MISSOURI GAS ENERGY
3420 Broadway • Kansas City, MO • 64111-2404 • (816) 360-5755

**ROBERT J. HACK**
*Vice President, Pricing & Regulatory Affairs*

January 27, 2000

FILED
JAN 31 2000
Missouri Public Service Commission

Mr. Dale Hardy Roberts
Secretary/Chief Regulatory Law Judge
Missouri Public Service Commission
P.O. Box 360
301 W. High Street
Jefferson City, Missouri 65102

**RE: Case Nos. GS-2000-133 and GC-2000-386** ← same thing

Dear Mr. Roberts:

Enclosed for filing in the above-referenced case, please find an original and fourteen (14) conformed copies of the **Settlement Agreement and Satisfaction of Complaint.**

A copy of this filing has been mailed or hand-delivered this date to counsel of record.

Thank you for bringing this matter to the attention of the Commission. Please call me if you have any questions regarding this matter.

Sincerely,

Robert J. Hack

C: F. Jay Cummings
Charles B. Hernandez
David Stueven
Douglas E. Micheel
William Dean
Jim Oglesby

Enclosures

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

| | | |
|---|---|---|
| In the matter of Missouri Gas Energy, A division of Southern Union Company, Regarding an incident at 101 East 41st Street, Kansas City, Missouri, on July 26, 1999. | ) | Case No. GS-2000-133 |
| The Staff of the Missouri Public Service Commission, Complainant, | ) | |
| vs. | ) | Case No. GC-2000-386 |
| Missouri Gas Energy, Respondent. | ) | |

**SETTLEMENT AGREEMENT AND SATISFACTION OF COMPLAINT**

Come now Missouri Gas Energy ("MGE"), a division of Southern Union Company, and the Staff of the Missouri Public Service Commission ("Staff"), by and through their respective counsel, and respectfully state as follows:

Procedural History

1. On December 23, 1999, the Staff filed a "Gas Incident Report" ("the Incident Report") in Case No. GS-2000-133. The Incident Report relates the relevant facts as found by the Staff surrounding an incident which occurred at approximately 8:09 p.m. CDST on July 26, 1999, in which a natural gas explosion and subsequent fire occurred in a multi-story apartment building located at 101 East 41st Street in Kansas City, Missouri ("the incident"). The apartment building was completely destroyed and ten persons were transported to area hospitals.

3

2. Also on December 23, 1999 the Staff filed a "Complaint" against MGE alleging violation of a Missouri Public Service Commission ("Commission") rule, 4 CSR 240-40.030(8)(I)3, regarding accessibility and operability of curb valves.

3. The Staff makes no allegation in the Incident Report or the Complaint that it is probable the incident would not have occurred but for the rule violation asserted in the Complaint. In the Incident Report, the Staff notes that the cause of the incident was the escape of natural gas from a 2-inch valve body (which valve had been removed and re-installed in 1973 by one of MGE's predecessor companies) after the pressure in the service line ejected the valve core. In the Incident Report, the Staff makes three operational recommendations pertaining to 1) the monitoring of curb boxes of elevated pressure service lines entering structures, 2) the conduct of on-site inspections of service line replacement projects and 3) the removal, relocation or changing of pipeline segments.

4. By "Notice" dated December 28, 1999 in Case No. GS-2000-133, MGE was advised that its response to the Incident Report is due no later than January 31, 2000. By a "Notice of Complaint" dated December 29, 1999, in Case No. GC-2000-386, MGE was advised that it was to file an Answer or the measures taken to satisfy the Complaint on or before January 28, 2000. This Settlement Agreement and Satisfaction of Complaint is designed to obviate the need for MGE to make a response in Case No. GS-2000-133 and an Answer in Case No. GC-2000-386.

Settlement Agreement and Satisfaction of Complaint

5. Without conceding the legal merits of any of the Staff's allegations of violation, MGE provides the following response to the recommendations made in the Incident Report.

MGE intends to implement, or continue to implement, the operational recommendations made by the Staff in its Incident Report as follows:

A. MGE has changed its construction standards and procedures (as shown in Attachments A-1 to A-31 appended hereto) in an effort to reduce inside meter sets requiring underground shut-off valves. In August 1999, MGE began identifying and inspecting curb boxes and service valves where elevated pressure service lines enter structures. This inspection was completed in Kansas City by year-end 1999 and will be completed by June 30, 2000, for the balance of MGE's service area. Thereafter, such inspections will occur annually. Any deficiencies discovered as a result of this new inspection process will be remedied within six months of discovery. Further details of this new inspection process, which goes beyond the requirements contained in the current Commission gas safety rules (4 CSR 240-40.030), are contained in Attachment B-1 appended hereto. In addition, MGE will make programming changes to its computerized Premise Data System (as generally described in Attachment B-3 appended hereto) to enhance the efficiency of this new inspection process.

B. To ensure the quality of work and accuracy of documentation, MGE has identified, for training purposes, a listing of specific items important to service line replacement projects. An outline of this training is contained in Attachment B-2 appended hereto. Review sessions have been held with inspectors and key contractor personnel to re-emphasize the specific requirements regarding the quality of work and accuracy of documentation related to service line replacement projects. MGE will include in its training sessions with employees and

contractors the importance of documentation and that the documentation of work completed should be performed on the job-site immediately following the completion of the work. In addition to the inspectors, MGE will utilize all company employees with construction experience to assist in monitoring and documenting inspections of contract work.

C. MGE will continue to emphasize the need to follow all federal and state pipeline safety rules in the construction, maintenance and operation of its gas delivery system, including the removal, relocation or change of pipeline segments, as prescribed in the Commission's gas safety rules (4 CSR 240-40.030).

6. These undertakings by MGE and their acceptance by the Staff, as well as the other aspects of this document, form a reasonable basis for settlement of the referenced dockets and any claims within the jurisdiction of the Commission arising from the incident. The commitments made by MGE herein shall constitute full settlement and satisfaction of any claims or causes of action which have been or might in the future be asserted against MGE before the Commission, which arise out of, are based upon, or could have been based upon, the facts surrounding the incident as related in the Incident Report.

7. This document shall not be construed to operate as a waiver or release of the Staff's right and ability to conduct follow-up evaluations of the representations made herein, or to in any way impair or affect the Staff's ability to file, or MGE's ability to contest, recommendations or complaints involving applications of the Commission's rules cited in the previously referenced Incident Report or Complaint to any future incidents, situations or events involving MGE, or to any other natural gas system operated under the jurisdiction of the Commission.

8. This Settlement Agreement and Satisfaction of Complaint is a compromise of disputed claims and neither all nor any part of this document constitutes an admission of any violation of law, statute, rule, regulation or procedure of any kind by MGE. No waiver or modification of any defense which has been raised by MGE in these dockets is intended or should be assumed as a result of this document.

9. This document shall not be construed as or operate as a settlement, satisfaction, release or waiver of any claims or defenses MGE may have now or hereafter against any other person or entity arising from or relating to the facts surrounding the incident or the actions taken by MGE as a result of the incident; MGE expressly reserves all rights and defenses it may have in regard thereto.

10. The Staff has represented to MGE that the foregoing Settlement Agreement and Satisfaction of Complaint is acceptable, and by execution of this document Staff recommends to the Commission that this Settlement Agreement and Satisfaction of Complaint be approved, in its entirety. If the document is not so approved in total, no party hereto shall be bound or prejudiced by any provisions contained herein or by any representations which have been made in the context of the attempted settlement hereof, and MGE shall be allowed a reasonable time in which to file a Response to the Incident Report and an Answer to the Complaint.

