AmeriGas®
America's Propane Company

November 16, 2007

Mr. Chris Hoidal
Director, Western Region
Pipeline and Hazardous Materials Safety Administration
U.S. Department of Transportation
12300 W. Dakota Avenue, Suite 110
Lakewood, CO 80228

Re: **Notice of Probable Violation and Proposed Compliance Order**
CPF 5-2007-0022

Dear Mr. Hoidal:

This is in response to the Notice and Proposed Order referenced above, dated October 19, 2007, which arose from a site visit in Kapolei, Hawaii on November 13, 2006. We appreciate the opportunity to respond to your Notice.

First, by way of background, the inspector who visited AmeriGas's Kapolei facility, and met with General Manager Ron Templeman, was apparently under the mistaken impression that AmeriGas operates gas transmission lines on Oahu. AmeriGas does not own or operate any transmission lines in Hawaii. AmeriGas does operate a limited number of propane distribution systems in Hawaii that fall under your office's jurisdiction, but none of those systems serves 100 customers or more from a single source.

During the meeting on November 13, 2006, Mr. Templeman responded to your inspector's questions, and confirmed that AmeriGas does not operate any transmission lines in Hawaii. Your inspector appeared to be satisfied with that, and he did not request any documents or inspect any AmeriGas facility. Thus, we were surprised when we received your Notice and Proposed Order last month.

I will respond to the Notice and Proposed Order according to your section numbers:

Item 1 in Notice and in Proposed Order. The section cited, 49 CFR §191.1, is simply a description of scope, and it does not contain any specific requirements. The Notice says that "Records were unavailable at the time of the inspection to substantiate compliance with this section." In fact, no records were requested by your inspector. Despite this, AmeriGas has an Operation and Maintenance Manual, a copy of which is enclosed with this letter. AmeriGas's O&M Manual was available in the Kapolei,

Hawaii office at the time of the inspection. Thus, Item 1 of the Notice is without merit, and Item 1 of the Proposed Order is unnecessary.

Item 2 in Notice and in Proposed Order. As mentioned in the preceding paragraph, AmeriGas already has an O & M manual in compliance with 49 CFR §192.605. Thus, Item 2 of the Notice is with out merit, and Item 2 of the Proposed Order is unnecessary.

Item 3 in Notice and in Proposed Order. The Notice cites 49 CFR §192.614 and states, "Records were unavailable at the time of the inspection to substantiate that a program was in place to prevent damage to its pipelines as a result of excavation." As mentioned above, no records were requested by your inspector. Please refer to Section 5.3 in AmeriGas's O & M manual, "Damage Prevention Program." Thus, Item 3 of the Notice is without merit, and Item 3 of the Proposed Order is unnecessary.

Item 4 in Proposed Order. Since AmeriGas's O & M manual already existed, and no changes to AmeriGas's procedures or infrastructure are required, no additional costs have been incurred by AmeriGas to comply with the applicable regulations.

We believe that this letter fully responds to the items raised in the Notice and Proposed Order. However, if you have any questions or need clarification, please do not hesitate to contact me. Thank you for your time and consideration.

Respectfully,

Douglas A. Stuart
Counsel

DAS/cr

1.0 INTRODUCTION

The Natural Gas Safety Act of 1968 required the Department of Transportation (DOT) to develop and enforce minimum safety regulations for the transportation of gases by pipeline. These regulations first became effective in 1970, and the Research and Special Programs Administration (RSPA) of DOT is charged with their enforcement. They are published in Title 49 of the Code of Federal Regulations (CFR), Parts 190, 191, and 192.

A. This pipeline safety code DOES NOT apply to (Part 192.1):

1) Fewer than 10 customers serviced from a single or manifolded source if no portion of the system is located in a public place; and,

2) Single-tank, single-customer gas systems located entirely on the customer's premises, but partially in a public place (includes churches or restaurants).

B. The pipeline safety code states that operators of all gas systems must:

1) Deliver gas safely and reliably to customers;

2) Provide training and written instruction for employees;

3) Establish written procedures to minimize the hazards resulting from gas pipeline emergencies; and,

4) Keep records of inspections and testing.

1.1 JURISDICTION

RSPA (Research and Special Programs Administration) of the Federal Department of Transportation establishes the regulations for the Office of Pipeline Safety and has the responsibility for enforcement, except for those States which have assumed responsibility for enforcement of their intrastate installations. The State may adopt additional or more stringent regulations as long as they are compatible with the minimum Federal Standards. If you are in such a State, contact the State agency to determine if there are additional pipeline safety requirements in excess of the Federal.

1.2 GAS OPERATOR

A person who engages in the transportation of gas. A gas operator may be a gas utility company, a propane company, or an individual operating a housing project, an apartment complex, condominium, or a mobile home park served by a master meter.

The term "Gas Operator" throughout this Manual will refer to the following:

1. To the District...

   a. Where the gas system and consumers are served directly by the Company, including billing; or

   b. Where the Company owns the gas system and services it directly, although the gas is sold to and customers are billed by others.

2. To others...

   a. A Master Meter System in which the Company delivers and sells the product to others who own and operate the gas system, billing the consumers by meter or in the rent.

1.3 RESPONSIBILITY

Where the District is the Operator, **the Market Manager is responsible for compliance with this manual.** Where others will be the Operator, the District should cause the Operator to be aware of the OPS requirements and, on request and as practicable, provide training to them.

In situations when the District is the Operator, it is the District Managers responsibility to periodically review the work being performed by field personnel through direct observation and / or engaging conversation to evaluate the existing procedures to ensure their effectiveness.

1.4 TRAINING

These procedures shall be reviewed at least once per year with all persons in the District who may be employed in the installation, operation, maintenance, repair, testing and surveys of a gas system subject to OPS. Document such training on a Training Documentation Form. Training records are subject to audit by the Regional Safety Technical Manager at any time, and will be inspected by OPS on any inspection. This manual will also be reviewed by Supervision at least annually, but not to exceed 15 months, to ensure changes/updates to 49 CFR are incorporated.

1.5 CUSTOMER NOTIFICATION (192.16)

AmeriGas assumes responsibility for the underground pipeline and aboveground piping up to the outlet of the meter as described in 192.16, including repair, maintenance, and testing.

1.6 WRITTEN PROCEDURES (192.603)

Operators are to maintain a set of written procedures for the operation and maintenance of OPS gas systems, called an Office of Pipeline Safety Operating Manual.

In addition, a supplementary system binder or file is to be maintained for each gas system that would fall under OPS jurisdiction. This supplementary plan is to include information, procedures and emergency measures specific to the gas system, and all surveys, inspection and test records. See Appendix D for a sample plan.

1.7 CLASS LOCATIONS (192.5)

Each system has a Class Location. The Class Location determines maintenance, monitoring, design and other requirements, and must be re-evaluated whenever there are changes in population density or structures.

The Class Location unit is an area that extends 220 yards on either side of a pipeline, and is determined by the buildings in the class location unit. Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building.

Class Locations are as follows:

A. Class 1 is any class location that has 10 or fewer buildings intended for occupancy.

B. Class 2 is any class location that has more than 10 but fewer than 46 buildings for occupancy.

C. Class 3 is any class location that has 46 or more buildings for occupancy, or where the pipeline lies within 100 yards of either a building or well-defined outside area (such as a playground, park or other area of public assembly) that is occupied by 20 or more persons during normal use.

