CAN EXCESS FLOW VALVES **SAVE YOUR LIFE?**

THE CONTROVERSY OVER COST, EFFECTIVENESS

Excavators have the biggest stake in excess flow valves. You are the ones who are in the line of fire if a service line is severed.

Your backhoe bucket is just getting a good bite, when you hear a loud pop. Blowing dirt fills the air, and the whistling noise is unmistakable—you've just severed a high pressure natural gas service line near a building. You must make a quick decision: jump and run, or make a more graceful exit, taking the backhoe with you.

ENTER THE EXCESS FLOW VALVE

For about 30 years, a little device has been available that acts like a fuse for natural gas lines. In the scene above, it would have snapped shut as the first squirt of gas left the pipe, stopping the dangerous leak. The device is called an excess flow valve (EFV).

The excess flow valve is on the "Most Wanted List" of safety improvements that hangs in the reception area of the National Transportation Safety Board headquarters in Washington, D.C. What a wonderful device!

THE CONTROVERSY

So why, in 1993, did the gas committee of the National Association of Regulatory Utility Commissioners (the state Public Utility Commissions) and the National Association of Pipeline Safety Representatives (state Offices of Pipeline Safety) recommend making their use optional, but not mandatory? Why did the National Propane Gas Association put out a bulletin warning its members that, although EFVs are required on LP storage tanks, members should not put complete reliance on these devices for preventing all accidents?

Those groups felt that the EFVs would reduce injury and damage only in very limited situations, and that there would be many more situations where the leak would be big enough to cause an explosion, but not big enough to trip the valve.

THE OFFICE OF PIPELINE SAFETY CONDUCTED TWO BENEFIT/COST STUDIES. ONE FOUND THAT THE BENEFITS OF USING EXCESS FLOW VALVES DID OUTWEIGH THE COST, AND THE OTHER DID NOT.

In addition, the rulemaking did not contain any performance standards, but did contain design features and testing requirements that most commentors found objectionable. The Federal Office of Pipeline Safety (OPS) responded with a 1996 rulemaking that did set basic performance standards. At press time, another rulemaking was scheduled to be finalized that would require gas system operators to notify their customers in writing regarding the availability of EFVs meeting DOT-prescribed performance standards, the safety benefits of these valves, and the cost of installation. If a customer requests

(continued)

installation, the notice proposes that an operator will be required to install the EFV if the customer pays all costs.

POTENTIAL PROBLEMS

The two largest natural gas distributors in Minnesota installed thousands of the devices in the late 1960s, and had between 15 and 25 percent of them stick shut in subzero weather. Irate customers without heat called to complain. The cost of digging through frozen ground to cut the stuck valves out of the line caused a lack of enthusiasm for the EFVs. Although the design of those valves is considered outdated, they are still on the market. Companies in warmer areas, using valves from different manufacturers, had very few false closures. The devices did close as designed when service lines were cut, and the companies have been happy to install more.

OPS DECLINES

The OPS conducted two cost/benefit studies. One found that the benefits of using EFVs did outweigh the cost, and the other did not. In a controversial decision, OPS declined to mandate their use.

At that time, a search of Minnesota accident records turned up only one reported incident where an EFV would definitely have helped. Almost every explosion involved gas leaks in a building or slow leaks outside that would have been too small to trip an EFV. Service line cuts were an unknown, because simply cutting one with a backhoe is not reportable in most states, unless it results in ignition, serious injury, death, or property damage more than $5,000.

But the Minnesota Office of Pipeline Safety was very interested in EFV performance. It wanted to know what type of incidents could be prevented or mitigated by using EFVs. Experiments were run in cooperation with several gas companies. These experiments added some information about conditions under which the valves would trip when a line was severed, and when a leak would not trip the EFV.

VALVES UP TO THE TEST

Tests showed that when a service line under normal pressure (15–60 psi) and of average length (75 feet) was open to the atmosphere, the EFV would trip and cut off the gas flow exactly as promised. With 100 feet of service line attached, one of the valves did not trip until the inlet pressure was increased to 16.5 psi—meaning it would not trip at 10 psi, the "lowest normal" natural gas pressure. But that low pressure usually occurs in the dead of winter, when excavation damage is not a problem.

Another question is whether EFVs will shut in the extremely dangerous situation where a line is snagged, but breaks next to the building. This often gets enough gas into the building to cause an explosion. In an attempt to see how big a hole it would take to trip the valve, the outlet of the line was plugged. Bigger and bigger holes were drilled until the valve tripped. These were not very conclusive. If anyone has done testing of EFVs where the break is under pavement, they have not shared their results very widely.

Another concern was that one brand of the EFVs tested offered a lot of resistance to gas flow. It took 16.5 psi inlet pressure to get as much gas through the line as 10 psi would deliver without the valve. If that EFV were placed in a service line that was running at capacity under low inlet pressure—such as during a cold snap—the extra resistance could starve gas appliances. That is dangerous. The flow resistance of the EFV is another design factor to take into account when sizing the service line.

THE EXCESS FLOW VALVE IS ON THE THE NATIONAL TRANSPORTATION SAFETY BOARD'S "MOST WANTED LIST" OF SAFETY IMPROVEMENTS—SO WHY ISN'T ITS USE MANDATORY?

OFFICIAL SUPPORT

Charles Batten, P.E., the chief pipeline accident investigator for the National Transportation Safety Board, has tried for years to get EFVs into more common use. He is quick to agree that use of EFVs will not stop all fires and explosions. But he is adamant that they will stop enough catastrophes to justify their use.

After the OPS declined to require the use of excess flow valves, the NTSB sent letters to all state governors, asking that they consider requiring EFVs in their states. Responses to those letters showed that the governors lacked thorough understanding of the situation. Subsequently, the NTSB has produced a document that addresses many misperceptions about excess flow valves and summarizes the safety board's findings.

—By Walt Kelly, *an underground facility damage prevention consultant based in Winona, Minn.*

ABOUT THE AUTHOR

Walt Kelly works with AGC chapters and members on damage prevention issues. He is a past director of Pipeline Safety in Minnesota. He testified on behalf of the National Association of Pipeline Safety Representatives at the 1993 DOT hearing on excess flow valves.

As a consultant, he helped establish the U.S. Department of Transportation's national campaign to promote safe excavation in 1994 and 1995, and has worked with states to upgrade their legislation.

Kelly chairs the One-Call Systems International Center Certification Committee, writes for a number of publications, and is a principal in the Center for Subsurface Strategic Action.

FOR MORE INFORMATION

Contact Walt Kelly at (507) 454-5147 or wkelly@luminet.net.