11. No party to this document believes the consideration and approval of this document requires a hearing before the Commission; however, the Staff and MGE stand ready if additional information is requested.

12. Nothing in this Settlement Agreement and Satisfaction of Complaint is intended to impinge or restrict in any matter the exercise by the Commission of any statutory right, including the right of access to information, and any statutory obligation.

13. The Staff also shall have the right to provide, at any agenda meeting at which this Settlement Agreement and Satisfaction of Complaint is noticed to be considered by the Commission, whatever oral explanation the Commission requests, provided that the Staff shall, to the extent reasonably practicable, provide the other parties with advance notice of when the Staff shall respond to the Commission's request for such explanation once such explanation is requested from the Staff. The Staff's oral explanation shall be subject to public disclosure, except to the extent it refers to matters that are privileged or protected from disclosure pursuant to any protective order issued in this case.

14. This Settlement Agreement and Satisfaction of Complaint represents a negotiated settlement. Except as specified herein, the signatories to this document shall not be prejudiced, bound by, or in any way affected by the terms of this Settlement Agreement and Satisfaction of Complaint: (a) in any future proceeding; (b) in any proceeding currently pending under a separate docket; or (c) in this proceeding should the Commission decide not to approve this Settlement Agreement and Satisfaction of Complaint in the instant proceeding.

15. If the Commission accepts the specific terms of this Settlement Agreement and Satisfaction of Complaint, the signatories waive their respective rights to cross-examine witnesses (subject to the provisions of paragraph 14); their respective rights to present oral argument and written briefs pursuant to Section 536.080.1 RSMo[1], their respective rights to the reading of the transcript by the Commission pursuant to section 536.080.2; and their respective rights to judicial review pursuant to Section 386.410. This waiver applies only to a Commission Report and Order issued in this proceeding, and does not apply to any matters raised in any

[1] All statutory references herein are to RSMo 1994 (Cum. Supp., as amended) unless specifically indicated otherwise.

subsequent Commission proceeding, or any matters not explicitly addressed by this Settlement Agreement and Satisfaction of Complaint.

16. MGE and the Staff each agree and represent that the attorneys listed below are duly authorized to execute this Settlement Agreement and Satisfaction of Complaint on their respective behalf, and that this document represents a complete description of all of the considerations for this agreement.

WHEREFORE, MGE and the Staff respectfully request that the Commission issue its Order Approving the Settlement Agreement and Satisfaction of Complaint, in its entirety as set forth herein, and to issue orders closing the above-captioned dockets.

Respectfully submitted,

Robert J. Hack MBE #36496
3420 Broadway
Kansas City, MO 64111
(816) 360-5755
FAX: (816) 360-5554

Attorney for Missouri Gas Energy, a division of Southern Union Company

David Stueven MBE #51274
Assistant General Counsel
Missouri Public Service Commission
P.O. Box 360
Jefferson City, Missouri 65102
(573) 751-6726
FAX: (573) 751-9285

Attorney for the Staff of the Missouri Public Service Commission

Certificate of Service

I hereby certify that a true and correct copy of the above and foregoing document was either mailed or hand delivered this 28th day of January, 2000 to:

Mr. David Stueven
P.O. Box 360
Jefferson City, MO 65102

Mr. Douglas E. Micheel
P.O. Box 7800
Jefferson City, MO 65102

**TO:** MGE Manual Holders

**FROM:** Bill Dean [360-5661]
3420 Broadway

**DATE:** December 10, 1999

MGE MISSOURI GAS ENERGY

**INTERNAL CORRESPONDENCE**

**SUBJECT:** Update to Standards

**CC:**

---

Please find enclosed changes and updates to the Company Standards and Procedures. Replace the following pages in your standards manual. A review of these changes should be held with those employees involved in these work activities.

## Design

| | |
|---|---|
| Standard 1020J | Piping System Design (Replace the entire standard)<br>Page 16 (5.9) Meter location and Entry - Inside meters require engineering approval. A GTO Service valve shall be standard for inside sets. Every effort shall be made to install the service stop and regulator above grade outside when meters can not be moved out. Pressure delivery inside shall not exceed 2 psi without engineering approval. |
| Standard 1120F | Service Regulator Selection (Replace the entire standard)<br>Page 3 (2.7.6) Use Black Steel pipe to vent inside regulators. Size to relieve inlet pressure to 2 psi. |

## Construction

| | |
|---|---|
| Standard 2250 H | Butt, Socket & Sidewall Fusion of PE<br>(Replace the entire standard)<br>Page 21 (6.2.1) A set of test straps shall be retained along with the procedure used for PE fusion qualifications. |
| Standard 2310 F | Direct Burial (Replace the entire standard)<br>Page 4 (3.2) Standard tracer wire<br>(3.2.1) Exceptions<br>(3.3) Do not tape tracer wire to pipe<br>(3.4) Place tracer wire in bottom of ditch directly under the PE pipe<br>(3.7) Terminate the tracer wire in a Marker Post Box<br>(3.8) Do not install tracer wire in curb or valve boxes. |
| Standard 2380 E | Service Connections to Main & Meter (Replace page 3 & 4)<br>Page 4 (6.2.2) Do not install tracer wire in curb and valve boxes. |

Standard 2390 H · Domestic Meter Installation (Replace the entire standard)
Page 2 (4.2.2) Meters shall be moved outside. Exceptions require approval from engineering.

Page 3 (4.3) Inside meters require a GTO stop at the first thread in the building. All valves on inside meter sets shall be GTO.
(4.4) Delivery pressure inside a structure limited to 2 psi unless approved by engineering.

Page 4 (7.2.1) Inside pressure limited to 2 psi
(7.4) Use Black Steel pipe to vent inside regulators. Size to relieve inlet pressure to 2 psi.

## O & M

Standard 3110 L — Emergency Plan (Replace pages 25 - 26)
Page 26 Changes in personnel and phone numbers

Standard 3240 H — Elevated Delivery Pressure (Replace the entire standard)
Page 2 (4.3.1 and 4.3.2) Reworded inside pressure limited to 2 psi unless approved by engineering.

Standard 3310 K — Meter Sets, Turn Ons and Changes Outs
(Replace the entire standard)
Page 4 (5.2) When performing a service call, locate the curb box and clean debris.

Page 5 (5.3.1) Inside pressure limited to 2 psi unless approved by engineering.

Page 14 (11.2.3) Use Black Steel pipe to vent inside regulators. Size to relive inlet pressure to 2 psi.

Standard 3320 H — Leak Investigation (Replace the entire standard)
Page 1 (2.1.2) If the meter is inside, the dispatch [illegible] leak call should include curb box location.

Page 3 (3.1.1) Upon arrival locate the meter valve or curb box. Check the curb box for valve access.

Standard 3560 E — Valve Inspection & Maintenance (Replace the entire standard)
Page 1 (2.1) Add the word essential valve
(3.2) Curb valves operating over 2 psi shall be inspected annually.

Standard 3680 D — Test Stations (Replace the entire standard)
Page 2 (4.1.2) Tracer wire shall not be installed in curb or valve boxes.

Page 6 (4.4.1) Test wires shall not be installed in curb or valve boxes.

Page 9 (5.2.13) Test wires shall not be installed in curb or valve boxes.

## Administration

New Table of Content Pages

| | |
|---|---|
| Standard 4190 | New Standard Winter Operations |
| Standard 4200 | New Standard Acceptance Sampling for Residential Gas Meters |

Attach

- Taps for steel services served from systems operating at pressures over 60 psig should be made using a 1/2" or 3/4" weld base punch tee, 1/4 " punch and 3/4" weld outlet and service line.