D. Class 4 is any class location unit where buildings have 4 or more stories above ground.

1.8 PENALTIES FOR NON-COMPLIANCE (190.221-229)

Non-compliance may subject the Operator to civil or criminal penalties. If the hazards warrant, a "Hazardous Facility Order" may be issued to shut down the system.

1.9 ANNUAL DISTRIBUTION REPORT (191.11)

Each Operator of a distribution system which serves 100 or more customers from a single source must submit each year, not later than March 15, an Annual Report for Gas Distribution System (DOT Form RSPA-F 7100.1-1), with a copy to the Operations Department.

2.0 DEFINITIONS

Following is a list of commonly used terms, and their meanings:

2.1 49 CFR: Code of the Federal Regulations, Title 49. This document contains the actual regulations the Operator must follow under the Pipeline Safety Act, as well as the transportation of a hazardous material by rail, water, air or highway.

2.2 MASTER METER SYSTEM: A pipeline system for distributing gas within, but not limited to, a definite area, such as a mobile home park, housing project, or apartment complex, where the operator purchases metered gas from an outside source for resale through a gas distribution pipeline system. The gas distribution pipeline system supplies the ultimate consumer who either purchases the gas directly through a meter or by other means such as by rent.

2.3 CORROSION: The rusting of metal pipe. This is caused by an electrochemical reaction that takes place between metallic pipe and its surroundings. As a result, the pipe deteriorates and will eventually leak. Underground corrosion can be retarded with cathodic protection.

2.4 CATHODIC PROTECTION: A procedure by which underground metallic pipe is protected against corrosion, by controlling the corrosion of steel pipe and connected metallic equipment through the use of electrolysis.

2.5 SERVICE REGULATOR: A device designed to reduce and limit the gas pressure to the consumer.

2.6 DISTRIBUTION LINE: A pipeline other than a gathering or transmission line.

2.7 MAIN: A gas distribution line that serves as a common source of supply for more than one service line.

2.8 SERVICE LINE: A gas distribution line that transports gas from a common source of supply (the main) to a customer's meter or to the connection of a customer's piping if there is no meter.

2.9 SERVICE RISER: The section of a service line which extends out of the ground and is often near the wall of a building. This usually includes a shut-off valve and a regulator.

2.10 MAOP: An abbreviation for maximum allowable operating pressure. This is established by design, past operating history, pressure testing, and pressure ratings.

2.11 SHUT-OFF VALVE: A valve installed to shut off the gas supply to a building. The valve may be located ahead of the service regulator, below ground at the property line, or where the service line connects to the main.

3.0 ACCIDENT AND INCIDENT REPORTING

3.1 TELEPHONE REPORT (191.5)

At the earliest following discovery, a report by telephone is to be made if there is a release of gas from a pipeline resulting in:

A. A death, or personal injury requiring hospitalization; or

B. Estimated property damage, including the cost of gas lost, of the Operator or others, or both, of $50,000 or more; or amount specified by authority having jurisdiction.

C. An event that is significant in the judgment of the Operator, even though it is not described above.

3.2 This report is to be made to the Regional Vice President/General Manager in accordance with the AmeriGas Safety Manual, AP No. 1.3. The Regional Safety/Technical Manager will report the incident to the National Call Center on the emergency reporting number 1-800-424-8802.

The District report of the incident must include:

A. The location of the incident (city, county, state, and physical address);

B. The time of the incident (date and hour);

C. The number of fatalities and personal injuries, if any;

D. Type and extent of property damage;

E. Description of the incident; and

F. Other information as required by the AmeriGas Accident Reporting Procedure.

3.3 WRITTEN REPORT (191.9)

Within 30 days of an incident an Operator shall make a written report to the Information Resources Manager, Office of Pipeline Safety, Research and Special Programs Administration, United States Department of Transportation, 1200 New Jersey Avenue, SE Building, 2nd Floor, Washington, DC 20590, using DOT Form RSPA-F 7100.1

If necessary, a Supplemental Report may need to be filed as soon as practical, following the original report.

Reports of incidents on intrastate pipelines shall be made to the State enforcement agency if the State requires such reporting.

The operations group will make such written reports.

4.0 REPORTS ON UNSAFE CONDITIONS (191.23, 191.25)

Note: This rule does not apply to Master Meter Operators or to conditions that may exist on a customer-owned service line.

Each Operator is to report certain safety related conditions, as described below, immediately after determining that a "safety related condition" exists. Each report must be filed and received by the US DOT Secretary within 5 working days (and, no longer than 10 days) after the day a representative of the operator first determines that a safety related condition exists. The report must be headed as a "Safety-Related Condition Report."

4.1 Operators are to instruct their personnel to recognize conditions that potentially may be "safety related conditions." Conditions which would most often need to be reported by a small operator include:

A. Unintended or abnormal movement such as earthquakes, landslides, or floods that impairs the serviceability of a pipeline;

B. Any crack or other material defect that impairs the structural integrity or reliability of the system.

C. A leak in a pipeline or LPG facility that would constitute an emergency.

D. Any malfunction or operating failure that would cause the pressure of the pipeline to rise above its maximum allowable operating pressure.

E. A safety related condition that could lead to imminent hazard and causes the operator to shut down the operation of a pipeline; or

F. Any other condition that is considered unsafe or hazardous in the judgment of the operator.

4.2 Safety related conditions that do not require a report include:

A. The condition exists on a pipeline that is more than 220 yards from any buildings or outdoor place of assembly, and is not within the right-of-way of an active railroad, paved road, or highway; or

B. The pipeline is repaired or replaced within 5 days. (191.23, b, 4, 191.25a)

This report is to be made according to the accident reporting procedures outlined in the AmeriGas Safety Manual. The Regional Safety Manager will make the written report within 5 days as required by 191.25.

5.0 OPERATING AND MAINTENANCE PLAN

A review and update, if needed, of this manual shall occur annually and not to exceed 15 months. The review and or updates shall be recorded on the Record of Review /Updates sheet.

5.1 INSTRUCTION FOR EMPLOYEES (192.605)

This manual covers operating, maintenance and emergency procedures which shall apply to all gas systems under the jurisdiction of the Office of Pipeline Safety.

Specific customer records regarding each locations construction, maps, operating history, maintenance records, etc., will be kept in a binder or file cabinet, in the front office, clearly identified as an OPS System.

The procedures outlined are based on the requirements found in 49 CFR, Parts 191 and 192; NFPA 58; NFPA 54; NFPA 59; the Guidance Manual for Operators of Small Gas Systems and the AmeriGas Safety Manual. When conflicts arise between 49 CFR and other regulations, the requirements of NFPA 58 and NFPA 59 prevail. When conflicts arise between 49 CFR and Company policy:

A. If the requirements of 49 CFR are more stringent, they shall prevail;

B. If the requirements of 49 CFR are less stringent, contact the Regional Safety/Technical Manager for guidance.

5.2 INSTALLATION PROCEDURES (192.11)

Make all installations in accordance with NFPA 58, NFPA 54, 49 CFR and the Guidance Manual for Operators of Small Gas Systems. These publications list the different materials qualified for gas service. All materials, parts and fittings used in a pipeline must be compatible.

