

Updated Rupture Mitigation Valves and Leak Detection Requirements

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Agenda

- Background
- Summary of Main Provisions of Rule Making
- Rupture Mitigation Valve Requirements
- RMV Site Design Considerations
- Kimley-Horn Overview



Background

- *Requirement of Valve Installation and Minimum Rupture Detection Standards*
 - New rule published April 8, 2022
 - Effective October 5, 2022
 - Affects installations after April 10, 2023
 - Applies to:
 - Type A gas gathering lines
 - Gas transmission lines greater than 6-inch diameter
 - Hazardous liquid lines greater than 6-inch diameter

Summary of Major Provisions of Rule

- Applies to most newly constructed and “**entirely** replaced” gas transmission pipelines 6-inches in diameter or greater
 - Requirements for entirely replaced onshore pipeline segments only apply to projects that involve the addition, replacement, or removal of a valve
- Add leak detection capabilities and Rupture Mitigation Valves (RMV) to comply with updated valve spacing requirements
- New reporting requirements following an event involving an RMV
- Updates to § 192.179 and § 195.260 concerning valve spacing
- Develop written procedures for evaluating and confirming potential ruptures as soon as practicable after initial notification or identification

Summary of Major Provisions of Rule

- New Definitions:
 - **Rupture Mitigation Valve (RMV):** Either an automatic shut-off valve (ASV) or remote-control valve (RCV) or alternate equivalent technology
 - **Entirely Replaced:** Where 2 or more miles of pipe, in the aggregate, have been replaced within any 5 contiguous miles of pipeline within any 24-month period
 - **Notification of Potential Rupture:** The notification to, or observation by, an operator identified in § 192.635 of a potential unintentional or uncontrolled release of a large volume of gas from a pipeline.

Summary of Major Provisions of Rule

- Updates to § 192.615 and §195.402 on Emergency Plans and Notifications
 - Emergency Plans: Develop written procedures for evaluating and identifying whether notifications of potential ruptures are actual ruptures as soon as practicable
 - Requires operators to maintain a liaison with and contact the appropriate public service authorities in the event of a pipeline emergency
 - Instead of communicating with individual fire, police, or other public entities, operators may instead establish a liaison with appropriate local emergency coordinating agencies
 - 911 Emergency Call Centers
 - City/County Emergency Managers

Rupture Mitigation Valve (RMV) Requirements

- **Purpose:** Shut in a section of pipe after a rupture has been identified to limit gas loss and consequences of a rupture
- **Spacing:** Must meet spacing requirements of § 192.179/195.260 and operational requirements of § 192.636
- **Operational Requirements:**
 - Isolation of a rupture in 30 minutes or less from identification of rupture
 - Capable of being operated remotely or by onsite personnel
 - Able to be monitored for status
 - Have a back up power source to maintain communication

RMV Spacing Requirements - Gas

- The rule updates § 192.179 RMV spacing requirements on gas transmission mains
 - RMV spacing essentially a one-class “bump” from sectionalizing valve requirements

Class	Current Maximum Sectionalizing Valve Spacing	Maximum RMV Spacing
Class 4	5 miles	8 miles
Class 3	8 miles	15 miles
Class 1 and 2 HCA*	Class 2: 15 miles Class 1: 20 miles	20 miles

*RMVs requirements will not apply if the segment is in a Class 1 or Class 2 location and has a Potential Impact Radius (PIR) of less than or equal to 150-feet

RMV Spacing Requirements - HVL

- The rule also updates § 195.260 - Valve spacing and location requirements on hazardous liquid pipelines including :
 - Potential HCA effects – 15 miles
 - No potential HCA effects – 20 miles
 - Suction and Discharge of a Pump Station
 - Water crossings greater than 100 feet in length
 - In locations determined by the integrity management preventive and mitigative measure process

RMV Spacing Requirements

- **Class location change:** Replace 2 or more miles of pipe within a 5-miles section due to class location change
 - Required to install or otherwise modify existing valves as necessary to comply with the valve spacing requirements and rupture mitigation requirements
 - Project must include replacement or installation of valve
- Replace between 1,000 feet and 2 miles - either install RMVs, or they may automate existing valves that comply with valve spacing
- Must be installed within 24 months of the class location change

RMV Installation Requirements

- **Laterals**

- Laterals may have RMVs away from tie in point as long as total lateral volume upstream of RMV doesn't contribute more than 5% of total segment gas volume
 - Cumulative of gas volume across all laterals
- 12-inch and less pipelines may use check valves as alternative equivalent technology
 - Must notify PHMSA on a project-by-project basis in accordance with 192.18 and 192.179
 - Must be maintained, inspected, operated, and remediated in accordance with 192.745

RMV Site Design Considerations

- **Location Selection**
 - Spacing
 - Power
 - Communications
 - Accessibility
 - Security
 - Land Use