- Taps for steel services served from systems operating at pressures between 5 and 60 psig should be made using a 1/2" or 3/4" weld base punch tee, 3/8" punch and 3/4" weld outlet and service line.

- Taps for steel services served from systems operating at pressures between 7" wc. and 5 psig should be made using a 1-1/4" weld base punch tee, and 1-1/4" weld or compression outlet and service line.

5.4.2. Plastic Services From Steel Mains

- Taps for PE services served from steel mains operating at pressures between 5 and 60 psig should be made using a 1/2" or 3/4" weld base punch tee, 3/8" punch and 1/2" IPS, 1/2" CTS. or 1" CTS. with a lock tight compression outlet for medium density PE service tubing.

- Taps for PE services served from Steel mains operating at pressures between 7" wc. and 5 psig should be made using 1-1/4" weld base punch tee' 7/8" punch with a lock tight compression outlet for 1" CTS. medium density PE pipe.

- PE tubing installed from service tees with compression outlets from steel mains shall be protected from stress and the potential of shear. Refer to Standard 2380 -- Service Connections to Main & Meter.

5.4.3. Plastic Services From Cast Iron Mains

- New taps on cast iron mains operating under 5 psig should be made by tapping and threading the main using a brass threaded PE tee with a outlet for PE pipe.

- Consideration may be given to use of a PE valve on PE service lines 2" and larger.

- On service renewals from a cast iron main, an effort shall be made to use the existing tap.

5.5. In cold climates where the frost level may reach the depth of the pipe, 1/2" IPS or larger PE shall be used to insert 1 1/4" steel to prevent freeze off.

5.6. Plastic Services From Plastic Mains

5.6.1. Taps for PE services from PE mains shall be made using heat fusion or electrofusion. Tapping saddles may be purchased with 1/2" IPS, 1/2" CTS or 1" CTS outlets to eliminate the use of a reducer at the main.

5.7. When installing service lines to serve larger loads, including Commercial or Industrial service taps from steel mains:

5.7.1. Service taps 1 1/4" and larger may be installed using a three-way-tee or when a tap valve is required a welded shaped nipple and weld flange gate valve.

5.7.2. When a valve is to be installed at the main consideration should be given to tapping the main on the side instead of the top to reduce stress of the main.

5.7.3. A transition fitting and plastic ball valve may be installed when the service is to be PE from a steel main.

5.8. Service tap connections 2" and larger from plastic mains should be made by the installation of a full volume PE tap tee by saddle fusion, electrofusion or by inserting a full opening PE tee in the main.

5.8.1. Normally plastic services can be squeezed off to stop the flow of gas. However, plastic valves may be installed in PE services when a shut off valve is required.

5.9. Meter Location and Entry, new and replacement.

5.9.1. The meter shall be located at the outside within 5 feet of the structure. If this location is not possible the meter maybe located a distance from the structure providing the yard line to the building is cathodically protected or PE pipe.

- Meters maybe installed inside a structure with Engineering approval. When installing a meter inside, a shut off valve and service regulator shall be installed outside in the inlet riser.

- When meters are installed inside the structure, a GTO service valve or equivalent shall be installed at the first pipe thread inside. All inside valves shall be a GTO or equivalent.

- Where a service riser can not be installed outside and service entry is below grade a curb valve and box shall be installed.

- Delivery pressure inside a residential or small commercial structure is limited to 2 PSIG without Engineering approval.

2.4. Closed Ends

2.4.1. At all times when work on piping is not being performed, all sections of joined pipe shall be sealed with end plugs to prevent water, foreign material or animals from entering the pipe.

2.4.2. Closures shall be watertight. Taped-over ends are sufficient only for temporary closure. Under no circumstances shall rags, burlap or other material be stuffed into the ends of pipe during construction work.

2.4.2.1. When a main is pulled under highways, streets or railways, the leading end of the pipe shall be capped and water tight.

2.4.2.2. The preferred method of capping PE piping is butt fusion.

2.5. Connections (Tie-Ins)

2.5.1. If PE pipe has been heated by direct sunlight or ambient air temperature that is hotter than the ground temperature of the ditch, the pipe should be allowed to cool before measuring and cutting the pipe to length to complete the tie-in. If the temperature of the pipe is hot to the touch, partially backfilling over the pipe in the ditch will allow it to cool before cutting and tie-ins.

2.5.2. Whenever a PE tie-in is made, it is important that the sections of pipe be properly aligned and supported on undisturbed or compacted soil to reduce the shear forces exerted on the pipe.

2.5.3. Welding tie-ins shall not be performed in a hazardous atmosphere. Refer to Standard 2520 -- Stoppling and Bagging, for additional information.

2.6. Sod Removal

2.6.1. When sod is encountered and it is determined it should be salvaged, care should be taken to remove and preserve it for replacement over the backfilled trench.

2.7. Testing

2.7.1. Prior to being placed in service, all new piping installed shall be tested in accordance with Standard 2410 -- Testing.

2.8. Care shall be taken when bending PE pipe to avoid kinking or short bending the pipe. As a general rule, the bending radius shall not exceed 25 times the pipe diameter.

2.9. Steel fittings shall not be used in the construction of PE systems except for connections to a steel system.

**3. Installation of Tracer Wire**

3.1. The ability to locate PE piping with a conductive-type pipe locator is desirable and will supplement -- but not replace -- straight-line installation with accurate measurements. An electrically conductive wire (tracer wire) shall be installed in the ditch with PE pipe.

3.2. AWG Solid copper #14 wire, yellow THHN coating is the minimum standard for tracer wire.

3.2.1. A Larger more substantial gauge wire may be used when pulling wire through boring holes.

3.3. When tracer wire is pulled through a bore along with the pipe it shall not be taped to the pipe.

3.4. The tracer wire should be installed in the bottom of the ditch directly below the pipe. Every effort should be made to maintain the integrity of the tracer wire.

3.5. Care shall be taken to assure continuity of the circuit, through the tracer wire to make sure it can be located by a conductive-type locator.

3.5.1. Splicing should be accomplished through use of a direct bury splice kit.

- Cut the tracer wire and remove approximately 1/2" of insulation.
- When using a Direct Bury Splice Kit, twist a wire cap onto the ends of the bare sections of wire, insert the wire cap into the grease pocket, and snap the lid closed.

3.6. When bonding one steel system to another across sections of PE pipe, use a cable of sufficient size to eliminate excessive voltage drop. A number #2 stranded cable is generally adequate. Refer to Standard 3660 - Bonding.

3.7. Tracer wire installed with PE mains shall be terminated above ground at a service riser or in a marker post terminal. This will provide access for a checkpoint. Location measurements shall be documented from aboveground structures.

3.7.1. In areas where marker post can not be installed a TR box may be used.

3.8. Tracer wires shall not be terminated in curb or gate valve boxes.

5.2 Two inch and larger service tap connections on mains shall be made by installing a three-way tee. An acceptable alternative is using a shaped nipple with a side tap weld-by-flange or weld-by-weld steel gate valve.

5.3 Shut-off valves may be considered for service taps 2 inches and larger on systems operating above 5 psig.

5.4 Refer to Section 3600 -- Corrosion Control, for applicable cathodic protection requirements.

5.5 All service tap fittings which will operate at a pressure of 60 psig or greater, and all tap fittings which are 2-inches or larger in diameter, shall be welded.

5.6 When the piping in a service line is to be welded, a weld base service tee shall be used.

5.7 Compression-type service outlets may be used at tap connections that will operate below 60 psig. Couplings installed by a mechanical or hydraulic process or other compression fittings which are rated for forces caused by internal pressure are acceptable for use within their rated limits. Refer to Standards 1020 -- Pipe System Design and 2240 -- Mechanical Joining.