When repairs are required, be aware of the materials that are in the system. Records indicating the type of materials and location of the piping and systems parts are essential. If such records are not available in the District, develop or secure them by:

A. Contacting the previous owners of the system;

B. Contacting the contractor who installed the system;

C. Checking local permits; or

D. Carefully exposing the pipe in certain locations to determine the type of material.

5.3 DAMAGE PREVENTION PROGRAM (192.614)

Before digging, locate the pipe network and other underground utility lines by one or more of the following methods:

A. Use of existing maps.

B. Locate underground metallic pipe and plastic pipe installed with an electrically conductive wire with pipe locating equipment.

C. Locate or verify locations of underground utility lines by contracting with utility companies.

D. Use a one-call system if available in your area to notify the appropriate utilities of your intention to dig. This type of service generally requires at least a 48 hour notice. (All locations with OPS installations must belong or participate in a "One-Call-System." Contact your State AHJ to enroll).

E. The district should maintain a list of area contractors that routinely perform excavation work and establish a contact person from each company to act as a liaison for correspondence. 192.614(c)(1)

F. Call before you dig notices and other related safety information will be sent to the customers and contractors each year to increase underground line safety awareness.192.614(c)(2).

G. If we are given notice that excavation is anticipated in our area, we should document who notified us of the expected excavation. The date it was received and what precautions were taken to prevent accidental damage such as, temporarily marking the lines before the excavation begins. 192.614(c)(3).

H. We should also inform the excavator as to how to identify our temporary line markers. 192.614(c)(4)

I. Temporary markings of underground lines will be identified by use of yellow flags or marking paint. 192.614(c)(5)

J. AmeriGas personnel will periodically follow-up and inspect our underground piping as necessary in any known areas of heightened potential for excavation. 192.614(c)(6)

K. When blasting has occurred in the vicinity of the gas system, follow Section 7.8 Blasting.

CAUTION: Service lines and mains installed prior to enactment of minimum depth requirements **may be very shallow; therefore, when uncertain, use non-sparking hand tools when digging until the lines are located.**

Where construction and/or maintenance projects are in progress, and trenches or ditches are left open in the absence of company employees, cover the openings, install barricades or rope, and mark with **"DANGER"** signs.

When you are made aware of an excavation by others that will take place in or around gas lines, advise the contractor of the location of gas lines.

5.3a PUBLIC AWARENESS (192.616)

AmeriGas will provide annual notification to the local Fire Department, Emergency Response Agencies, Excavation Contractors, and general public in areas in which a pipeline system is located on the use of a one call system and possible hazards associated with the pipeline system. (See Appendix D)

5.4 PIPELINE INSTALLATION, REPAIR AND REPLACEMENT

A. Bury service lines to a minimum of 18 inches and gas mains to a minimum of 24 inches, and at greater depths where soil erosion is prevalent or where required by local codes. When this requirement cannot be met, contact the Regional Safety/Technical Manager.

B. AmeriGas OPS systems normally do not operate at the design pressures of excess flow valves (EFV) in service lines, however, the use of EFV is required on any installations that has multiple sources of supply. The use of EFV in service lines shall be considered for any installation that has more than 500 customers.

5.5 STEEL PIPE INSTALLATION

A. Use schedule 80 pipe for liquid service and vapor service over 125 psig, welded or threaded; however, Schedule 40 pipe may be used if welded. Schedule 40 threaded pipe may be used for vapor service under 125 psi.

B. Fittings and valves used at pressures higher than container pressure shall be suitable for a working pressure of at least 350 psig; those used at pressures equal to container pressure (liquid or vapor)

shall be suitable for a working pressure of 250 psi; those used at vapor pressures under 125 psi shall be suitable for working pressures of 125 psi.

5.5a WELDING OF STEEL IN PIPELINES (192.221-192.245 Subpart E)

A Welding on pipelines must be performed only by outside personnel, who are qualified in accordance with Section 3 of A.P.I. Standard 1104 or Section IX of the ASME Boiler and Pressure Vessel Code, or is otherwise qualified under the provision of 192.225 through 192.245, and certified to weld on pipe of the above specifications.

B. Prior to performing welding on a pipeline system by outside personnel, the District must secure a copy of the Qualified Welding Procedure, Welder Qualification Test Record, and results that are to be used on the pipeline as outlined in API 1104.

5.6 COPPER TUBING INSTALLATION

A. Copper tubing may be used where authorized by the authority having jurisdiction and in accordance with the specifications and installation requirements in NFPA 58, NFPA 54, and the AmeriGas Safety Manual AP No. 9.1.

B. Tubing must be soft copper and meet the specifications for Seamless Copper Tubing for Air Conditioning and Refrigeration Field Service, Type K or L.

C. Fittings must be brass and connections made with heavy duty forged flare nuts.

D. Protect tubing by sleeving with a non-metallic piping where external forces could cause damage to the tubing. Seal the sleeve at both ends to prevent water from entering the sleeve and freezing.

5.7 PLASTIC PIPE INSTALLATION

Plastic pipe (Polyethylene or PE pipe) may be used where authorized by the authority having jurisdiction and in accordance with the provisions of NFPA 58, NFPA 54 and the AmeriGas Safety Manual, AP No. 9,II.F.

5.8 PE PIPE INSTALLER QUALIFICATIONS (192.285)

A. All employees installing PE pipe and making joints are to be trained by a representative of the pipe manufacturer or distributor of the pipe in accordance with the provisions of 192.281 through 192.283. Training in heat fusion will include the making of a minimum of (3) satisfactory welds. Upon satisfactory completion of this training, employees will be certified by the Regional Safety Technical/Manager in accordance with the AmeriGas Safety Manual, AP No. 9.1, II.F.9. Documentation of the qualifying procedures used by the trainer are to be secured and maintained in the O and M Manual.

B. An employee must be requalified in accordance with the provisions of 192.285 if he(she) does not make any joints within a 12-month period.

C. All outside contractors installing PE pipe must show evidence of being certified in accordance with DOT requirements.

5.9 INSTALLATION REQUIREMENTS

A. PE pipe must be manufactured according to ASTM D-2513 specifications and marked with the manufacturer's name or trademark, the SDR (Standard Dimension Ratio) of the pipe, the size of the pipe, the designation "PE", the date manufactured and the designation ASTM D-2513. All PE pipe installed in a new system should be from the same manufacturer.

B. Before using plastic valves, consult with the PE pipe manufacturer or a knowledgeable distributor.

C. The maximum service pressure permissible for PE piping is 30 psig, and should be as low as practicable to prevent reliquefication.

D. Bury PE pipe directly in the ground, or use it to replace a deteriorated buried metal pipe. In the latter case, a slightly smaller PE pipe may be inserted into the existing metal pipe, providing the PE pipe will be of adequate size to supply demand.

E. Joining may be accomplished by using heat fusion, butt or socket welding, or mechanical fittings compatible with the pipe being used, and in accordance with the instructions by the manufacturer of the fittings. Detailed procedures for joining of PE Pipe may be found in the PE manufacturer's training literature.