RMV Site Design Considerations

- **Engineering Considerations**
 - Operating Pressure
 - Pipeline Depth
 - Electrical Hazardous Classification Areas
 - Grading and Stormwater Management
 - Site Lighting
 - Vehicle Parking



Rupture Detection Equipment

- Required as part of the Valves Rule
- Achieved through installation of dedicated equipment or with transmitters and alarms
 - Monitor for abrupt increase in flow through a meter or sudden decrease in pressure in a line segment
 - Necessary to account for downstream load profiles to prevent false alarms



Courtesy Cowan Dynamics

Actuated Valves

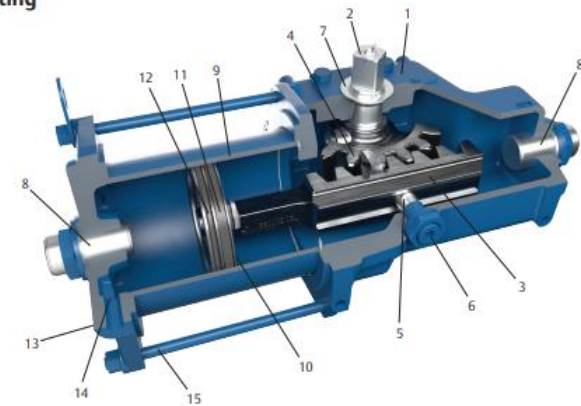
- Powered by:
 - Hydraulic Pressure
 - Pneumatic Pressure
 - Electric Current
- Can be used in either rotary (ball valve) or linear (gate valve) operations
- Controllers receive pneumatic or electric inputs and operate actuators



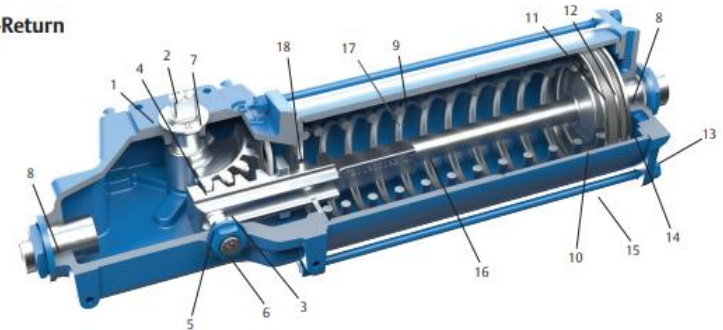
Actuated Valves

- Two major types of actuators
 - Double Acting
 - Has air or liquid supplied to both sides of piston. Uses pneumatic or hydraulic pressure to both open and close valve
 - Spring Return
 - Has air or liquid supplied to one side of piston and spring on opposite. Uses pneumatic or hydraulic pressure to either open or close valve; spring affects opposite motion

RPD - Double-Acting



RPS - Spring-Return



Courtesy Biffi Actuators

Actuated Valves

- Pneumatic Actuators
 - Use compressed gas to generate operating energy
 - Quick response
 - Not ideal for high pressure service due to gas compressibility
- Hydraulic Actuators
 - Use liquid to apply pressure to actuator's mechanical components
 - Able to exert large amount of force due to liquid incompressibility but limited in acceleration and speed
 - Available in spring return and double-acting designs

Actuated Valves

- Direct Gas Actuators
 - Utilize high pressure natural gas or nitrogen to achieve on-off control
 - Common in natural gas transmission applications
- Gas-Over-Oil
 - Use high pressure gas suspended above a hydraulic fluid to provide operating energy



Gas over Oil Actuator

Summary

- New PHMSA “Valve” rule:
 - Requires Rupture Mitigation Valves and Leak Detection equipment be installed
 - Updates spacing requirements for RMVs
 - Establishes minimum rupture identification requirements

Summary

- RMV Locations and Actuators
 - Multiple considerations when establishing RMV site and selecting equipment
 - Actuated valves currently provide most effective compliance with new requirements
 - Leak detection and valve status reporting critical to rule compliance

Summary

- Rupture Detection Equipment
 - Monitor for sudden changes in flow or pressure
 - Either dedicated equipment or monitored transmitters
- Actuators
 - Multiple types of actuators and controllers
 - Choose the correct specifications for your application

Kimley»Horn Oil and Gas Services



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Auxiliary System Design and Modifications



Horsepower Modifications and Upgrades



Structure and Foundation Design



Site Development



Environmental Compliance



Trenchless Technology



Utility Conflict Resolution



Public Improvements



Pipeline Design (Transmission and Distribution)



Metering & Regulating (M&R) Station Design



Permitting Services



Pipeline Integrity Design



Base Mapping and GIS Services



Electrical/SCADA Design



Main Replacement and Upgrades



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Station Maintenance and Upgrades



Compressor Station Design



Pig Receiving/Launching Station Design



DOT Coordination



Routing Studies and Assessments



THANK YOU!

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