5.8 Compression outlet service tees may be used for both steel & PE services. Insulating compression outlet service tees may be used on steel services which will operate below 60 psig and which must be insulated from unprotected bare steel main.

5.8.1 Compression couplings to PE shall contain an armored or bead gasket and solid metal corrugated stiffener.

5.8.2 The soil beneath the plastic pipe leaving a steel compression coupling should be firmly compacted to avoid shear. Additional stress reducing procedures include installing a short piece of PE pipe slipped over the outlet of the tapping tee to undisturbed earth and carefully backfilling the excavation in layers. Blocking material should be avoided as it may create stress points when used to support plastic pipe.

5.8.3 PE pipe shall not be kinked or exceed the manufactures bending recommendations. Refer to Standard 1020 -- Piping System Design.

5.9 The use of steel bushings or all-thread nipples shall not be permitted, nor shall gasket or ground joint unions be permissible for use on the underground portion of the service.

**6.0 Curb Valves and Curb Boxes**

6.1 Curb valves shall be installed on services which supply a meter located inside a building where an above- grade entry does not provide for the installation of an easily accessible valve in the outside inlet riser, or when required by local codes, regulations or franchise.

6.2 When a curb valve is installed, an approved curb box supported independently of the service line and designed to permit ready operation of the valve shall be installed.

6.2.1 The preferred design of the curb box is one of the slip-type extension to eliminate stress caused by loads on the lid assembly. The curb box should be made of a plastic material with the top or lid constructed of cast iron.

6.2.2 Tracer wire for PE systems or cathodic test leads shall not be installed in curb boxes.

6.3 Only PE valves shall be installed in underground PE services as curb valves.

# Construction Standard

MGE MISSOURI GAS ENERGY

| SUBJECT: Domestic Meter Installation | Page: 2390 - 1 |
|---|---|

TABLE OF CONTENTS



## 1. Applicable Codes and Regulations

1.1. This Standard meets the requirements of the Federal, Pipeline Safety Regulations, Sections 192.197, 192.353, 192.355, 192.357, 192.359, 192.363 and 192.365; and Missouri 4 CSR 240-40.030 (4)(DD), (8)(B)(C)(D)(E)(F)(H) and (I).

## 2. General

2.1. A separate meter shall be installed for each customer requesting service.

2.2. A service line may be installed to serve only one meter location or meter header. Branch service lines may be installed to serve two meter locations. Refer to Standard 2315 Branch Service lines .

2.3. The meter shall be installed so the base of the meter is not in contact with the ground to protect it from corrosion.

2.4. The meter setting may be built using fittings or a pre-fab set may be used.

2.5. When a prefab setting is used, the setting or riser shall be fastened to the structure with a bracket or otherwise stabilized to prevent breaking due to ground settlement, where necessary.

2.6. The meter setting should be compact and installed level and plumb.

**3. Sizing**

3.1. The customer's load should be determined and the meter sized based on a 1/2-inch w.c. differential across the meter.

3.1.1. Meters shall not be exposed to pressures greater than the working pressure of the meter.

**4. Location**

4.1. All new residential and small commercial meter installations shall be located outside, when possible. The meter normally should be located at the building and within 5 feet of the front of the structure. The meter may be installed at the property line to meet local regulations or when the architecture or building design does not provide for a proper meter location.

- When the meter location is more than 5' from the structure the down stream piping to the building wall is defined as a service line and the responsibility of the company.

- For new installations the meter shall not be located within 3 feet of an electric meter or opening, such as a door, window, dryer vent etc.

4.2. The meter location should be protected from vehicular traffic and should not interfere with pedestrian traffic.

4.2.1. The meter and inlet stop should be readily accessible to permit emergency shut off, meter reading and maintenance.

4.2.2. When the service line to inside meters is replaced, the meter shall be relocated to the outside.

- When the meter can not be installed outside, every effort shall be made to install a riser on the outside wall with a service stop and service regulator. This installation shall be made under the approval and direction of the Division Engineer.

4.2.3. When service lines are replaced and the customer's existing fuel line enters the structure below grade, the meter shall be located along the building wall at the entry location.

4.3. When the meter must be located inside a structure, it shall be located as near the service entrance as practical. A GTO service stopcock shall be installed at the first threaded fitting inside the structure.

4.3.1. All inside valves installed shall be GTO or equivalent.

4.4. Inside meter and service regulators shall be located a minimum of 5 feet from any source of ignition.

4.4.1. Residential installations shall be limited to a maximum of 2 PSIG delivery pressure without Engineering approval.

4.4.2. Meters shall not be installed in closets, bathrooms, under combustible stairways, or other inaccessible locations.

**5. Service Risers**

5.1. Anodeless service risers inserted with the appropriate size PE of shall be installed for all new PE services.

5.2. When soil conditions are such that the ground may settle (such as near a new building foundation), flex-risers with a stabilizing bracket bolted to the building foundation or a stake should be installed to secure the riser in place.

5.2.1. Pre-bent steel service risers coated with a epoxy coating may be installed on steel services. Standard risers shall have a threaded outlet to accommodate the service valve.

5.3. PE services that terminate through a steel casing entrance utilizing a service head adapter may be used when the meter setting cannot be located outside the structure.

5.4. Steel weld fittings and associated piping shall be used to construct steel risers for 6-inch and larger steel service lines. These facilities shall be properly coated and protected in accordance with Section 3600 -- Corrosion Control.

5.5. A lock wing meter stop valve shall be installed above grade and ahead of the service regulator.

5.6. Threaded fittings at the service riser shall not be installed below grade.

**6. Inlet Valve**

6.1. The standard valve shall be a 1" inch, lockwing stop (load or inlet pressures may require a larger valve). A readily accessible outside shut-off valve shall be installed for inside meter sets. A valve in the entry riser is preferred to a curb stop.

7. **Service Regulator**

7.1. A service regulator shall be installed ahead of each meter or bank of meters when the inlet pressure exceeds 14 inches w.c.

7.2. The regulator should be sized and set to provide the required downstream load and pressure, usually 7 inches w.c. or as required by contract oral agreement. See Standards 1120 -- Service Regulator Selection, and 3240 -- Elevated Pressure Delivery.

7.2.1. Residential installations shall be limited to a maximum of 2 PSIG delivery pressure without Engineering approval.

7.3. Each service regulator vent shall be located away from the dripline of the structure, vented down and/or protection (shield or gutter) provided when the regulator is installed below a roof without gutters as a precaution to prevent an icing-over condition in winter.

7.4. When service regulators are installed inside a structure, the relief vent opening shall be vented to the outside using black steel pipe. The vent should be sized so that the maximum safe value of 2 PSIG on the customer's fuel line is not exceeded.

7.5. When inlet pressures exceed 60 psi, second-stage regulation or a operating monitor shall be installed.

8. **Insulation**

8.1. The inlet riser shall be insulated from the customer's fuel line.

9. **Grunsky Tee Application**

9.1. Where a Grunsky tee fitting is installed, it shall be placed at the meter outlet before the fuel line enters the structure. This fitting shall be installed to set the delivery pressure, and to maintain gas flow to the customer during meter change out.

9.2. Use of the Grunsky bag and fitting

9.2.1. The Grunsky bag is used to supply gas to the customer during meter change out without disrupting service.

TABLE OF CONTENTS



## 1. Applicable Codes and Regulations

1.1. This Standard meets the requirements of the Federal, Pipeline Safety Regulations, Section 192.197; and Missouri 4 CSR 240-40.030 (4)(DD).

## 2. Definitions

2.1. Elevated Pressure - Any pressure above the standard metering pressure of 0.25 psig supplied to a customer's piping unless a standard metering pressure is defined by tariff.