F. Install all PE pipe below ground. Bring the service above ground by use of an anodeless riser with appropriate mechanical fittings. No PE pipe shall be exposed aboveground. Do not use risers to support external loads.

G. Support PE pipe along its entire length with properly tamped and compacted soil. Backfill material must not contain large or sharp rocks, broken glass or other objects which may damage the pipe. Where such conditions may exist, use dirt or sand backfill.

H. Where PE pipe is laid in an area where there has been digging and backfilling, and it appears the backfill may settle, prevent shear and other stress concentrations at valves, connectors and plastic-to-pipe transition fittings by using external stiffeners or sleeves.

I. Provide adequate slack through "snaking" to prevent pullout or separation of a joint from expansion and contraction of the pipe caused by temperature changes. PE pipe will expand or contract 1 inch for each 10 degrees temperature change for every 100 feet of pipe.

J. Take special care to prevent coal tar type coatings or petroleum base tape from contacting the plastic pipe, as it may cause plastic pipe to deteriorate.

K. PE pipe may be inserted into metal pipe to protect it from damaging soil conditions, vehicular traffic, or as a replacement for an existing main or service line. Protect the PE pipe from damage during the insertion process. In addition, take measures to prevent water from accumulating and freezing in the sleeve and damaging the PE pipe.

L. Install valves or valve enclosures in a manner that will protect the PE pipe from excessive torsional (twisting) or shearing (cutting) loads when the valve is operated.

M. Install 14 gauge tracer wire over the entire run of PE pipe separated with at least 6 inches of fill, to aid in locating the pipe. Ensure that both ends of the tracer wire terminate above ground at each riser.

N. LP-gas vapor flowing through PE pipe creates a static charge. Take the following precautions to avoid ignition when there is a possibility of a flammable gas-air mixture being present:

1) Use a wet tape conductor, grounded with a metal pin driven into the ground, and lay it in contact with the section of exposed pipe.

2) If a gas mixture may already be present, wet the pipe from the ground end with a mild soap solution, then apply the tape.

3) Wet the tape occasionally with water.

O. Do not vent gas through ungrounded PE piping in a ditch or excavation, vent to a remote location.

5.10 TAPPING OR REPAIRING LINES UNDER PRESSURE (192.627)

Steel Pipe All taps made on steel pipe, whether pressurized or de-pressurized, are to be made by qualified persons. Where taps or repairs must be made on a pressurized line, obtain approval and directions from the Regional Safety/Technical Manager.

A. The following are minimum guidelines when working on de-pressurized lines:

1. Reduce the pressure in the pipe to 0 psig.

2. Ensure there is enough room in the excavation to work safely.

3. Special precautions for cathodically protected pipe: Cathodic protection electrical currents will be interrupted by the separation of the pipe, with possible spark ignition of any gas vapors that

may be present. Attach a jumper wire on the piping so that electrical continuity will be maintained.

4. After repairs have been completed, remove the jumper wire, and wrap or coat all exposed bare steel pipe and valves before backfilling.

B. Plastic Pipe The affected section of pipe can be isolated using (2) "pinch tools". Slowly release the gas trapped in the isolated section through a partial opening to Zero psi.

CAUTION: When releasing gas in an excavation, the escaping gas can displace the oxygen and can cause asphyxiation. Use a positive pressure respirator if you remain in the excavation during the de-pressurizing. Ensure the excavation has been thoroughly ventilated before resuming work.

CAUTION: When releasing gas ensure that no ignition sources are present, including clothing that can create a static buildup.

CAUTION: Welding or cutting on a pipeline containing a combustible mixture is prohibited.

5.11 PIPELINE MARKERS (192.707)

Install a line marker over each buried main as close as practical to where the main crosses a road, street or railroad; on aboveground lines where accessible to the public; or whenever necessary to identify the location of the pipe to reduce the possibility of damage to the system.

Markers are shown in the Decal Manual and are available through the Purchasing Department. The District name and 24-hour telephone number is required on all markers. Marker warnings should be written legibly on a background with sharply contrasting colored letters and indicate "Caution" or "Danger" followed by the word "Gas." The dimensions of the characters on the line markers should be no less than 1 inch tall and $1/4^{th}$ inch stroke width.

5.12 VAPOR METER INSTALLATION (192.357)

Install vapor meters in accordance with the AmeriGas Safety Manual, AP No. 9.3. Apply an altitude correction factor for meters operating at 11 in. w.c. and installed above sea level. For meters operating above 11 in. at any altitude, if a low pressure index is used, apply the proper pressure correction factor.

5.13 VALVES

A. Service Line Valves (192.365)

B. Use service line valves capable of being locked.

1. Install service line valves upstream of the regulator and vapor meter and outside of the building. When service line valves must be installed underground, cover them in a durable box or standpipe that allows ready operation of the valve. Do not put stress on the service line with the weight of the box or standpipe.

C. Valves Other Than Cast Iron or Plastic (192.145)

1. Each valve must meet the minimum requirements or equivalent, of American Petroleum Institute (API) 6D. Valves that meet this standard can be obtained through Purchasing. Purchasing will ensure that documentation is provided that demonstrates compliance with this DOT Requirement.

Valves that do not meet this requirement can not be used in pipeline installations.

5.14 KEY VALVES (192.747)

A. Key valves are distribution line valves that are installed to shut down or isolate sections of the system in an emergency or for service. Install one at each high pressure regulator, and at any other location appropriate for isolating piping sections. All valves must be readily accessible.

B. To prevent a potential hazard, do not operate a key valve without the full understanding of its function. No valve should be opened where there is a pressure difference across the valve until the difference is fully understood and it is safe to open the valve.

C. Inspect and service each key valve, including the service valve on the storage tank(s), at least once each year, at intervals not to exceed 15 months. Ensure the handle is not "frozen", the valve is free from leaks, the valve is readily accessible and ground movement is not creating a shear force on the connections. If a valve is found defective it should be repaired or replaced immediately. **Record the results on Form No. 5.**

5.15 MAXIMUM ALLOWABLE OPERATING PRESSURE (192.621)

The high pressure lines should be operated at 10 psig or at a pressure that will maintain the required pressure in the distribution lines, but shall not exceed the MAOP of 20 psig. In cold climates, such higher pressures can cause reliquefication of the propane vapor. Each O and M plan must contain procedures specific to a particular gas system for the establishment of MAOP's.

The first (1^{st}) stage lines should be operated at a maximum 10 psig and be installed ahead of all second (2^{nd}) stage regulators.

The second (2nd) stage lines should be operated at a maximum 14" (inches) water column (wc) for all appliance lines.

See Appendix C for formulas and sample calculations, and Appendix C-1 for documentation of MAOP.

5.16 REGULATORS AND OVERPRESSURE PROTECTION (192.739)

A. Install regulators in accordance with NFPA 58, NFPA 54 and AmeriGas Safety Manual, AP No. 9.2, including installing the regulator so that the relief valve is positioned to prevent any dirt, rain, snow, ice, or other debris from entering.

With the following additional requirements:

1) The system must be two-staged.

2) As protection against system failure, install (2) first-stage regulators with pressure gauges capable of reading in 2 psig increments in parallel to serve the storage or manifolded tanks (Commonly referred to as a "Monitoring Regulator System"). One of the regulators is to function as the primary and be set at the required distribution pressure; the second is to serve as the backup and be set at about 2 psig lower.

