressure and flow, with labels for 'Pressure Build-Up' and 'Blow-Down'.
Pressure Relief: Pilot

Relief Devices

Pilot

Vent
Internal Relief

IRV in Closed Position
Internal Relief

IRV in Open Position
Internal Relief Capacities for Sensus 243-12-2 and 243-12-6

Regulator outlet pressure set at 7” W.C.
Relief begins @ 9” above set point (set by the spring)
NOT ADJUSTABLE
Internal Relief Capacities for Sensus 243-8-2 and 243-8-6

Regulator outlet pressure set at 7” W.C.  
Relief begins @ 9” above set point (set by the spring)  
NOT ADJUSTABLE
A distribution system is being up-rated from 15 Psig to 60 Psig. Existing service regulators Sensus 243-12-2 with a 1/4” orifice, 125 Psig maximum working pressure,

**PROBLEM:**
- What if any effect does the increase in pressure have on the capacity of the internal relief?
- What, if any action do you need to take?
Pressure Limiting Devices

- Monitor regulators
- Slam-shuts
- Series regulation
Pressure Limiting: Monitor Regulators
Pressure Limiting:
Working Monitor Regulators

LEGEND
I = INLET
O = OUTLET
S = SENSE
L = LOADING

1ST STAGE & MONITOR REGULATOR
FLOW
2ND STAGE REGULATOR
Pressure Limiting: Working Monitor Regulators

- **MONITOR PILOT**
- **FIRST STAGE PILOT**
- **CONTROL PILOT**
- **FIRST STAGE & MONITOR REGULATOR**
- **2ND STAGE CONTROL REGULATOR**
Series Regulators

60 PSIG INLET MAOP

FIRST CUT SET @ 15#

SECOND CUT SET @ 10#

10 PSIG MAOP
Pressure Limiting: Slam-Shuts
Operators MUST COMPLY with the following Federal Regulations for over-pressure protection
Prevent accidental over-pressuring

Result of failure
- Regulator
- Other

Must have:
- Additional pressure limiting or
- Pressure relieving device

Upstream system same or lower MAOP
- Does not apply
Corrosion does not impair

Valves won’t stick

Tested - ensure it is operable & does not leak

Non-combustible supports

Non-hazardous discharge location

Stacks and vents
  - Clear - water, snow, ice, etc.
  - Properly sized

Single incident cannot effect both

Locked in position – unauthorized operation
192.201 Required Capacity of Pressure Relieving and Limiting Stations

- **MAOP ≥ 60psi**: – MAOP +10%  
  (or 75% SMYS) which ever is less

- **MAOP ≥ 12psi < 60psi**: – MAOP + 6psi

- **MAOP < 12psi**: – MAOP + 50%

- **LP** – prevent unsafe operation of appliances
Module 4.2 Methods of Over-pressure Protection

192.201 Required Capacity of Pressure Relieving and Limiting Stations

MAOP

MAOP+
Allowable over-pressure build-up

System Pressure

Normal Operation
192.201 Required Capacity of Pressure Relieving and Limiting Stations

MAOP

Allowable over-pressure build-up

System Pressure

Accidental Over-Pressuring

MAOP+
Each calendar year $\leq 15$ months

- Ensure in good mechanical condition
- Adequate capacity
- Set to function at correct pressure
- Properly installed
  - Protected from dirt, liquids, etc.
| Must have sufficient capacity to protect connected facilities. |
| Capacity must be consistent with pressure limits. |
| Inspected each calendar year \( \leq 15 \) months |
| - by test in place |
| - or by review and calculations |
| - or experimentally determined capacity |

| Compare calculated capacity under conditions of operation: |
| - Rated capacity |
| Subsequent calculations not needed if: |
| - Operating conditions have not changed |
| Replace if inadequate |
QUESTIONS?