



The remains of an office building explosion in Jefferson City in 1988.

DAMAGE CONTROL

Series of natural gas explosions in 1988 led to tougher pipeline inspection standards by The Missouri Public Service Commission

“That dramatic explosion in our state capital on October 30, 1988, marked the beginning of a winter of crisis in natural gas safety in Missouri.”

PSC Chairman William D. Steinmeier in an August 1, 1991, article in *Public Utilities Fortnightly*.

By Dale Johansen

On that chilly early morning, the reality of the dangers of natural gas distribution systems – the safety of which is routinely taken for granted – hit hard in our state capital. At about 5:30 a.m., a leak from a fractured cast iron natural gas main ignited in an office building on the 400 block of Jefferson Street, turning that building into smoldering rubble. Adjacent apartment buildings were also severely damaged and were ultimately razed. Fortunately, and perhaps miraculously, no fatalities resulted from this accident, but there were 11 injuries.

This accident in Jefferson City marked the beginning of a winter where several natural gas accidents occurred in Missouri. On the day after Thanksgiving, a house blew up in the Hickman Mills area in Kansas City, killing a two-year-old boy and seriously burning his

seven-year-old brother. The source of the explosion was a natural gas line fracture in the threads of a joint in a bare steel, customer-owned service line that was not protected against corrosion. A week later, again in Kansas City, natural gas leaking from a cast iron main was ignited by the retained heat from a parked car's catalytic converter, engulfing the car in flames.

In January 1989, a Fulton home exploded and burned, killing a young boy and his uncle. The source of the natural gas was a corrosion hole in a bare steel, customer-owned service line that was not protected against corrosion.

While the natural gas accidents in Jefferson City and Fulton brought attention and concern about pipeline safety close to home, public concern in the metropolitan Kansas City area actually started in September 1987, when several natural gas accidents occurred on both sides of the Missouri-Kansas border. Concerns were further heightened by the above-noted accidents and reached a new level when on February 10, 1989, a natural gas explosion in Oak Grove resulted in the death of an elderly retired couple in their home.

These incidents made it clear to the Commission and the Commission's pipeline safety staff that additional attention needed to be paid to cast iron and steel mains, service

lines and yard lines that were not protected against corrosion when installed. In addition, these accidents resulted in unprecedented actions by the Commission, including the promulgation of an emergency rule requiring all natural gas companies in Missouri to conduct emergency leak surveys over all steel service lines and yard lines not protected against corrosion, and to make immediate and necessary repairs. During the 1989 legislative session, House Bill 938 was passed giving the Public Service Commission the authority to enter certain types of emergency orders with regard to pipeline safety matters and also provided the Commission with safety jurisdiction over the municipally-owned natural gas systems in Missouri.

WHERE WE ARE

During 1989, Commission members, the Commission's pipeline safety staff, the Commission-regulated natural gas operators and other interested stakeholders worked on far-reaching modifications to the Missouri natural gas pipeline safety regulations. Prior to the catastrophic events of 1988-89, the Commission had relied for years on its adoption and enforcement of the pipeline safety regulations promulgated by the federal Department of Transportation's Office of Pipeline Safety.



Charred rubble from a natural gas explosion in Oak Grove in 1989.

Firemen survey the scene of a natural gas explosion in Jefferson City in 1988.



“In promulgating these new rules, it was our goal”, Chairman Steinmeier wrote in the *Public Utilities Fortnightly* article, “to achieve the highest standards of safety while assuring the cost-effectiveness of proposed solutions. We were not at all interested in ordering expensive actions by gas systems to create the appearance of solving a problem if those expenditures would not actually provide a commensurate improvement in public safety.”

The modifications to Missouri’s natural gas pipeline safety regulations, which became effective December 15, 1989, made Missouri’s regulations more stringent than the comparable federal regulations in numerous respects, and arguably made Missouri’s pipeline safety regulations some of the most stringent in the nation.

For more than 20 years since then, investor-owned and municipally-owned natural gas systems have been required to accelerate leak surveys and prioritize the elimination of various types of piping that have the greatest potential for hazard. As detailed in federal pipeline safety annual reports, these replacement programs have resulted in the following:

- * The elimination of almost 1,100 miles of cast iron mains.