3) Use regulators equipped with high capacity internal relief valves. If a pressure regulator is not so equipped, install an in-line relief valve with the appropriate start-to-discharge pressure at the outlet of the regulator (See NFPA 58 Chapter 2).

B. AmeriGas requires all external relief valves devices be placed with a Monitoring Regular System. Inspect each high pressure regulator at least once each year, at intervals not to exceed (15) months, to determine its physical condition, including the external surface, adjusting spring, vent opening, and the stability of its mounting. **Record the results of the inspection on Form No. 6.** In addition, the regulations require a test to be conducted annually to determine if the overpressure protection device (external relief valve) is of sufficient capacity for the system, if feasible. If not feasible, a calculation must be made on an annual basis to ensure the capabilities of the relief device. AmeriGas requires all external relief devices be replaced with a Monitoring Regulator System. Refer to Appendix C for formulas.

C. Procedure for Testing Monitoring Regulators

1) Check gauge pressure of first monitoring regulator, and note.

2) Lower pressure of second monitoring regulator by 4 psig., (system should be operating at pressure noted in step one).

3) Check gauge pressure of second monitoring regulator, and note.

4) Raise the pressure of the first monitoring regulator by 4 psig, (system should be operating at pressure noted in step three).

5) Reset monitoring regulators to original settings.

5.17 PRESSURE TEST

On new installations, and when repairs are made to an existing system, pressure test all lines before backfilling, as follows:

A. Test liquid or vapor piping to be operated at tank pressure at 125 psig or tank pressure, whichever is greater, for a minimum of 60 minutes. Use air, nitrogen or carbon dioxide. Do not use oxygen.

B. Test mains and service lines, including PE pipe, to be operated at 40 psig or less at 50 psig or 150 percent of the MOP, whichever is greater, for a period of 60 minutes, or as required by the authority having jurisdiction. Use air, nitrogen or carbon dioxide. Do not use oxygen.

C. For other than mobile homes: Test low pressure lines from the second stage regulator to the shut off valve before each appliance that are to be operated at 14" w.c. or less at 10 psig for a period of 15 minutes. Use air, carbon dioxide, or nitrogen as the test medium.

D. For mobile homes: Test methods and pressures must be in accordance with NFPA 501A or the authority having jurisdiction.

5.18 LEAK TEST

After the regulator is installed and appliances connected, perform a low pressure leak test with propane as the test medium, at 9" w.c. for a period of (10) minutes per AP No. 9.4, or as required by the authority having jurisdiction.

Record test results of high pressure lines on Form No. 14, and of low pressure lines on a Service Work Order.

5.19 PURGING (192.629)

A. Purge lines after installation or repair and before placing in operation. Whenever a line is purged, take care to ensure that the purging medium is released into one end of the pipe in a moderately rapid and continuous flow to prevent a hazardous mixture of gas and air from forming within the pipe. If necessary, a slug of inert gas may be used to keep the gas and air from mixing. Also take care to ensure that a flammable mixture is not released within a

confined space or near ignition points. Since complete purging may be of a short duration, do not leave the point of discharge unattended during purging.

B. When purging lines 3 inches and larger, use an inert gas (nitrogen or carbon dioxide) to displace the air, then displace the inert gas by LP-gas.

C. Any line places out of service should be purged according to 5.19, A.

D. **NEVER USE OXYGEN FOR PURGING.**

5.20 ODORIZATION (192.625)

The Company purchases odorized gas for resale. Verify this odorant by "sniff testing" whenever gas is delivered to the storage tank(s) or service is performed on the system, and at least once per month. Establish test points at outer extremities of the system with one test point being at the furthest point from the source of supply. If gas is delivered by transport, the transport driver is to determine the presence of odorant at the time of delivery. This does not take away the responsibility of the District to verify the presence of odorant each month. Persons performing the "sniff tests" must allow sufficient time between test points to ensure their sense of smell was not affected by the previous test (See NFPA 58 Chapter 1). **Record the results of these tests on Form No. 7.**

5.21 CORROSION CONTROL - ABOVEGROUND STEEL PIPE AND EQUIPMENT.

Properly prepare and paint all aboveground steel pipes and tanks exposed to atmospheric corrosion at time of installation. Inspect aboveground pipe and tanks at least every (3) years, and repaint as necessary. Container pitting or corrosion should be checked against the guideline of CGA Pamphlet 6. **Record inspection results on Form No. 11.**

5.22 CORROSION CONTROL - BURIED PIPELINES (192.455)

A. Steel pipe installed before July 31, 1971. Determine any areas of active corrosion by electrical or leak detection survey or other comparable means. Cathodically protect any areas of active corrosion.

B. Steel pipe installed after July 31, 1971. Wrap all pipe, using X-Trucoat or equivalent, or coat with bitumastic or equivalent. Coat all fittings. Properly apply the coating to ensure that it adheres to the metal surface sufficiently to prevent the entrance of moisture, and that it covers the metal surface completely with no "holidays". Inspect the coating before laying the pipe and backfilling to ensure there is no damage. Backfill with dirt or sand free from rocks or other material that could damage the coating.

C. Pipelines that show evidence of localized pitting or generally corroded areas must be repaired or replaced. Replacement steel pipe must also be coated and cathodically protected.

5.23 CATHODIC PROTECTION (192.455)

A. Cathodically protect all steel pipe and tanks installed underground after July 31, 1971, in addition to the corrosion protection prescribed above, using anode bags or a rectifier system that will maintain a negative voltage of at least -0.85 volt, with reference to a saturated copper-copper sulfate half cell. (Compliance with this requirement is not required if the Operator can demonstrate that corrosive condition does not exist.) Cathodically protect tanks that are underground or mounded by including them in the protective system for the pipe, or isolate them with insulating fittings and protect them separately.

B. To establish test points on a system, an evaluation of the system should be done prior to setting the number of test station and have a (minimum 2 test points per system or 1 test point per every 35 customers) to periodically determine the adequacy of the cathodic protection through electrical measurements.

C. Test lead wires must be connected to the pipeline so as to remain mechanically secure and electrically conductive. Each test lead wire must be attached to minimize stress concentration on the pipe. Each bare test lead wire and bared metallic area at point of connection to the pipeline must be coated with an electrical insulating material compatible with the pipe coating. (192.471)

D. Each impressed current type cathodic protection system or galvanic anode system must be designed and installed so as to minimize any adverse effects on existing adjacent underground metallic structures. (192.473)

E. Consult a person or firm qualified in the field of pipeline corrosion control methods to determine the specific requirements and procedures for a system. All valid recommendations made by a contracted person or outside firm must be adhered to at the time of installation or subsequent inspections, whether performed by the contractor or in-house personnel.

F. Install an insulating fitting aboveground, upstream of the vapor meter, to isolate the protected underground piping. If aboveground storage tank(s) are used, install an insulating fitting when necessary to join dissimilar metals underground. DO NOT use a metal sleeve on a metal gas line.