2.2. Fixed-Factor Account - An account receiving elevated pressure where the pressure is accurately regulated to a preset value and the meter setting has no pressure compensating device.

2.3. Line Pressure Account - An account receiving elevated pressure where the pressure delivered to the customer is the same as the distribution system pressure.

2.4. Alternative piping systems - Residential or commercial piping using corrugated stainless steel tubing (CSST) or other approved material other than traditional steel pipe.

2.5. Compensating Index - A meter index used to correct gas volume of a specified pressure under flowing gas conditions to a base pressure of 7" inches w.c.

## 3. Operating Considerations

3.1. Elevated pressure service may require specialized equipment, billing procedures or maintenance procedures.

3.2. For new elevated pressure accounts of one psig and or 1,200 cfh. or greater a pilot or constant-loaded regulator should be considered. Refer to Standard 1120 -- Service Regulator Selection, for more information.

3.3. Fixed-factor accounts require a factor applied in the billing process to correct for the pressure increase above the normal metering pressure of 0.25 psig.

3.3.1. Once elevated pressure has been granted and service establish the fixed factor multiplier shall be entered into the CSS system on the DMMT screen by the department responsible for turning on the gas supply to the customer.

3.4. Line pressure accounts not billed as a fix factor accounts require a chart or instrument (mechanical corrector, electronic corrector, EGM) to compensate for variations in pressure.

3.5. Elevated pressure accounts may require regulators, relief valves, or other equipment on the customers' fuel line. All such devices shall be the responsibility of the customer.

3.6. Elevated pressure of 2 psig may be provided to a customer who has installed an AGA approved Corrugated Stainless Steel piping system. The fixed factor shall be applied to the billing system

**4. Standard Elevated Delivery Pressures**

4.1. Elevated pressure available to customers shall be based on customer need, but is subject to pressure, flow and economic considerations.

4.2. Elevated pressure requests normally are not granted where distribution system pressure is estimated to be less than 1 psig.

4.3. All elevated delivery pressures must be approved by the employee designated by the regional vice president before the service is offered to the customer.

4.3.1. Elevated pressure delivery to residential and small commercial customers using alternative piping systems shall be limited to two psig or less.

4.3.2. Large commercial and industrial customers may be granted elevated pressure delivery designed to the supply system.

4.4. Customers may be granted fixed-factor Elevated Delivery Pressures found on or above the line that corresponds to the Estimated Minimum System Pressure in **Table 1.** Examples are listed below:

4.3.2. Water heaters, furnaces or other gas fired appliances found in garages or carports shall be Red tagged and left off unless they are properly installed and all burner and ignition devises are at least 18" above the floor.

4.3.3. When gas fired appliances are found without an accessible approved manual shut off within 6' of the appliance it shall be left off and Red Tagged.

4.3.4. The visual inspection shall include observation of flexible connectors. When it can not be determined if uncoated brass connectors contains soldered joints and no apparent corrosion or leakage is observed the appliance shall be Yellow tagged. The customer shall be advised to replace the connector with the coated or stainless steel type connector. When a uncoated brass connector is found to be kinked, leaking, corroded or with soldered joints, the appliance shall be Red Tagged and left off. Refer to Standard 3340 Flexible Connectors.

4.4. When Company personnel are denied entry to inspect **large industrial** or commercial customer facilities, the customer shall be advised in writing of their responsibility to inspect and safely maintain the fuel line. The customer shall be asked to sign a letter of acknowledgment. The letter shall be filed with the meter order. See Exhibit 3.

4.5. It is desirable that one properly installed appliance be connected and ready for use before gas is turned on into a building. However, if such an appliance is not present, gas may be left on at the meter after the Company representative has conducted proper tests, inspections, and purging of the houselines. In such cases, Meter Order Form 757-100 shall clearly indicate "no appliances connected, houseline inspected, tested and purged".

4.6. The customer's piping shall be electrically insulated from Company services and mains. This usually is accomplished through the use of insulated meter swivels on the outlet of the meter or an insulating union. All regulator and relief vent piping from the inside to the outside shall be insulated from the meter set.

4.7. Natural gas service **SHALL NOT** be initiated if any plastic gas piping is discovered above grade or inside the structure as a part of the customer's fuel line.

4.8. The meter setting (above-grade piping) shall be inspected for atmospheric corrosion. Any problem areas shall be corrected by cleaning and painting.

4.9. It is recommended that a tee be installed in the outlet piping to accommodate future quick meter by-pass change outs.

5. **Meter Set and Turn-On Procedure For Diaphragm Meters**

5.1. The following procedures shall be followed whenever employees or its contractors are required to enter a structure to initiate service.

5.1.1. Verify the name and address of the customer while identifying yourself and the service to be performed.

5.1.2. Turn off all constant flow pilots and burner valves on appliances without 100 percent safety devices. Turn 100 percent safety valves to the ON position with the thermostat calling for heat while conducting a shut-in test to verify the valve is working properly. Red tag any valve that is leaking. Note the appliance rating(s) to verify that the proper meter size was selected.

5.1.3. Gas outlets not in use should be inspected to assure that they are properly capped or plugged.

5.1.4. Red tag all improperly installed appliances. Date and initial the tag. Leave the gas OFF to that appliance, document on the meter order the reasons for red tagging, have the customer sign the order, and notify the dispatcher of the red tag when the order is completed at that address.

5.1.5. If you enter the structure, the meter and fuel lines are to be purged (when possible) through an open appliance burner.

5.2. All inside meters shall have an outside shut off valve. This valve maybe above ground on the inlet riser or maybe located in a curb box.

5.2.1. When performing a service order where the outside valve is underground:

- Locate and inspect the curb box for leakage, accessibility, and alignment of the curb valve.
- Note if dirt, debris, cathodic test leads, or tracer wires impede the operation of the valve.
- Report any repairs corrections needed.

5.2.2. Verify that the stopcock at the meter is off before placing the curb key and operation of the curb valve.

5.3. Visually inspect the regulator and/or relief valve vent for correct positioning and for verification that the vent opening is clear, unobstructed, and facing down. The vent opening should have a screen cover. Replace defective or improper vents. The regulator vent must be located away from the drip line of the structure and/or protection (shield or gutter) must be provided when a service regulator is installed below a roof without gutters as a precaution to prevent an icing-over condition in winter.

5.3.1. When new service regulators are installed and when initiating service to a customer, the service regulator shall be tested for set point (standard 7" w.c.) and checked for lock up, maximum 1" w.c.

- Delivery pressure to residential and small commercial customers shall not exceed 2 PSIG without Engineering approval.

5.4. If the Meter Order has a "Y" in the "Age Change" column indicating the meter has been selected for change-out in the Meter Change-Out Program, replace the meter.

5.5. Before turning gas ON, remove all metal recessed blank discs from the meter. Check the meter setting for soil subsidence and rebuild the loop if necessary, installing an outlet tee to accommodate a quick change bag.

5.6. Install new meter gaskets on both the inlet and outlet swivels. Apply an approved lubricant to the inlet and outlet threads, as necessary.

5.7. Turn the gas stopcock counterclockwise slowly in order to purge the meter to atmosphere through the outlet tee.

5.8. Note on the meter order if elevated pressure is being delivered and indicate fixed factor, compensating index, etc.

5.9. Sniff tests should be conducted on all customer service orders. It is not necessary to disconnect the piping in order to conduct these tests. The purpose of the sniff test is to determine if the gas odor is readily detectable. This test shall be documented on the back of the meter order in the Sniff Test box.

5.10. Check all meter loop fittings for leaks using a liquid soap-type low-temperature leak detector and/or combustible gas indicator.

