

# 12-G Pressure Limiting and Regulating Stations

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### **1.0 SCOPE**

In order to eliminate hazardous leaks and minimize releases of natural gas from pipeline facilities, this chapter describes the procedures for inspection and maintenance of pressure limiting and regulating stations, relief device inspection and capacity calculation and inspection of vaults.

### **2.0 REGULATORY REFERENCES**

49 CFR Part 192 §§ [192.201](#), [192.739](#), [192.741](#), [192.743](#), [192.749](#), ADB-2021-01

### **3.0 PROCEDURE**

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For the purposes of this procedure, regulating station is defined as a station with pressure limiting and/or overpressure protection devices serving three or more customers.

### 3.1 Regulating Stations, Annual Inspection and Maintenance [[192.739](#)], [ADB-2021-01]

Regulating stations *shall* be inspected each calendar year not to exceed 15 months. If the M&R Technician discovers a condition that *may* cause the *MAOP* of the *downstream pipeline* system to be exceeded, immediate action shall be taken to remedy the condition and the Engineering Manager shall be notified. Inspections and other maintenance shall be documented appropriately. All maintenance on regulators, relief valves and other equipment shall be performed in accordance with manufacturer's procedures.

During inspection of a regulating station, the inspector shall ensure the following:

- (a) If SCADA signals are transmitted from station to *gas* control, notify gas control before starting work.
- (b) Visually inspect the station to ensure that it is in good mechanical condition.
- (c) Install calibrated pressure-indicating gauge to monitor *outlet* pressure while performing maintenance to regulators and relief valves.
- (d) Establish flow on the by-pass, if available, and isolate the primary regulator from the gas flow. If a secondary regulator or other pressure-limiting device is not used to provide temporary regulation, see [section 3.5](#).
- (e) Check lock-up, set point, and proper operation of the primary regulator and if applicable, the monitor regulator. The regulator may be disassembled for internal inspection at the discretion of the DENC and DESC Field Measurement representative. For the purposes of this procedure, the set point is the set regulator delivery pressure and lock-up is the maximum pressure reached resulting from the pressure buildup during a no-flow condition on the downstream system. Ensure that the set point does not exceed the MAOP of the downstream system.
- (f) If applicable, check lock-up, set point and proper operation of stand-by regulator as outlined in step e.
- (g) Test relief valves or other overpressure protection in accordance with [section 3.3](#) of this procedure.
- (h) All pressure gauges, all pressure recorders and all SCADA transmitters *should* be calibrated throughout their operating ranges.
- (i) All station valves (except those designated "do not operate") should be partially operated and lubricated if required.
- (j) All station piping and components should be checked for leaks with a soap solution or with an appropriate *leak* detector.
- (k) Ensure that all valves are in their proper positions for normal operation and locked if necessary.
- (l) If SCADA signals are transmitted from station to gas control, notify gas control after completing the inspection.
- (m) Check for atmospheric corrosion
- (n) Check condition of station inlet/outlet risers (corrosion at ground level)
- (o) Visually inspect station - remove weeds, trash, etc. from inside station
- (p) Check that station signs and line markers are correct and in good condition

- (r) Inspect station fencing. If station does not have a fence, evaluate if it is a need due to location, distance from roadway, amount of pedestrian access, risk of vandalism, etc. Any remediations or requests for installations shall be marked on the essentials order so a timely follow up can be done.
- (s) Ensure all valves have been returned to their normal operating position before leaving the area.
- (t) Install magnetic flags or other visual indicator to any valve that is opened or closed to indicate a change; remove the flag when the valve is returned to the operating position.
- (u) Verify all components including piping, valves, valve position, equipment, equipment set points, control lines, etc. match the corresponding records and drawings. If changes are necessary, record appropriately in essentials to update the record or drawing.

### **3.2 Farm Tap Inspections**

Farm Taps shall be visually inspected annually not to exceed 15 months. Inspections and other maintenance shall be documented appropriately.