G. A map for each system, showing the location of cathodically protected pipe, anode bags and test points, is to be maintained for as long as the system remains in service. **Use Form No. 3.**

H. Test cathodically protected systems for pipe-to-soil readings each calendar year, with intervals not exceeding (15) months. The readings should be at least -0.85 volts. **Record readings on Form No. 12 and Retain for the Lifetime of the System.**

I. Inspect rectifier systems at least (6) times a year, with intervals not to exceed 2-1/2 months. **Record results on Form No. 13 and Retain for 5 Years.**

J. If readings are low, take corrective action. Two consecutive low readings are a violation of OPS regulations. For valid interpretation of the voltage measurement, voltage (IR) drops other than those across the structure-electrolyte boundary must be considered.

5.24 INSPECTION OF EXPOSED UNDERGROUND PIPE (192.459)

Whenever any buried pipeline is exposed for any reason, inspect it for evidence of external corrosion. Where there is general or localized corrosion to the extent that leakage might result, repair or replace the pipe. Where corrosion has reduced the wall thickness to less than 30% of the nominal thickness, replace the pipe. Coat or wrap and cathodically protect any replacement or repaired pipe. **Record the results on Form No. 10 and Retain for the Lifetime of the System.**

5.25 INTERNAL INSPECTION OF PIPE (192.475)

Whenever steel pipe is removed for any reason, inspect the internal surface for corrosion. If internal corrosion is found, investigate the adjacent sections of pipe. Where general corrosion or pitting is found and is such that leakage might result, replace the pipe in accordance with the section above. **Record the results on Form No. 10.**

5.26 ACCIDENTAL IGNITION OF GAS (192.751)

A. Take precautions to prohibit all sources of ignition from pedestrian, vehicular or other workplace hazards in areas where the presence of gas from leakage, purging or venting may constitute a hazard of fire or explosion. Use appropriate warning devices, signs and/or barricades, as necessary. Route traffic as far away from the area as practical. Use non-sparking tools and lights that are approved for hazardous locations.

B. Vent gas during maintenance, servicing or purging only after potential sources of ignition are removed, and in accordance with NFPA 58, Section 4-3. Use vertical stacks. Use a flare stack for a controlled burn, if appropriate. If it is necessary to release a potentially hazardous mixture in a pit or trench, ensure you have constant ventilation, and you have a satisfactory CGI meter test before permitting work in the space. Ensure fire extinguishers are readily available.

C. Notify the local fire department when flaring or releasing more than minimal quantities of gas. It is also good public relations to notify residences and businesses in the area when the flaring would attract attention or concern from the public.

5.27 INACTIVATION OF PIPELINE SEGMENTS (192.727)

A. When service is discontinued to a customer, close the service valve and secure it with a lock or other device, or install a mechanical device or fitting that will prevent the flow of gas in the line to prevent unauthorized use or resumption of service.

B. Evaluate these discontinued service lines, at periods not to exceed six months, and take one of the following actions:

1) Retain the deactivated system for an additional designated period;

2) Remove the meter and regulator and cap or plug the service line; or

3) Abandon the service line at the main, using abandonment procedures.

4) For permanent abandonment, see section 5.28.

Document your actions on a Sales and Service Order (SSO) and file in the system binder or file forever.

5.28 ABANDONMENT OF FACILITIES (192.727)

When a gas main or service line is abandoned, physically disconnect it from the piping system, vent it to the outdoors in a safe manner, and seal the ends with a plug or cap. Purge lines ~~3~~ 2 inches or larger with nitrogen. **Document all abandonment's on a Sales and Service Order (SSO) and file in the system binder or file forever.**

5.29 RESTORATION OF GAS SERVICE (192.725)

Each disconnected service line must be tested in the same manner as a new service line before reinstated. Before restoring service to a system serving multiple customers, shut off each affected customer at the service riser. Inspect the piping system to ensure there are no open pipe ends. Prove low pressure lines and appliances leak free using a water manometer, test block or other leak testing device. Re-light and place in operation of all gas-fired appliances. **Document your actions on a Service Work Order.**

5.30 OTHER EQUIPMENT

Other equipment installed or used in a gas system, such as, but not limited to, vaporizers, vapor meters, leak detectors, etc., should be listed or approved, and installed and operated in accordance with the manufacturer's instructions, AmeriGas Policy and Procedures, and the authority having jurisdiction.

5.31 MANUFACTURERS' LITERATURE

Manufacturers' literature, to include specifications, installation and operating instructions should be maintained for all equipment installed and serviced in the gas system.

5.32 CONTINUING SURVEILLANCE (192.613)

A. Maintain a continuing surveillance of each facility to determine and take appropriate action concerning failures, leakage history, substantial changes in cathodic protection requirements or other unusual operating or maintenance conditions. This surveillance can be accomplished by training employees to be alert when on-site for any unusual or potentially unsafe condition, and by a periodic review of the inspection and test records of the facility.

B. Segments of pipelines that may become unsafe must be replaced, repaired, or removed from service. Any hazardous leak must be repaired in a prompt manner. If any segment of the facility is determined to be in an unsatisfactory condition, but no immediate hazard exists, initiate a program to recondition or phase out the segment.

5.33 PATROLLING AND INSPECTION (192.721)

A. The frequency of patrolling mains must be determined by the severity of the conditions which could cause failure or leakage, with the consequent hazards to public safety.

B. As a minimum, patrol mains located in areas where the piping may be subject to potential damage by ground movement, loss of support or vehicular damage at least 4 times per year, with intervals not exceeding 4-1/2 months, by walking along the pipeline and observing factors affecting the safe operation. Patrolling may be done in conjunction with the leakage survey or as meters are read. Include in your inspection:

1) External corrosion of aboveground pipe.

2) The general condition of regulators and meters.

3) Whether line markers are properly displayed.

4) Determine if any construction or excavation that might affect the pipeline is taking place in the immediate area.

5) The condition of the valves and fittings on an aboveground tank, to include ensuring there are no combustibles or flammables with 10 feet.

6) The condition of the valves and fittings in an underground tank dome, including whether there is proper dome drainage. **Record the results on Form No. 8.**

5.34 LEAKAGE SURVEY (192.723)

A) Schedule leakage surveys as frequently as may be required by the nature and age of the system and local soil conditions. Distribution systems outside of a principal business area are to be surveyed at intervals not to exceed 5 years; distribution systems within a business area are to be surveyed once a year, at intervals not to exceed 15 months. Use a CGI (Combustible Gas Indicator) to make this survey.

B) This survey is to include, but not limited to, the following:

1. Manhole and catch basin survey. The atmosphere in manholes providing access to gas, telephone, sewer and water systems, etc.; curb boxes; catch basins; cracks in surfaces of roadways or sidewalks.

2. Building survey. The atmosphere in or near cracks in building walls, floors, foundation, floor drains, service line entrances.

3) Distribution mains, service lines and riser survey. A bar hole probe shall be made adjacent to these lines and a testing of the atmosphere in the hole.

4) Vegetation survey. The condition of vegetation above and adjacent to mains, service lines and risers shall be visually inspected for signs of gas leakage. Conduct a bar hole probe where there are signs of possible gas leakage as evidenced by brown or wilted vegetation, leafless trees, etc.

Record results on Form No. 9 (See Appendix B for additional information regarding leakage surveys.)