5.11. Observe the surface conditions over gas lines for soil subsidence or indications of gas leakage. Gas detection equipment shall be used to investigate any indication of gas leakage and where soil subsidence is noted

5.12. Conduct a shut-in test of the house piping by observing the test dial of the meter to determine if gas is passing through the meter. This observation should be made with the test hand on the upstroke. The test hand on meters with compensating indexes and meters on a pressure billing factor are not corrected for pressure. When providing elevated pressure, a factor must be applied to the test hand read. All of the house piping shall be included in the shut-in test. This test is to be made at the delivery pressure to the customer. Tables 1 and 2 can be used for determining the appropriate observation time.

| TABLE 1 | |
|---|---|
| **Test Observation Times For Various Meter Dials** | |
| **DIAL STYLES – CUBIC FEET** | **TEST TIME – MINUTES** |
| 1/4 | 5 |
| 1/2 | 5 |
| 1 | 7 |
| 2 | 7 |
| 5 | 20 |
| 10 | 30 |

| TABLE 2 | |
|---|---|
| **Pressure Correction Factors When Dealing With Elevated Pressure For Common Compensating Indexes** | |
| **DELIVERY PRESSURE (PSIG)** | **CORRECTION FACTOR** |
| 1/2 | 1.017 |
| 1 | 1.051 |
| 2 | 1.119 |
| 5 | 1.324 |
| 10 | 1.666 |
| Line Pressure | $\frac{14.4 \text{ psig} + \text{Delivery Pressure}}{14.65 \text{ psig}}$ |

5.13. On new structure sets, when the fuel lines have never been in service, the shut-in test must be gas tight (0 percent leakage).

5.14. When leakage is discovered on customer-owned equipment or fuel lines which have previously had service, response shall be in accordance with the following.

5.14.1. An attempt shall be made to locate the source of leakage. It is not intended that an extensive search be conducted inside the structure. Such searches shall be resisted to special cases and require supervisory approval.

- For **any leak considered hazardous**, regardless of the amount of leakage, or if leakage is found on piping adjacent to ignition sources and the leak cannot be repaired, the meter should be shut off and sealed until repairs are made.

# O & M Standard

MISSOURI GAS ENERGY

| SUBJECT: Leak Investigation | Page: 3320 - 1 |
|---|---|

TABLE OF CONTENTS



## 1. Applicable Codes and Regulations

1.1. This Standard meets the requirements of the Missouri Pipeline Safety Regulations, 4 CSR 240- 4 0.030(14)(B).

## 2. Leak Investigation Procedures Resulting From Notification By The Public

2.1. Any leak or odor reported by the general public, police, fire, or other authorities, or any notification of damage to Company facilities by contractors or other outside sources, should be responded to immediately.

2.1.1. Each person receiving leak notifications shall be trained to obtain and record the proper information to the Leak Notification log (form 316-25). In the event the person reporting the leak does not have or refuses to provide all the information, that fact shall be recorded to the log.

2.1.2. A Gas investigation order shall be prepared for each leak notification. The corresponding leak log number should be recorded on the order to serve as a cross reference between the two documents.

- When the meter at the associated address is located inside the structure the dispatch information shall include the curb box location.

2.1.3. Each leak reported shall be promptly and thoroughly investigated to determine the extent of the leak. Any leak considered hazardous shall be made safe, which may include isolating the leak or discontinuing service, whichever is appropriate.

2.2. The response to suspected gas odors shall be in accordance with the following.

2.2.1. Each report shall be thoroughly investigated to determine whether or not a gas leak is present. If the source of the odor can be determined, it shall be indicated on a gas investigation order.

- Special attention shall be given to those situation where conditions of excessive ground water, rain, snow, ice or wind conditions could impair the venting or detection of a natural gas leak.

2.3. All leak investigations which encounter fumes or customer complaints of headaches, burning eyes, or nausea shall be thoroughly investigated in accordance with the following. (Such findings may indicate the presence of carbon monoxide or the movement of raw gas through the flame zone of an appliance.)

2.3.1. Tests shall include:

- A complete check with a CGI inside and a CGI or FI outside the premises;
- A check for the presence of carbon monoxide using a carbon monoxide detector; and, a meter shut-in test, where appropriate.
- Gas appliances shall be checked for proper adjustment, proper installation, including make-up air; proper flue conditions; and the possibility of a faulty heat exchanger.

2.3.2. Refer to Standard 3345 -- Carbon Monoxide Response, for more information about response to carbon monoxide calls and liaison with local public safety agencies.

2.3.3. The results of all tests shall be documented.

2.4. The investigation for gas leakage may include or require any of the following.

2.4.1. House piping shut-in tests.

2.4.2. Flame Ionization (FI) or Combustible Gas Indicator (CGI) readings.

2.4.3. Soap solution tests.

2.4.4. Observation of brown grass spots, dead or dying shrubs or trees, bubbling water, or discoloration of the soil (vegetation survey), and soil subsidence.

2.4.5. Smell analysis. (Caution: Some soil and pipe conditions may remove the odor from natural gas.)

2.4.6. Visual inspection of house piping (fuel line). Refer to Standard 3310 paragraph 4.3 and Standard 3315.

2.5. A gas investigation order, including all necessary information, shall be prepared for each leak being investigated. All documents relating to the leak call shall be cross-referenced.

2.5.1. In the event the person reporting the leak does not have or refuses to provide all necessary information, that fact shall be documented.

**3. Inside Leak Investigation**

3.1. Investigation of suspected gas in a building shall be in accordance with the following.

3.1.1. Upon arrival verify the address or meter number, locate the meter valve or curb box.

- When curb boxes are encountered the lid should be removed and checked for access to the curb valve.

3.1.2. Turn on the combustible gas indicator (CGI), purge, and zero the instrument in a gas-free atmosphere.

3.1.3. Upon first entry into the building, sample the atmosphere with the CGI set on the lower scale to determine if a hazard exists. If the CGI indicates the presence of one percent gas (20% LEL) in free-standing air, the situation shall be treated as a hazardous condition, and the following actions should be taken immediately. (Refer to Standard 3545 -- Hazardous Atmospheres, for additional information.)

NOTE: **The first and foremost concern shall be the safety of employees and the public. Personnel at the site shall determine the best method of ensuring the safety of both the customer and the employee and determining whether the source of the leak can be quickly identified and eliminated, or whether evacuation of the building is necessary.**

- If the source of gas is known to be located outside the structure or is unknown but could be located outside the structure, evacuate all occupants from the entire structure immediately and test adjacent structures.

- If the source of gas is known to be inside the structure the level of evacuation should be based on the amount of gas detected and the employee's judgment but at a minimum requires evacuation of any room where gas is detected at levels stated above, and all rooms immediately adjacent including above/or below.

- Shut off the gas supply to the structure.
- Establish and identify a restricted zone. This may be accomplished by using warning tape to identify the zone's perimeter.
- Eliminate all sources of ignition.
- Open doors and windows to ventilate, if practical. Concentrations greater than the 100% LEL (5% gas) level may require the assistance of fire department or emergency response personnel in determining and initiating a safe ventilation process.
- Remove vault, manhole, and valve box covers, as appropriate.
- Vent any escaping subsurface gas directly to the atmosphere by digging over the point where gas in entering or adjacent to the building, if appropriate.

3.1.4. If no hazardous conditions are detected, further atmospheric checks need to be made only in the area of the reported leak.