During inspection of a regulating station, the inspector shall ensure the following:

- (a) Visually inspect the station to ensure that it is in good mechanical condition.
- (b) All station piping and components should be checked for leaks with a soap solution or with an appropriate leak detector.
- (c) Ensure that all valves are in their proper positions for normal operation and locked if necessary.
- (d) Check for atmospheric corrosion
- (e) Check condition of station inlet/outlet risers (corrosion at ground level)
- (f) Visually inspect station - remove weeds, trash, etc. from inside station
- (g) Verify the station is adequately protected from vehicular damage

### **3.3 Relief Device Testing, Inspection and Capacity Calculation [192.739] [192.743]**

The capacity of relief valves at system regulating stations *must* be reviewed and calculated at least once each calendar year, but at intervals not exceeding 15 months. Relief valves must have enough capacity to limit the pressure on the facilities to which they are connected to a level that does not exceed the MAOP plus allowable build-up. Subsequent calculations are not required if the annual review indicates that operating parameters and equipment have not changed since the initial calculations.

When the annual station inspection is completed, if the station parameters have not changed (beyond normal regulator drift from the recorded setpoint) the Measurement Technician attests (through Essentials) that the station parameters have been reviewed and that the calculation is correct. If the parameters are changed, then the Measurement Technician shall confirm with Gas Measurement Engineering that the parameters in the field are correct (documented through Essentials). If changes are observed in the field that are not correct, then the Measurement technician shall consult with local project engineering.

#### **State Specific: South Carolina**

Changes in station parameters are documented in GIS.

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If relief valves have insufficient capacity, new or supplemental relief valves must be installed to provide the additional capacity required or *upstream* pipeline MAOP must be lowered to a pressure that permits existing relief valves to provide sufficient capacity in the event of the largest capacity regulator failing wide open.

During inspection of a relief device, the M&R Technician shall ensure the following:

- (a) Ensure that the relief stack is free of water, debris or any other foreign matter that could prevent its normal operation.
- (b) If feasible, relief devices shall be tested to determine that they have mechanical function to desired set point. The relief device may be tested in accordance with one of the following methods.
  - (1) Raising the pressure on the system with the regulator until the set point is established and the valve is un-seated.
  - (2) Isolating the relief from the system (closing valve under the relief) and inducing pressure under the relief with a high-pressure hose until the set point is established and the valve is un-seated.
  - (3) The relief valve may be disassembled for internal inspection at the discretion of DENC and DESC measurement personnel.
- (c) If relief device testing is not feasible, Engineering shall calculate the capacity of station and ensure that the manufacturer's rating on the relief device is adequate to prevent over pressuring of the downstream system. After an initial calculation, subsequent calculations are not required if the parameters (regulators rated capacity and delivery pressure, station configuration, valves, etc.) used in the initial calculation do not change.
- (d) If the station does not have adequate overpressure protection, action shall be taken to provide adequate overpressure protection.
- (e) Dominion Energy Southeast Energy Group will set all relief valves not to exceed the values of the specifications listed below. Any exceptions must be approved by the Division Engineer and should be documented on customer contracts where applicable.

Pressure Supplied to Customer	Max Relief Pressure Setting	Max Blowing Pressure
7" w.c.	21" w.c.	2 psig*
2 psig	3.5 psig	5 psig
5 psig	10 psig	15 psig
Pressures higher than 5 psig	Delivery plus 5 psig	Delivery plus 10 psig

\* ANSI B109-4 Self Operated Diaphragm-type Natural Gas Service Regulators, Section 5.3.9 (Approved 4/23/98). Secretariat: American Gas Association Operating Section, Catalog No. XQ9802

Note: Table valves are standard, there may be deviations for others that are approved by engineering.

### 3.4 Replacing Components

Adding, removing and replacing regulating station components with non-identical components is considered a design change and requires approval. Examples of changes that require this approval are changes in orifice size, pilots, regulators or relief valves. This list is not intended to be all-inclusive. Replacing components with identical kind does not require approval. During an inspection of a regulating station, if any component of a regulator station is removed, replaced or otherwise changed, the change shall be documented and the adequacy of the relief device verified in accordance with [section 3.3](#) of this procedure.

