

CITY UTILITIES

Bringing Power Home.

August 16, 2004

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AUG 17 2004

Dale Hardy Roberts, Secretary
Missouri Public Service Commission
Governor Office Building
200 Madison Street
Jefferson City, MO 65102-0360

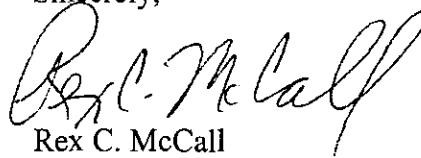
Missouri Public
Service Commission

Re: In the Matter of City Utilities of Springfield, Missouri
Case No. GS-2004-0257

Dear Mr. Roberts:

Please find for filing in the above case an original and eight copies of City Utilities of Springfield's Response to PSC Staff Recommendations filed on June 16, 2004.

Sincerely,



Rex C. McCall
Assistant Legal Counsel

Enclosure

c: Dana K. Joyce
Missouri Office of the Public Counsel

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AUG 17 2004

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

Missouri Public
Service Commission

In the Matter of an Investigation into)
City Utilities of Springfield Plastic)
Pipe Failures and the Adequacy of its) Case No. GS-2004-0257
Leak Survey Procedures, Installation)
Procedures and Replacement Criteria)

**CITY UTILITIES OF SPRINGFIELD'S RESPONSE TO
PSC STAFF RECOMMENDATIONS FILED JUNE 16, 2004**

Comes now City Utilities of Springfield, Missouri ("City Utilities"), a municipally-owned utility, and makes the following responses to the recommendations of the Public Service Commission ("PSC") Staff filed with the Commission on June 16, 2004:

General Comments and Prior Actions

On December 30, 2003, the Missouri Public Service Commission issued its Order Establishing Case in Case No. GS-2004-0257. In the Order, the Commission established Case No. GS-2004-0257 for the purpose of conducting an investigation into City Utilities of Springfield's Plastic Pipe Failures and the adequacy of its leak survey procedures, installation procedures and replacement criteria.

On June 16, 2004, the PSC Staff filed a report on the status of the investigation and made recommendations to the Commission. The PSC Staff recommended that the Commission order City Utilities to implement the items highlighted in the report and to file a response to the Staff's report within sixty (60) days.

Absent any such order to date, City Utilities does hereby voluntarily respond to the PSC Staff report.

City Utilities and the PSC Staff have communicated frequently during the investigation process and will continue to work together to ensure the public's safety.

For many years prior to the PSC Staff's investigation, City Utilities has proactively identified leaks due to various causes, including rock impingement. It should be noted there is no pattern of incidents which are related to leaks in plastic piping due to rock impingement. City Utilities takes seriously all failures and has taken steps to track and mitigate these types of failures. More formal procedures specific to leaks due to localized stress, such as rock impingement, began in 1998.

The use of plastic piping to transport natural gas has grown steadily over the years because it is economic, lightweight, highly corrosive-resistant, and easy to install. The American Gas Association (AGA) estimated that by the end of 1998, there were nationally over 550,000 miles of plastic pipe in service for gas distribution.

On April 23, 1998, the National Transportation Safety Board (NTSB) issued a Special Investigation Report entitled, "Brittle-like Cracking in Plastic Pipe for Gas Service." This report described how plastic piping installed in natural gas distribution systems through the early 1980's, may become vulnerable to brittle-like cracking when subjected to localized stress intensification, such as at a point of rock impingement. The NTSB report indicated that brittle-like cracking referred to a "part through crack initiation" that resulted in a tight, slit-like opening, rather than a ductile failure where a significant yield of the pipe occurred. Those terms referred to the characteristic of the leak opening only, but did not indicate that the pipe was easily cracked or broken.

In response to the NTSB report, City Utilities instituted more formal procedures to track plastic pipe failures using the AGA's "Plastic Pipe Failure Report" form. In April of 2000, and in accordance with the Office of Pipeline Safety's Advisory Bulletin ADB-99-02, City Utilities prepared a report reviewing the leak history of its plastic piping. At that time, City Utilities

identified 640 miles of plastic piping gas mains, containing 275 miles of piping which was installed prior to 1982. The data did not point to any one year of manufactured pipe for which there had been an abnormally high incidence of failure. The report divided all of City Utilities plastic pipe that had been installed into segments. City Utilities then identified ten segments with the highest leak rates. City Utilities' leak investigation then surveyed the ten segments more often than the rest and scheduled them for replacement. The ten segments did not show any correlation of failure with any one year of manufacture of the plastic pipe.