3.1.5. Once it has been determined that a hazardous condition does not exist, response shall be in accordance with the following:

- A shut-in test or instrument test should be performed. A supervisor may be consulted to determine when a shut-in test may not be required (such as in restaurants, apartment complexes, master meter installations, etc.).
- If no reason for the odor in structures such as apartment buildings is found, the investigation normally should be extended to adjacent piping of surrounding systems until a reason for the odor or gas indication can be determined.

3.2. The following procedures shall be followed when running a shut-in test to determine the extent of leakage.

3.2.1. Check regulator lock-up. Appliances should be shut off at the pilot valve and/or burner. Do not turn off the appliance main shut-off valves unless the pilot and burner valves on all appliances cannot be shut off.

3.2.2. On inside meter settings, relight a small burner and observe the test dial of the meter to determine whether the meter is functioning. On outside meter settings, utilize the orifice tip and rubber stop with a #78 orifice installed in the outlet of the meter and observe the test dial. If the dial hand moves, the meter is operating

# O & M Standard

MISSOURI GAS ENERGY

**SUBJECT: Valve Inspection & Maintenance** | **Page: 3560 - 1**

TABLE OF CONTENTS



## 1. Applicable Codes and Regulations

1.1. This Standard meets the requirements of the Federal, Pipeline Safety Regulations, Sections 192.745, 192.747, and Missouri 4 CSR 240-40.030 13(U)(V).

## 2. General

2.1. This standard shall apply to all system safety and sectionalizing valves identified as essential valves and certain curb valves.

2.2. Each essential distribution valve shall be identified by number and location. The valve record shall include a sketch indicating the location of each valve.

2.3. Standard 3550, Vault Inspection, and Maintenance shall be followed when a vault must be entered to perform valve inspection or maintenance.

2.4. Standard 2540, Prevention of Accidental Ignition shall be followed during the inspection process.

## 3. Inspection and Maintenance Frequency

3.1. Each distribution valve covered by this procedure shall be inspected, maintained as described in Section 4.0 at least once each calendar year, at intervals not to exceed 15 months.

3.2. Underground valves on service lines such as curb valves shall be inspected as follows:

3.2.1. Underground valves serving service lines where pressure exceeds 2 PSIG into the structure shall be inspected annually not to exceed 15 months.

3.2.2. Underground valves serving service lines where pressure is less than 2 PSIG into the structure shall be inspected at the time of the normal leak survey.

3.3. Some valves may require more frequent inspection, based on prior operating and maintenance experience. These valves shall be identified and inspected as often as determined necessary by Operating Management to insure safe and reliable operation.

4. **Procedure**

4.1. Visual inspection to ensure proper valve access.

4.2. Verify valve location. Measurements shall be taken from known points.

4.3. Check the valve box for condition and alignment. Clean as necessary.

4.4. If there is valve locking device, (above ground valves) inspect it for proper operation / lubrication.

4.5. Check the essential valve identification number on distribution valves for accuracy and legibility.

4.6. Check the atmosphere surrounding below ground valves for the presence of gas using a CGI unit. Above ground valves may be checked using a soap test. If leakage is found, classify and schedule for repair in accordance with Company standards.

4.7. Inspect and maintain the valve operator (above ground valves) in accordance with the following.

4.7.1. Pneumatic operators shall be inspected and maintained in accordance with the manufacturers recommended procedures.

4.7.2. Gear operators, bushings, and seals shall be cleaned of dirt, paint, rust, or other foreign materials.

4.7.3. Inspect accessible piping for corrosion and coating damage.

4.8. Partially operate metallic valves to ensure that it turns freely and functions properly

4.9. If the metallic valve does not operate satisfactorily, lubricate the valve in accordance with the manufacturers recommended procedures. Special care shall be taken to avoid over-lubricating valves located directly upstream of meters or regulators. Do not lubricate if the valve is operating satisfactorily.

TABLE OF CONTENTS



## 1. Applicable Codes and Regulations

1.1. This Standard meets the requirements of the Federal, Pipeline Safety Regulations, Sections 192.469 and 192.471; and Missouri 4 CSR 240-40.030(9)(K) and (L).

## 2. General

2.1. Test stations are a necessary part of a cathodic protection system. Each pipeline under cathodic protection must have sufficient test stations or other contact points for electrical measurements to determine the adequacy of cathodic protection. When they are installed, record good location information in respect to permanent landmarks to enable the test stations to be located for routine monitoring.

## 3. Design Considerations

3.1. Test stations shall be designed to avoid placement of a reference electrode within the influence of an anode.

3.1.1. Test station installations shall be verified to be representative of the entire protected section.

3.2. Test station designations are as follows:

3.2.1. Type A - A single structure connecting test point (see Exhibits 1, 2 and 3).

3.2.2. Type B - A single structure connecting test point with the anode lead connected in series with the test lead (see Exhibits 4 and 5).

3.2.3. Type C - A dual structure connecting test point for piping located on each side of an insulator. Connections are on each side on the insulator (see Exhibit 6).

3.2.4. Type D - A dual structure connection test point for casings, with leads attached to the carrier piping and to the casing piping (see Exhibit 7).

3.2.5. Type E - A dual structure connection test point for pipeline crossings, with leads attached to each line (see Exhibit 8).

3.3. Recommended test station spacing guidelines are as follows.

3.3.1. Bare Pipe - Urban - Every 1,000 feet

3.3.2. Bare Pipe - Rural - Every 2,640 feet

3.3.3. Coated Pipe - Urban - Every 2,640 feet

3.3.4. Coated Pipe - Rural - Every 5,280 feet

**NOTE:** Short, isolated sections of protected piping should have a minimum of one test station per section.

**4. Type A Test Stations**

4.1. Application of Type A test stations (single structure)

4.1.1. A welded steel service electrically continuous to a steel main is the preferred method of installation for this type of test station.

4.1.2. The tracer wire of a direct buried PE service line may be connected to a steel main and utilized as a test station if provisions are made to place the half cell directly over the main. Connecting the service line tracer wire to the main should only be performed if a test station is required. If installed, the customer's house line shall be insulated from the inlet riser.

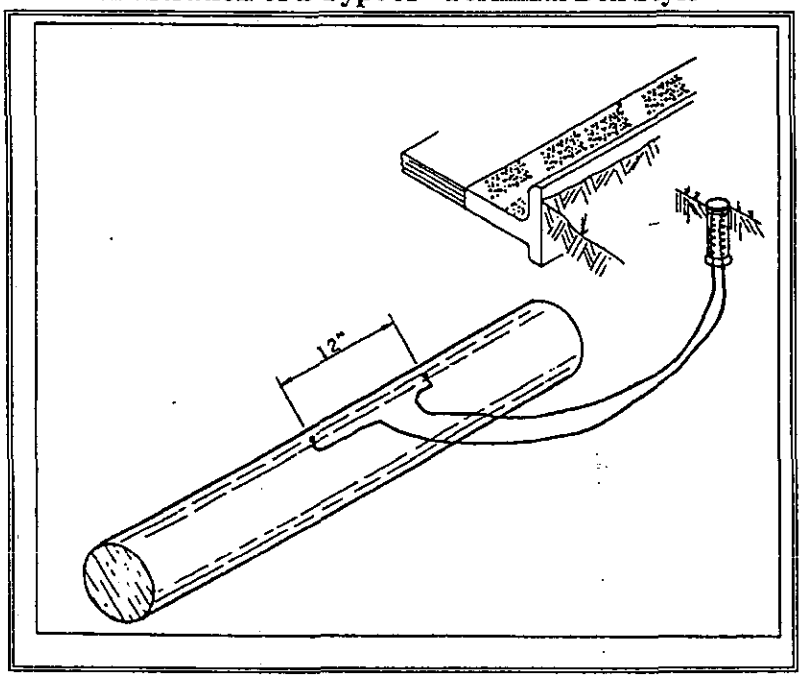
- **Tracer wire shall not be installed in a curb or distribution valve box.**

4.3.1. Installation Procedures for a Type A - Condulet Style

- Locate a structure to install the condulet on, such as a pipeline marker, utility pole, or other above-grade permanent structure that is in close proximity to the main.
- Install a test lead (No. 12 AWG with TW insulation). Two identical test leads (one as a spare) may be installed and spaced a minimum of 12 inches apart, using thermite welds.
- Coat all exposed piping and thermite welds.
- Install test leads at a minimum depth of 18 inches.
- Insure that the bottom of the conduit is properly reamed and covered to assure the integrity of the test lead wires.
- Connect the leads to the condulet terminal posts.
- Take a pipe-to-soil potential using the test station prior to backfilling to verify connections.
- Assure that sufficient slack exists in the lead wires to avoid damage during backfilling of the excavation.
- Backfill the excavation.
- After backfilling, take a pipe-to-soil potential to verify no damage has taken place during the backfilling process.
- Record the address or location and initial read of the test station on the Cathodic Protection Test Record.