- * The elimination (replacement or corrosion protection) of almost 1,100 miles of steel mains that were not protected against corrosion when installed.

- * The elimination of almost 300,000 steel service lines and yard lines that were not protected against corrosion when installed.

WHO WE ARE, WHO WE REGULATE AND WHAT WE DO

The Commission’s natural gas pipeline safety program is run under a cooperative agreement with the federal Pipeline and Hazardous Materials Safety Administration (PHMSA), an agency of the U.S. Department of Transportation.

The Commission has jurisdiction over all intrastate gas pipeline operators in Missouri. These operators include four intrastate transmission pipelines, seven investor-owned natural gas distribution utilities (six of which also have intrastate transmission pipelines and all of which have multiple operating districts/inspection units), 42 municipally-owned natural gas distribution systems, one gas distribution system owned and operated by a private company on a Department of Defense facility at Fort Leonard Wood, and three pipeline systems that supply landfill gas directly to customers. The Public Service Commission does not have jurisdiction over interstate natural gas transmission pipelines or hazardous liquid pipelines. For safety purposes, these pipelines are regulated by PHMSA.

In total, the intrastate gas pipeline operators have 105 “inspection units” for purposes of the Gas Safety program’s comprehensive annual inspection program, and include 26,682 miles of distribution main, 693 miles of transmission lines and more than 1.5 million service lines.

The Gas Safety/Engineering Section (Gas Safety Section) of the Utility Operations Division’s Energy Department is responsible for the Commission’s gas pipeline program. The Gas Safety Section consists of eight inspectors and a program manager.

Gas Safety Staff members are primarily involved in an on-going field inspection program consisting of Missouri-regulated natural gas system operators. In addition, staff performs operation and maintenance compliance inspections, follow-up inspections, construction inspections and gas incident investigations. Staff also conducts safety-related consumer complaint investigations on an “as needed” basis.

So far in calendar year 2010, Gas Safety Staff has conducted approximately 60 comprehensive inspections, five follow-up inspections, eight construction inspections and eight leak survey/investigation inspections. These inspections have resulted in the Staff being out of the office approximately 550 days, with about 1/3 of those days being spent “in the field” physically inspecting pipeline facilities, conducting construction inspections and verifying leak surveys and leak investigations.

Gas Safety staff reports probable violations it finds of Commission pipeline safety rules to the system operators,

Stronger Rules by the PSC

Significant modifications to the PSC’s natural gas pipeline safety rules adopted in December of 1989 included:

- * Requiring operators to address specific work activities in their operation & maintenance (O&M Plan) plans, and requiring operator personnel to review and update the plans on a regular schedule.

- * Requiring the training of operation/maintenance/emergency response personnel, and requiring successful demonstration that all such personnel possess the knowledge and skills needed to perform their assigned work activities, and requiring that all such personnel review the O&M plan on a regular schedule.

- * Requiring leak detection surveys be conducted on a more frequent basis with the surveys to be conducted with leak detection instruments.

- * Prohibiting the installation of customer-owned service lines and yard lines.

- * Requiring tests/checks of customer-owned facilities, such as house piping and gas-fired appliances, before service can be initiated.

- * Requiring all newly installed service regulators have full over-pressure protection.

- * Increasing the requirements for excavator notification to prevent damage to pipelines.

- * Increasing the requirements for public education to enhance the recognition of and response to natural gas leaks.

- * Systematic replacement programs and more frequent leak surveys pertaining to steel service lines and yard lines that were not protected against corrosion when installed.

- * Systematic replacement and/or corrosion protection programs (that must be approved by the Commission) for steel mains that were not protected against corrosion when installed.

- * Systematic replacement programs (that must be approved by the Commission) for cast iron mains.

who are then responsible for implementing appropriate corrective actions. Most enforcement is accomplished on an “informal” basis between the Staff and the operators. However, if an operator does not take sufficient corrective action in a reasonable time period, the Staff may file a formal complaint against the operator with the Commission

to resolve the matter. Such complaints generally include a request for a Commission order directing the operator to comply with the rule in question, as well as a request for authority to seek civil penalties from the operator in an appropriate circuit court.