PIPELINE VALVES

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Topics

- Automatic Shut-off Valves (ASVs)
- Remote Control Valves (RCVs)

PIPELINE VALVES (manual, automatic, remote controlled)

Mainline block valves are required by federal regulations. The required spacing for valves varies with the class location with closer spacing being required in higher class locations. The question to be discussed herein is: When and where should automatically or remotely operated valves be used in place of manually operated valves?

REFERENCE

AGA White Paper

Automatic Shut-off Valves (ASV)

And

Remote Control Valves (RCV)

On Natural Gas Transmission Pipelines

March 25, 2011

FEDERAL VALVE SPACING REQUIREMENTS
49 CFR 192.179

- Each point on the pipeline must be within a certain distance of a valve depending on the class location.
- Class 4 2.5 miles
- Class 3 4 miles
- Class 2 7.5 miles
- Class 1 10 miles

MANUALLY-OPERATED VALVES

A manually-operated valve must be closed by pipeline operating personnel who must be present at the valve site even though most large valves have motorized equipment for closing the valve. The time required to close a valve includes the time it takes to determine that closure is needed, the time for the personnel to arrive on site, and the time it takes to actually operate the valve.

AUTOMATIC SHUT-OFF VALVES (ASVs)

ASVs are designed to close automatically based on pressure and flow data from nearby sensors. The threshold for closure is set to correspond to changes in pressure or flow that would accompany a pipeline rupture. No human intervention is required. The valve will close if and when the pressure change or flow rate increase determined at the sensors crosses the pre-set threshold.

REMOTE CONTROL VALVES (RCV)

RCVs are valves that can be closed by a signal from a remote location such as the operations control center of a pipeline company. The decision to close a valve is made by a person who interprets pressure and flow data and determines that a pipeline rupture has occurred. The time it takes to close the valve may include time that is spent verifying that a rupture has actually occurred.

LIMITATIONS ON ASVs

An ASV could close based on pressure and flow changes that are caused by sudden increases in demand. A closure of this type could interrupt critical customers for no valid reason.

LIMITATIONS ON RCVs

The person in the control center will make a decision to close the valve only when it has been verified that a rupture has actually occurred. The time to do this could include sending personnel to verify that a rupture has occurred.

HOW CRITICAL IS CLOSURE TIME?

It has been found that most injuries and fatalities associated with gas pipeline ruptures occur within the first 30 seconds following the release of gas. A review of 13 NTSB incidents has shown that the consequences of the incidents would not have changed if the valves had closed immediately after the release of gas. Nevertheless, there is an incentive to cut off the flow of gas as soon as possible in an HCA.

QUESTIONS?