4.4. Type A - Terminal Box Style

## EXHIBIT 3
**Illustration of a Type A - Terminal Box Style**




4.4.1. Installation Procedures for a Type A - Terminal Box Style

- Determine a location to install the terminal box that will provide protection for the box and a more permanent type of installation. Examples are street curbing, sidewalks, and fence posts that are in close proximity to the main.
- Install two identical test leads (No. 12 AWG with TW Insulation), spaced a minimum of 12 inches apart, using thermite welds. One test lead may be installed as an option.
- Follow procedure described in Paragraph 4.3.1 of this Standard.
- **NOTE: Test lead wires shall not be installed in a curb or distribution valve box.**

5.2.8. Connect the anode wire and main lead together on the lower terminal post.

5.2.9. Take a pipe-to-soil potential using the test station prior to backfilling to verify connections.

5.2.10. Assure that sufficient slack exists in the lead wires to avoid damage during the backfilling of the excavation.

5.2.11. Backfill the excavation.

5.2.12. After backfilling, take a pipe-to-soil potential to verify no damage has taken place during backfilling process.

5.2.13. Record the address or location and initial read of the test station on the Cathodic Protection Test Record.

- **NOTE: Test lead wires shall not be installed in a curb or distribution valve box.**

## 6. Type C Test Stations

6.1. Application of Type C Test Stations (Dual Structure with Insulator)

6.1.1. A condulet-style station is the preferred installation of this type of test station.

6.1.2. Installation of a terminal box test station may be used if a condulet is impractical. Note that the location of installation of this type test station is important in assuring that it can be found during subsequent monitoring or locating.

6.2. Installation Procedures for Type C Test Stations

6.2.1. Locate the station as close as possible to a pipeline marker, utility pole, or other abovegrade permanent structure.

6.2.2. Install one main bond lead (minimum No. 8 AWG with TW Insulation) on each side of the insulator. The main bond leads shall be spaced a minimum of 12 inches apart from the monitoring lead connection, using thermite welds.

6.2.3. Install one test lead (No. 12 AWG with TW Insulation) on each side of the insulator as the monitoring leads, using thermite welds.

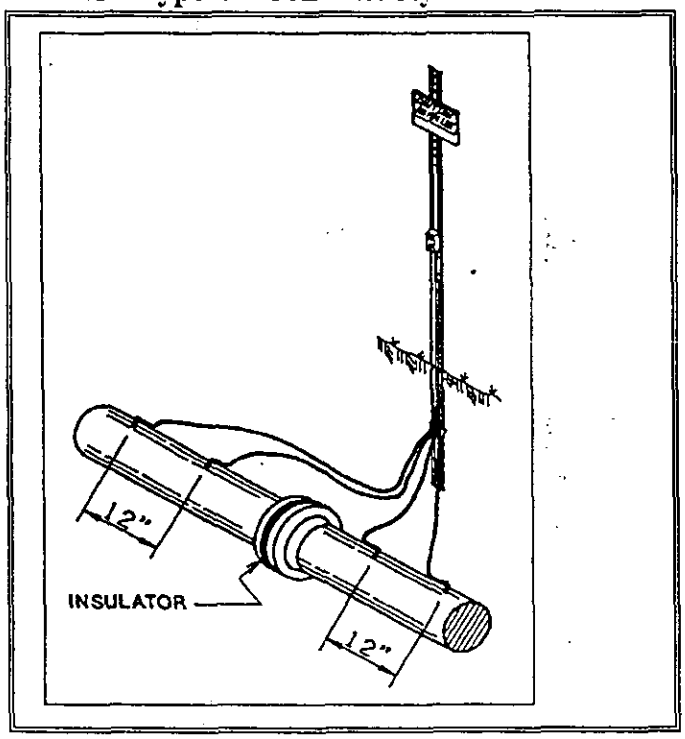
**NOTE: It is very important to be able to identify each lead. Use of color-coded wires or some other method of identification is necessary.**

6.2.4. Coat all exposed piping and thermite welds.

6.2.5. Install leads at a minimum depth of 18 inches.

## EXHIBIT 6

**Illustration of a Type C - Condulet Style or Terminal Box Style**




6.2.6. Ensure that the bottom of the conduit (if used) is properly reamed and covered to assure the integrity of the test lead wires.

6.2.7. Connect the monitoring test lead to the correct condulet terminal post.

6.2.8. When bonding is necessary, install a bonding wire across the two lower terminal posts.

6.2.9. Take a pipe-to-soil potential using the test station prior to backfilling to verify connections.

# Action Plan FOR ALL MGE LOCATIONS

## Meetings following the incident.

### July 27th, 1999

Review valving on the 55 psi system – determine essential valves and to annual inspection and map.

Install an official time source in the dispatch office.

### August 3, 1999

Review with MGE employees and contractors proper documentation of service cards.

Determine if it is proper for service lines to be looped around the tap.

## New Annual Inspection

1. Inspection of Curb Boxes:

a. Identify service lines where line-pressure greater than 2 psi enters a structure.

b. Document outside valve location.

c. Document location and conditions of the curb box if line is below grade.

d. Document conditions found, valve access and operational. Create a repair order to correct any deficiencies.

e. Post all curb box locations to PDS. Indicate essential valve and date inspected.

f. Repair all deficiencies within six months of detection.

g. Perform annual inspections of essential curb box valves.

# Training

## January 12, 2000

Hold training session with foreman, inspectors, and key contract personnel (Foreman, lead men)

1. Review the MPSC 41st and Walnut and 12th and Walnut incidents reports.

    a. Conclusions

    b. Steps we are taking to ensure compliance

    c. Responsibilities

2. Develop a list of specific items that will ensure proper service line replacement and Documentation. (Examples).

| Accuracy | Observation |
|---|---|
| Depth | Reamed and Shimmed Casing |
| Measure of Tap | Locator wire properly installed |
| Measurement of curb valve | Meter supported |
| Bridging | PE not in stress from bending |
| Pressure tests | Padding |
| Pipe installed | Meter location |
| Old service cut of location | |

**Brainstorm list add essential items**

Hold review of expectations and responsibilities with foreman, inspectors and key contract personnel.

# Request for IT:

Modify the PDS Screen and database.

1. Area or box to indicate "Essential curb box valve".

2. Date inspected (box for) MM/DD/YY.

3. Report Menu

   Create a report by Division and Town.
   List each essential valve by:

   a. address
   b. shown measurements
   c. Last date inspected provide blank space for current inspection date.

4. Provide a blank to pencil in the current inspection date.