In 2001, City Utilities developed written procedures for actions to be taken when a brittle-type failure (axial split) occurred and those procedures are currently performed when an axial split leak occurs. The procedures set forth that City Utilities will:

- ◆ Collect appropriate data regarding the failed pipe;
- ◆ Survey the piping installed under the same job order number as the failed main for leaks;
- ◆ Record the failure on the Plastic Pipe Failure Master List;
- ◆ If necessary, send the failed pipe to a laboratory for testing;
- ◆ Plot the repaired leak location on a map; and
- ◆ Analyze the piping to determine the need for replacement.

While repairing the leaks and performing the evaluations detailed above, several mains were identified as being an even higher priority than those on the original list of ten gas main segments. The higher priority gas mains were scheduled for renewal and were replaced.

City Utilities gas main renewal plan also created a Plastic Pipe Failure Master List as the primary list of gas main renewals to be completed for plastic pipe replacement. The program for replacing the piping on this list is ongoing.

Additionally, in accordance with the PSC Staff's recommendations regarding the Frisco Building incident, City Utilities has implemented the following procedures:

- ◆ All underground leaks attributed to rock impingement on plastic service lines will result in the replacement of the entire service line from the main to the meter.
- ◆ Leaks attributed to rock impingement on plastic mains will be evaluated in accordance with the above procedures and tracked on the Plastic Pipe Failure Master List and scheduled for renewal. The renewals are detailed under the "Responses to PSC Staff Recommendations" set forth below.

City Utilities has also begun to conduct quarterly leak surveys in the designated downtown business district. These surveys will continue. City Utilities has also conducted an instrument leak survey of all pre-1982 plastic gas piping in the first half of 2004. During this survey, City Utilities treated all underground leaks on plastic piping as either a Class 1 or a Class 2 leak, giving them a higher priority than they may have otherwise had. City Utilities will continue to classify all underground leaks on all plastic piping (mains and services) as either Class 1 or Class 2.

City Utilities is working closely with the PSC Staff and will continue to do so in submitting and analyzing data regarding the plastic piping failures.

Responses to PSC Staff Recommendations

1. *Continue the current practice of voluntarily replacing all of the plastic mains that have been included within a list of rock impingement leaks. The details of the replacement priorities and amounts per year (number of miles a year to be replaced) will have to be worked out at a later date.*

City Utilities began tracking leaks due to rock impingement in 1998, and has since added some additional leak locations dating back to 1991, based upon information found during the investigation. These prior leak locations have been compiled into a

“Plastic Pipe Failure Master List.” Since that time, this list has been the primary source for performing Gas Main Renewals in the City Utilities Gas System.

The Plastic Pipe Failure Master List currently contains 97 locations where a leak occurred due to rock impingement, and was subsequently repaired. In 37 of the 97 locations, City Utilities replaced the piping that was installed under the same work order number for the main segment in question. At each prior leak location, City Utilities has reviewed its record to determine the length of pipe that was installed under the work order number for the main segment number in question. This method was chosen because it was felt that the length of pipe installed under the same work order number on a main segment would most likely have been installed using the same methods and in the same environmental conditions.

As discussed with the PSC Staff, these sections of pipe will be included in a replacement program. The remaining sections of pipe on the Plastic Pipe Failure Master List total 7.1 miles of piping yet to be replaced. After discussing time frames with the PSC Staff, City Utilities proposes replacing these sections over a three (3) year time from the date of this report.

Any new segment of pipe (as described above) where a failure due to rock impingement is discovered will be replaced within a minimum of three (3) years from the date of its discovery. Factors such as the number of leaks, operating pressure and environmental conditions shall be considered in the timing the replacement of the pipe.

2. *Regarding a separate list of plastic pipe leaks from 1983-2003, the Staff recommends that all plastic services that had a portion (partial replacement) of the service line replaced due to material failure, aged/worn component, natural causes, or other, be replaced from main to meter. The replacement priority must be based on leak/failure history, pipe diameter, pressure district, pipe loading conditions (under vent restrictive surfaces where vehicle traffic may cross),*

age of plastic pipe, etc. The specific priorities and replacement amount per year will also have to be determined at a later date.