When temporarily taking a pressure regulator out of service in order to perform maintenance or for replacement, a means of controlling gas pressure shall be provided in accordance with the following procedures:

(a) Temporary Pressure Regulation

The following chart contains the minimum guidelines for temporary regulation. Additional precautions may be taken to ensure pipeline safety.

**GUIDELINES FOR PROVIDING TEMPORARY REGULATION**

Type of Regulation	Recommended Min. # of On-site Personnel	Restrictions / Special Instructions
Temporary regulator with outlet pressure greater than or equal to 1 psig	1	Valve or other flow control means required in case of temporary regulator failure; if adequate relief is not present then pressure shall be monitored in accordance with <a href="#">section 3.5(c)</a> of this procedure.
Temporary regulator with outlet pressure less than 1 psig	1	Valve or other flow control means required in case of temporary regulator failure; adequate relief shall be provided.
Valve throttling as a means of regulation into a system operating at greater than 1 psig, steel or plastic	2 w/o adequate relief 1 w/ adequate relief	Ideally two people should be present when physically removing a regulator from the pipeline; pressure shall be continuously monitored in accordance with <a href="#">section 3.5(c)</a> of this procedure.
Valve throttling as a means of regulation into a system operating lower than 1 psig, cast iron system, or service lines	2	This method should be only be used in emergencies; pressure shall be constantly monitored in accordance with <a href="#">section 3.5(c)</a> of this procedure; adequate relief shall be present when used in regulating gas to an industrial and/or commercial customers.

The Engineering Manager or designated personnel shall provide the following:

- (1) Design of temporary regulation.
- (2) Pressure range, which may be seasonal, to which the gas must be regulated. In determining the upper limit of the pressure range, the *maximum allowable operating pressure* (MAOP) and specified minimum yield strength (*SMYS*) shall be taken into consideration in accordance with [section 3.5\(d\)](#) of this procedure.

(b) Valve Throttling

If downstream pressure is temporarily regulated by valve throttling, the valve used shall be designed to meet pressure and flow conditions. It is essential for personnel throttling valves to know the mechanics of the valve. Valves typically have a much greater flow capacity than a pressure regulator of the equivalent pipe size. For their simple operation and ease of flow control, 1/4 turn valves with stops to cease turning of a valve when it is fully open or closed are recommended. Only in emergencies may valve throttling be used to regulate gas into the following systems:

- (1) Low pressure (< 1 psig) system,
- (2) Service lines. Valve throttling shall not be used to control pressure into a commercial or industrial *service line* unless adequate overpressure protection is present.

(c) Pressure Monitoring

The pressure shall be monitored using a calibrated pressure gauge or manometer. If temporary regulation is accomplished through valve throttling, the preferred method is for the person throttling the valve to monitor the downstream pressure. If this is impractical, the person monitoring the downstream pressure shall be in constant communication with the person throttling the valve. Personnel monitoring downstream pressure should periodically update the person providing manual regulation in addition to notifying him/her of significant changes in pressure. Sudden system pressure increases may result if operation of utilization equipment downstream of the regulation is discontinued and conversely, sudden system pressure decreases may result if the same equipment is brought into operation. The speed and the severity of the system pressure changes depends on several factors including the size of the pipeline system and the gas demand on that system. Smaller pipeline systems will experience pressure swings more quickly than larger systems.

- (d) Accidental Overpressure - The MAOP of the downstream system should not be exceeded but if this is not practical, the pressure of the downstream system may reach the following:

Regulated System	Maximum system pressure
Low-pressure distribution	maximum pressure that will not cause unsafe operation of utilization equipment
Less than 12 psig	MAOP x 1.5
Greater than or equal to 12 psig but less than 60 psig	MAOP + 6 psig
Greater than or equal to 60 psig	MAOP x 1.1; to a maximum of 75% SMYS

- (e) If the maximum system pressure as calculated above is accidentally exceeded, immediate action shall be taken to prevent further over pressuring up to and including termination of the gas supply to the system. The system shall be investigated for possible leaks. Leak responses shall be conducted in accordance with [Chapter 12-B Leak Response, Leak Classification, and Gas Emergencies](#).