5.35 MAINTENANCE SCHEDULE

Maintain a 12-month schedule of maintenance, tests and inspections required, similar to your vehicle PM schedule. The schedule should be posted and available to all involved personnel. To determine the adequacy of existing procedures, documents of work performed, such as Service Work Orders, must be reviewed by supervisors.

5.36 PROCEDURES FOR START-UP AND SHUT-DOWN (192.605)(b)(5)

Start-up: To assure operation within established Maximum Allowable Operating Pressure limits for a particular system, and unless otherwise provided for in another section of this manual, no gas shall be introduced into a distribution line unless high pressure, or first stage, and final stage regulators, as well as overpressure protection devices, are installed in the piping.

1. Shut off all lock-wing valves at meter locations.

2. Re-pressurize gas line.

3. Check repaired or replaced sections of piping to ensure it's leak free.

4. Refer to P & P 11.6 appliance lighting.

Shut-down: System shut-down shall occur at the container(s) shut-off valve, or other key valve that is located upstream of a pressure regulating device, and overpressure protection device.

1. Shut off main tank valves to discontinue source of supply.

2. Locate and repair or replace damaged section of pipeline.

3. If necessary purge system as required, see section 5.28.

4. Document and record all affected customers.

5.37 PERIODIC REVIEW AND QUALIFICATION OF PERSONNEL (192.605)(b)(8)

1. Refer to Operator Qualification Program (OP-202-B-1) section on Pipeline Operator Qualification File.

2. During the annual review of the OPS O & M and OQP materials, employees are encourage to give feedback and input on any issues in the program. Upon collection of this feedback/input from the employees, the Operator Qualification Committee annually will review the feedback and determine if changes need to be made to the program

5.38 PRECAUTIONS FOR ENTERING EXCAVATED TRENCHERS (192.605)(b)(9)

1. AmeriGas relies on contractors to perform this function and will ensure the contractor adheres to the requirements contained in 192.605(b)(9), which relates to unsafe accumulation of vapor or gas and emergency rescue equipment.

6.0 EMERGENCY PLANNING (192.615)

6.1 All employees are to be trained in response to emergencies that may occur in OPS gas systems. These emergencies may include, but are not limited to, the following:

A. Uncontrolled leaks considered hazardous.

B. Fire or explosion.

C. Failure of or danger to major segments of the system.

D. Natural disasters (floods, tornadoes, hurricanes, earthquakes, heavy snow fall, etc.)

E. Interruption of gas service.

F. Civil disturbance (riots, etc.)

6.2 No emergency plan can cover all situations and conditions. There is no substitute for sound judgment by the persons involved. In any emergency, the safety of people is the highest priority.

6.3 Before any emergency, develop general plans to meet the types of emergencies that could normally be expected. General emergency planning is provided below. Modify or amend these plans to meet your District situation and capabilities. In addition, the supplementary system binder or file for each system should contain specific directions and requirements for various emergencies.

6.4 PRE-PLANNING

A. Review this Manual and the applicable system binder or file for specific OPS gas systems at least once a year with all personnel.

B. Maintain liaison with the appropriate public officials, including police, fire departments, local emergency response groups and hospitals with respect to emergency procedures. This liaison should be periodic personal contact to discuss the appropriate operations, new information or requirements and verify their emergency contact method and number (home, office, pager, etc.) Provide training to organizations on request (192.616).

6.5 TRAINING FOR FIRE DEPARTMENTS IS A MUST. Appropriate fire departments should be approached at least annually for training of their new personnel and refresher training for others. The training should cover as a minimum.

A. Propane properties, as they affect fire personnel. Operation of container valves.

B. Emergency responses as outlined in the Emergency Response Procedures.

6.6 Post emergency telephone numbers for police, fire, hospital, burn center, emergency response group, etc., on the telephones or in a highly visible location in the District Office. Use 911 if that is the proper emergency number for your location.

6.7 Post emergency contact telephone numbers on District office doors and plant gates for public use.

6.8 Ensure there is a positive method of contacting District emergency personnel outside of working hours. Use an answering service or machine that directs the caller to a specific emergency contact. Ensure there is a qualified emergency employee on-call whenever the office is closed.

6.9 A specific list of parts, fittings, supplies, and tools needed for emergency repairs should be identified for each location based on the components of each individual system. This equipment should be maintained by either the operator or contractor.

6.10 Discuss the various types of emergencies that could occur with the resident managers or maintenance personnel employed by the installation owner.

6.11 In conjunction with Marketing Department, provide each new customer with a packet containing information on odorization and odor fade, procedures to follow in the event of a gas leak and a 24-hour emergency telephone number for the District.

6.12 Each employee who delivers propane or installs or services the gas system should be alert to any unsafe or potentially unsafe condition or procedure that may be encountered. Correct the problem, if possible; if not, take action, to include shutting off the gas supply to the area, and report the situation to the Market Manager.

6.13 RESPONSE TO EMERGENCIES

A. When responding to an emergency, the Market Manager or the senior qualified employee at the scene should take charge of AmeriGas actions to eliminate or bring the hazard under control, as outlined in the Emergency Response Procedures.

B. If fire or other emergency response personnel are on the scene, the AmeriGas person is to identify him(her) self to the person in charge and provide information and assistance as may be required.

C. The Market Manager is to commence an investigation in accordance with the AmeriGas Safety Manual, AP No. 1.3.

7.0 EMERGENCY RESPONSE PROCEDURES (192.615(b)(1)

Supervisory personnel shall be provided a copy of this manual and should familiarize themselves in the emergency procedures.

NOTE: Gas leaks are to be handled immediately. Gas service is not to be re-established until leaks are corrected and leak tests are satisfactorily performed.

1. First Notification of an Emergency

A. The person receiving the report obtain as much information as possible to enable the responding service person to better understand the situation; however, use common sense and consider possible danger to life and property when holding the caller on the telephone.

B. In the case of a possible gas leak, advise the caller to:

1) Evacuate the building or area.

2) Extinguisher all open flames, including appliance burners, pilots and smoking material.

3) NOT to operate any electrical switches or thermostats, ring door bells, use the telephone or light matches or lighters.

4) NOT to start a vehicle if the gas leak is outside.

5) Verify 911 or their local Police, Fire, and EMS Agency has been notified..

6) Advise emergency responders of Product Specific Hazards

7) Interact, cooperate, and, advise emergency responders as necessary.

7.3 LEAKS W/IGNITION (Gas Fire) Take the following action until the situation is corrected or until the fire department takes charge.

A. Isolate the leak by shutting off the gas at the storage tank or at a line valve. DO NOT EXTINGUISH THE FIRE UNTIL THE LEAK HAS BEEN STOPPED.

B. Eliminate or reduce the exposure of portable containers to heat from the fire by removing them, if possible.

C. If the tank is involved in the fire, apply water, if available, to the top of the tank to cool the metal and keep the pressure down.

D. Keep bystanders well away from the scene. Assist with evacuation if required by the person in charge. In the absence of the fire department or other emergency group, if tank failure appears probable to you, require evacuation to a minimum of 2000 feet (approx. ½ mile) from the tank.

7.4 LEAKS W/O IGNITION

A. Determine the leak by small, sound or portable leak detector.

B. Isolate the leak by shutting off the gas supply at the tank or a line valve, upstream of the leak. If the location of the leak cannot be readily determined or there are multiple leaks, shut off the valve on the storage tank.