The PSC Staff refers to a list of locations where a leak on a service line occurred and was repaired. Because the leak forms did not specifically indicate rock impingement as a leak cause, the leaks that occurred at these locations may have been related to rock impingement. City Utilities' current policy is to replace the gas service line from the main to meter if a leak due to rock impingement is found and verified.

There are 181 locations on the referenced list where only a portion of the service line where the leak occurred was replaced. City Utilities agrees to replace all of these services in their entirety from the main to the meter by December 31, 2005.

3. *Recommend that City Utilities review the current Plastic Pipe Failure Report and develop instructions and guidelines for filling out this Report to be used for field applications. The Staff also recommends that a section be added to the Report just for "rock impingement". A lot of different terminologies have been used in the past to describe plastic piping failures due to rock impingement. For instance, the primary cause of documented past leaks/failures on plastic piping typically included four different categories of "aged/worn component", "material failure", "natural causes", and "other". The leaks on this list were confirmed to be plastic pipe failures that involved rock impingement. Due to this inconsistency used in the field for describing leak causes, the Staff believes that another leak cause category should be added for the special cases where a rock was found to be in direct contact with the plastic wall of the pipe that subsequently caused a brittle-like failure. This leak cause category should be defined as "rock impingement". If some other type of foreign object is found lying against plastic piping that appears to have caused the failure, the object description could be included within a comment section beneath "rock impingement".*

The Plastic Pipe Failure Report used by City Utilities was the AGA's Plastic Pipe Failure Report from the 1994 AGA Plastic Pipe Manual for Gas Service. City Utilities will begin to use the more simplified version of this form from the 2001 AGA Plastic Pipe Manual for Gas Service. We have modified this form to include a specific category for "Rock Impingement" and a place for comments. City Utilities has also developed

written instructions to guide field employees in completing this form. The use of this form will be fully implemented by September 16, 2004.

4. *Once City Utilities has reviewed the Plastic Pipe Failure Report and has implemented the desired changes, training should be conducted for all field personnel that may be involved in leak repair. The training should emphasize that whenever a failure has occurred due to rock impingement, the primary leak cause must be recorded as "rock impingement" and the backfill conditions surrounding the pipe must also be documented within the Plastic Pipe Failure Report.*

City Utilities will conduct training regarding the proper way to complete this form for all affected employees. City Utilities will notify the PSC Staff of the time and date of this training. This training will be completed by September 16, 2004.

5. *The Staff recommends that City Utilities develop an on-going field monitoring program to identify other possible areas that may be susceptible to rock impingement. In particular, whenever a section of plastic main or service line is exposed for any reason other than an underground leak (repairs, making service taps, exposed excavations, scheduled pipeline relocation projects, etc.) the backfill conditions surrounding the plastic piping should be evaluated and documented. If the backfill condition surrounding the plastic piping contains rocks, or other debris, in direct contact with the piping that could potentially cause a brittle-like failure, the bedding surrounding the plastic piping in that area should be replaced with AG limestone, sand, or other suitable material that is free from rocks. The excavation in the open trench should also be extended in both directions along the main or service line until suitable backfill conditions are encountered.*

The Staff believes that an Exposed Pipeline Condition Report could be revised/edited to accommodate the above information or a new form (e.g. Backfill Condition Report) could be developed. The information acquired from either the Exposed Pipeline Condition Report or Backfill Condition Report could then be entered into a separate database file for tracking these observations.

City Utilities has developed a Plastic Pipe Exposed Pipeline Condition Report form to document the backfill conditions surrounding the piping. City Utilities has also developed instructions to guide field employees in completing this form each time a plastic pipe (main or service) is exposed. The use of this form will be fully implemented by September 16, 2004.

If it is discovered that the backfill conditions surrounding the plastic piping contains rocks or other debris that could be detrimental to the piping, the excavation will be extended in both directions until suitable conditions are found.

If extending the excavation in both directions is impractical, an engineering evaluation will be performed to determine the appropriate remedial action.

6. *"The Staff recommends that AG limestone or sand free of rocks be used as bedding material around the plastic piping for all new plastic service line installation that involve open trenches. This would include any new installations for business, commercial, and residential areas, whenever the open trench style of installation is used. The amount of bedding below, above, and around the plastic pipe will vary depending upon trench conditions encountered and the amount of rock in the spoil that will be used as final backfill material. At a minimum, 4 to 6 inches of bedding material is recommended."*

City Utilities has modified its Gas Construction Standards to require a minimum of 4 to 6 inches of bedding material around all newly installed plastic gas service lines that involve open trenches. This bedding material will typically be limestone sand. However, other suitable materials or alternate protection methods such as rock shield sleeves may be evaluated and used in the future.

