

After the blasts, a cloud of questions

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Explosions from gas leaks are very rare, but a recent spate of terrifying incidents has led some to wonder if the state's 21,000-mile underground network of pipes is as safe as it should be

By Keith O'Brien, Globe Staff | March 15, 2009

The explosion, coming as neighbors were sipping their morning coffee, ripped through the house in Gloucester, tearing off the roof, peeling back the walls, and sprinkling glass across the neighborhood like rain.

Red flames licked the sky. One man was seriously injured and nearby residents, shocked by the fury of the Jan. 25 blast, weren't exactly surprised by the cause. For weeks before Wayne Sargent's home exploded, they had been complaining about the smell of natural gas wafting down the street.

Gas explosions, like this one, are relatively rare, and injuries and deaths are rarer. But they happen, and lately they have been happening with bizarre and alarming frequency as three Massachusetts homes, and one in Manchester, N.H., have exploded since December.

These blasts, killing three and injuring one, have served as a reminder of the dangers associated with the massive underground pipe system tunneling beneath streets and delivering a flammable product to nearly 1.5 million customers in the state. The system's 21,000 miles of gas main would be nearly enough to travel around the circumference of the Earth. More than a third of the system relies on old, antiquated pipes.

A Globe review of Massachusetts gas explosions, dating to 2004, underscores what makes it such a hard system to defend against catastrophic accidents. Leaks are common - thousands each year require repairs - and the causes are many and mostly unpredictable: Old, corroded pipes, errant backhoe operators digging in the wrong spot, or human error have factored into incidents in the last five years.

There's no evidence that aging infrastructure, shoddy maintenance, or poor oversight has played a direct role in the recent rash of explosions. They remain under investigation. But the blasts and annual death tolls raise the question: Are these terrifying incidents just part of the cost of a gas distribution system? Could utilities and state regulators be doing more?

"Our responsibility is to figure out what's leading to these explosions," said Paul Hibbard, chairman of the state Department of Public Utilities, which has eight inspectors to oversee the state's entire pipeline system. "Does it indicate a trend? Should something change as a result? Our obligation is to answer these questions and provide these answers to the public."

After the most recent incidents, gas companies say there is no cause for panic over safety. According to federal guidelines, Massachusetts, with eight state inspectors, has twice as many than required. The most recent federal audit of the department's pipeline safety team gave the state a nearly perfect score. And in many cases, state regulations are often more stringent than federal standards, requiring thicker walls on some pipes and greater volumes of odor-inducing chemicals in the gas, meaning residents typically smell it long before it is a threat.

The state's largest gas companies - National Grid, Bay State Gas Co., and NStar - all report significant declines in leak rates in recent years. The majority of leaks are minor, even harmless, according to state regulators. And despite concerns about aging pipes, gas company executives say that many are as reliable as ever. However, gas industry executives cannot promise a flawless operation given the volatile nature of the resource being delivered.

"Our goal is zero, absolutely zero incidents," said Nick Stavropoulos, executive vice president of US gas distribution for National Grid. But Stavropoulos can't guarantee it. "All we can do is guarantee that we're doing everything we can within our power to assure us and the public that our system is safe - as safe as it can be."

Gas leaks are far more common than most people know or than some gas companies like to discuss. In 2007, the last year with complete data, gas companies in Massachusetts made more than 4,000 leak repairs on gas mains, according to annual reports filed with the state. The number one cause, aside from the category "other," was corrosion.

But the majority of leaks are what regulators call "grade 3" leaks - problems that must be monitored, yet pose no threat. They are essentially the equivalent of a "fender-bender," said Chris Bourne, the state director of the pipeline engineering and safety. What he and others worry about, he said, are the equivalent of head-on collisions: grade 1 leaks that can lead to fiery explosions.

Statistically, these incidents are rare. There are roughly 1.1 million miles of natural gas mains crisscrossing the country, yet on average in the last two decades there are fewer than 90 incidents per year, killing just more than 15 people annually, according to federal data. And such incidents are even less common in Massachusetts, where according to federal data there were 20 incidents and six deaths between 1998 and 2008. But the recent house explosions have prompted state officials to review the 12 incidents recorded since 2004.

At the outset, Hibbard explained, there's no indication that state oversight is a problem. And he said he doesn't have any indication that the recent explosions are related to aging pipes. But there's a reason why the state tracks the number of old bare steel and cast-iron pipes in the ground and requires gas companies to have plans to phase them out.

"It'd be nice to go through and rip out all the old pipes and put in new pipes," said Charles Batten, the former chief of pipeline accident investigations for the National Transportation Safety Board. "But that's not going to happen."

Cast iron pipes, first used more than 100 years ago, can corrode and leak. Federal regulations enacted in 1970 stopped gas companies from installing them, and around the same time gas companies started moving away from bare steel pipes as well. In their place came plastic pipes, which are more pliable in shifting soil, and "cathodically protected" coated steel pipes that carry a slight electrical charge to help them resist corrosion.

Such upgrades have helped improve safety, regulators say, and phasing out older pipes has helped as well.

Bay State Gas Co. launched a program four years ago, said spokeswoman Sheila Doiron, to replace 570 miles of old steel pipe by 2020. National Grid expects to replace up to 50 miles this year.

And NStar has been replacing about 16 miles of old pipe per year recently, even though many old pipes are aging just fine, according to Thomas Hart, the company's director of gas engineering.

"There are some large-diameter cast iron pipes that are still very thick and still performing very well," said Hart. "And there are studies that show it will still be performing well for decades."

Still, with 7,900 miles of antiquated pipes in the ground, questions about the infrastructure will linger, and Alan Cantor, for one, believes they are questions worth asking.

Cantor, a Boston lawyer, has represented several victims of gas explosions in recent years, including Heath and Tara Carey, whose two daughters, ages 4 and 5, died in a 2002 Hopkinton blast.

To this day, NStar, the gas provider in the case, denies any wrongdoing or that aging pipes were a factor. But in 2003, the state issued a notice of "probable violation," saying the gas company failed to monitor the home's steel service line for corrosion in the five years predating the incident.

The family sued and NStar settled for \$17.2 million. Cantor believes the age of the pipe - it was about 30

years old, he said - may have played a role in the malfunction.

But even if it didn't, what happened is still disturbing, he said. A house exploded and it shouldn't have.

"It's troubling," Cantor said, "troubling because of the increasing age of the system and the increasing frequency of the explosions we're seeing. As you can see, anytime there's a breach of the system involving high-pressure gas, it's a tragedy waiting to happen. I'm concerned and I think most people should be concerned."

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