### 3.6 Monitoring System Pressures, Telemetry or Recording Devices [[192.741](#)]

- (a) Each distribution system supplied by more than one system regulating station must be equipped with telemetry or pressure recording devices to indicate the gas pressure in the system.
- (b) On distribution systems supplied by a single system regulating station, telemetry or pressure recording devices may be installed in the system, if necessary, taking into consideration the number of customers supplied, the operating pressures, the capacity of the installation, and other operating conditions.
- (c) If indications of abnormally high or low pressure are detected, the system regulating station and its auxiliary equipment must be inspected and necessary measures must be employed to correct unsatisfactory operating conditions.
- (d) The installation of a high / low pressure alarm should also be considered when selecting the sites to monitor system pressures. System pressure alarms should be checked and monitored by the control room.

### 3.7 Vault Inspections [[192.749](#)]

- (a) Safety Precautions

The following safety precautions shall be observed while working in or inspecting a vault:

- (1) Before entering any vault or confined space see [Chapter 1-E, 3.9 Confined Space Entry](#).
- (2) Ensure that vehicles and combustion engines are kept away from vault openings.

- (3) All possible sources of ignition should be kept away from the work area, except those that may be required to perform work. See [Chapter 12-I Prevention of Accidental Ignition](#) concerning the prevention of accidental ignition.
- (4) Prior to entering, the vault shall be checked for the presence of gas with a combustible gas indicator. Vaults containing gas shall be allowed to vent before entering the vault. Appropriate personal protective equipment such as fire retardant clothing and eye protection shall be used when working in a gaseous atmosphere.
- (5) Prior to entering, the vault shall be checked for oxygen deficiency. If the atmosphere in the vault is not stabilized with an oxygen (O<sub>2</sub>) level of at least 19.5% O<sub>2</sub> in air, the appropriate breathing apparatus shall be worn while working in the vault. Manufacturer's instructions shall be followed when using breathing apparatus.
- (6) Safety equipment such as fire extinguishers and additional breathing apparatus shall be readily available.
- (7) At least two DENC and DESC employees shall be on-site when working in a vault with at least one DENC and DESC employee remaining outside the vault at all times. Prior to entering the vault to assist an employee a radio or phone call will be made requesting additional assistance and all precautions outlined in item [3.7\(a\)\(5\)](#) of this procedure will be observed.

This list is not intended to be all-inclusive as field conditions may dictate the need for additional safety measures.

(b) Inspection

- (1) Vaults that contain system regulating stations should be inspected each time the station is inspected.
- (2) Each vault having a volumetric internal content of 200 cubic feet or more shall be inspected each calendar year at intervals not exceeding 15 months in accordance with the following:
  - (i) Ensure the vault is in good physical condition and properly ventilated. Vents shall be checked to ensure they are not blocked and are free of debris.
  - (ii) Inspect the vault for the presence of gas. If gas is found in the vault, inspect for leaks and any leaks found shall be repaired.
  - (iii) Inspect vault cover to ensure that it does not present a hazard to public safety. Some of the items to consider are corrosion, damage from physical force, door hinges and lids that may present tripping hazards.
  - (iv) Verify with a CGI that the level of gas in the vault is below 20% *LEL* (1% gas in air). After verifying that the gas is below this level, inspect any insulators to ensure that the protective measures required by [Chapter 8 - Corrosion Control](#) are present and in working condition (securely attached, electrical continuity, etc.).

**State specific: South Carolina**

BEFORE entering a vault or any other confined space refer to DESC Safety Department procedure [SD-300](#) to determine the safety precautions and documentation necessary to safely enter.

**3.8 ILI Launcher and Receiver Safety [[192.750](#)]**

- (a) Any launcher or receiver must be equipped with a device capable of safely relieving pressure in the barrel before removal or opening of the launcher or receiver barrel closure or flange and insertion or removal of ILI (pigging) equipment.

#### **4.0 TRAINING/QUALIFICATIONS**

See the appropriate system Operator Qualification Program.

#### **5.0 DOCUMENTATION/FORMS**

System specific forms should be used where applicable.

#### **6.0 RELATED DOCUMENTS**

None at this time.

#### **7.0 APPENDICES**

None at this time.

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