7. *The Staff recommends that City Utilities continue their current practice of performing quarterly leak surveys of the downtown business areas. Also, for plastic service lines that are beneath vent restrictive surfaces, the Staff recommends a complete FI Survey over the service line and that a gas leak check be made near the service riser. If no opening (e.g. 12" x 12" opening) exists in the asphalt or pavement near the service riser, a CGI reading performed in conjunction with a bar hole placed near the riser will need to be made.*

City Utilities will continue its current practice of performing quarterly leak surveys of the downtown business areas.

City Utilities will perform an annual leak survey on the following items: the remaining segments of pipe contained on the "Plastic Pipe Failure Master List," the services that were only partially replaced (until such time as they are renewed), and the

segments where gas main leaks were repaired but were not verified to be due to rock impingement.

As discussed with the Staff, during City Utilities routine FI leak surveys as required by the Missouri Pipeline Safety Regulations, City Utilities will perform a bar hole reading using a Combustible Gas Indicator (CGI) near the service riser where no opening exists around the riser for services located under vent restrictive surfaces. City Utilities Operations and Maintenance Manual will be changed to reflect these procedures.

8. *In reference to a list of plastic pipe leaks containing underground leaks from 1983-2004 in which the primary leak cause involved "aged/worn component", "material failure", "natural causes", or "other", the Staff recommends conducting spot-checks of these plastic mains to determine the pipe bedding condition near the pipe wall. The spot checks should be made in two locations for each main approximately 20 feet (both directions) from the past repair area. If rocks or other debris are found against the pipe wall, the plastic piping associated with that particular Job Order Number must be systematically replaced.*

The list of plastic pipe leaks from 1983-2004, contains approximately 255 leaks on different plastic main segments and the Staff recommends that at least 20% or 51 of these leak locations be spot-checked annually for proper bedding material that is free from rocks or other materials that would make the piping susceptible to brittle-like failures.

Of the 255 prior leak locations included on the PSC Staff's list, 56 locations were duplicated on the Plastic Pipe Failure Master List and either have been or will be replaced. City Utilities will perform the spot checks referenced above on the remaining 199 locations and will document the results. After additional discussions with the PSC Staff, we propose that 33% (or 67 locations) be checked each year until all locations are checked. Any locations that are found to have rocks or other debris against the pipe wall will be added to the list of plastic piping to be replaced as discussed under Recommendation 1, above.

Reporting Requirements

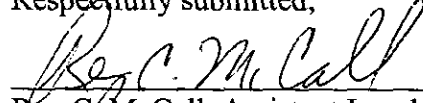
City Utilities will provide semi-annual reports to the PSC Staff containing, at a minimum, the following items until such time as mutually agreed upon between the PSC Staff and City Utilities that such reports are no longer required.

- ◆ Results of the quarterly business district leak survey.
- ◆ Results of leak surveys of plastic piping beneath vent restrictive surfaces.
- ◆ Results of annual leak surveys.
- ◆ The status of plastic service line and main replacements made to date.
- ◆ Schedules and records of training for personnel who are involved in documenting leak repairs of plastic pipe due to rock impingement, determining backfill conditions and who are responsible for determining the extent of plastic piping that is in an environment conducive to rock impingement.

City Utilities remains proud of the safety of its natural gas distribution system. City Utilities will continue to cooperate with the PSC on the continuation of this study to determine if there are other opportunities to enhance safety for City Utilities' customers and natural gas customers across the state.

WHEREFORE, City Utilities of Springfield, Missouri respectfully requests the Commission to adopt the recommendations of the PSC Staff, with the clarifications stated above.

Respectfully submitted,




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ATTORNEY FOR CITY UTILITIES
OF SPRINGFIELD, MISSOURI

CERTIFICATE OF SERVICE

I certify that I served the foregoing document on the Missouri Office of the Public Counsel, Governor Office Bldg., Suite 650, P.O. Box 7800, Jefferson City, MO 65102, by overnight mail, and Dana K. Joyce, General Counsel for the Staff of the Public Service Commission, P.O. Box 360, Jefferson City, MO 65102, by mailing a copy of the same in the U.S. Post Office, first-class mail, postage prepaid on August 16, 2004.


Rex C. McCall