C. Evacuate the area, as required.

D. Eliminate and prevent ignition sources in the area and downwind of the leak, to include vehicle traffic, smoking, non-explosion-proof flashlights or other lights, flares, lighted appliances in buildings downwind of the leak, etc.

E. Use a water mist spray, if available, to increase the dissipation of the vapor aboveground. For underground leaks, the gas must be purged from the soil.

7.5 NATURAL DISASTERS Generally, the hazards that can be expected are containers floating away, containers knocked off their bases and pipeline failures. Primary actions include:

A. Give priority to the control of any leaks.

B. Shut off the valves on containers that have broken loose. Inspect the containers for damage. Reset the containers or return them to the District yard. Drain the containers of any water. Purge the container and treat with methanol before using.

C. Inspect piping, regulators and meters for damage. Make necessary repairs or replacements. If the damage cannot be corrected at the time, isolate and lock off the affected of the system.

7.6 CIVIL DISTURBANCES The hazards generally encountered are from vandalism and may involve broken lines, open valves or damaged regulators and meters.

A. Give priority to the control of any leaks.

B. Make repairs. If repairs cannot be made at the time, isolate and lock off the affected portions of the system.

7.7 DAMAGE TO MAJOR SEGMENTS OF THE SYSTEM Generally, this type of damage is caused by others digging and damaging the piping.

A. Isolate the damaged sections. Make repairs. If repairs cannot be made at the time, lock off the isolated sections until repairs can be made. Ensure the remaining portions of the piping system are leak-free.

B. Make sure there are no flammable concentrations of gas pocketed in ditches of low-lying areas.

7.8 BLASTING

A. When you are aware of any blasting having been done in the vicinity of the gas system, survey the system to determine if there is any evidence of a leak or other damage. Respond to any hazardous conditions as outlined elsewhere in this Section.

7.9 INTERRUPTION OF GAS SUPPLY

A. The primary objective is to determine the reasons for the interruption and correct the problem. Respond to any hazardous conditions as outlined elsewhere in this Section.

B. Gas service is not to be resumed until conditions are corrected for safe operation, and all pressure/leak tests are satisfactorily performed.

7.10 RULES APPLYING TO ALL OF THE ABOVE EMERGENCIES

A. When working with any gas leaks, make sure the area is kept free of ignition sources.

B. When repairs have been made, make sure the area is free of flammable concentrations of gas, inside and outside of buildings in the area, using an electronic leak detector.

C. When repairs have been made to damaged piping, ensure the affected sections are leak-free before re-introducing gas. If repairs cannot be made to any part of the system at the time, the affected sections are to be "Red-Tagged" until repairs can be made.

D. When restoring service to a system serving multiple customers, service is to be restored on a house-to-house basis. Shut each customer off at the service riser. Purge the lines, if necessary. Conduct a leak check of all service and house lines, using a water manometer and/or block gauge. If you cannot get into a house or metered service because the customer is not at home, do not restore service. Lock the customer's service off and leave a "Service Interruption Notice" in a conspicuous place requesting the customer to contact the gas company for restoring service.

E. Where appropriate, and under the direction of the AmeriGas Legal Department, failed equipment should be sent to a laboratory for examination for the purpose of determining the cause(s) of the failure and minimize the possibility of recurrence (192.617)

7.11 REPORTING ACCIDENTS

All accidents and incidents are to be reported in accordance with the Operation/Safety Policy & Procedure Manual, AP No. 1.3.

7.12 MEDIA CONTACT, PUBLIC AND PRIVATE STATEMENTS

No statement or release of any specific information is to be given without authorization from the Regional Vice President/General Manager or above. See the Safety Manual, AP No. 1.3, for more detailed precautions.

7.13 REVIEW OF EMERGENCY RESPONSE PLANS (192.615 b,3) (192.617)

After each emergency, whether actual or simulated, supervisory personnel should conduct an audit and critique of the event to review the procedures followed and determine if the emergency response

plan was effective. Managers should have copies of emergency response plans ahead of time to enable them to plan and review the elements of response with all relative personnel.

If any equipment fails in an emergency or simulated occurrence, where appropriate, the failed device should be analyzed and samples of this equipment sent to a laboratory for examination to determine the cause (s) for the failure.

The Regional Safety/Technical Manager will determine how the failure is to be handled and if th device is to be tested by a laboratory.

All failed devices, equipment or facilities are to be kept for future reference.

A leakage survey must be conducted over a residential pipeline system at least every five (5) years; and in central business districts and shopping centers each year, at intervals no to exceed fifteen (15) months. Areas surveyed should be marked on a map of the distribution system, with the approximate location of each leak found.

1.1 Where the following may be present, the frequency of the survey should be increased and/or a leak detector used.

A. Material makeup of system. Certain materials may develop a higher than average leakage rate, such as unprotected steel pipe and coated steel pipe not under cathodic protection;

B. Age of pipe (over 20 years) and corrosive soil environment;

C. Pipe having a previous history of excessive leakage and the cause(s) have yet to be eliminated;

D. Pipelines in, under, or near buildings, especially schools, churches, hospitals, or other buildings having a high concentration of people;

E. Pipelines located in areas of construction, blasting or recent heavy weight traffic. Pipe located in crawl spaces under apartment buildings or mobile homes; and

F. Service lines in or under buildings and meters in buildings.

Available openings for finding leaks include water, sewer, electric, and telephone lines; manholes; cracks in pavement; and hollow walls (cinder block construction) in areas near gas piping.

When conducting these surveys check for leaks near the gas pipe entrance, both inside and outside the buildings.

If a leak is discovered, it must be investigated to determine if a hazardous condition exists. If so, immediate action must be taken, to include shutting off the gas system and, if necessary, each segment of the pipeline that is deemed unsafe must be repaired, replaced, or removed from service. Any new or repaired service lines re-installed, must be tested as if they were new, from the point of disconnection.

2.0 Warning Signs of a Leak

2.1 Odor: Gas is intentionally odorized so the average person can perceive it at a concentration well below the explosive range. Gas odor is the most common and effective indication of a leak. A report of gas

odor should be investigated immediately, the possible leak found, and repaired. This odorized gas may be filtered out as it passes through soil. It may also be modified by passing through soil and into sewage systems containing vapors or fumes from other combustibles, as well as the sewage odor itself. Therefore, odor is not always totally reliable as an indicator of the presence or absence of gas leaks. Nevertheless, in making maintenance rounds, always be alert for the smell of gas.

2.2 Vegetation: Vegetation in an area of gas leakage may improve or deteriorate, depending on the soil, the surveys of changes in vegetation may indicate slow sub-soil leaks. Vegetation surveys should be supplemented with instrumentation.

2.3 Insects: Insects migrate to points or areas of leakage. They seem to like the smell of the gas odorant. Checks for heavy insect activity, particularly near the riser, the gas meter and regulator should be made.

2.4 Fungus-like Growth: Such growth in valve boxes, manholes, etc., may indicate gas leakage. The color of the growth is generally white or grayish-white and looks like a coating of frost.

2.5 Sound: Listen for leaks. A hissing sound at a bad connection, a fractures pipe or a corrosion pit hole as the usual indication of a gas leak.

2.6 Unaccounted for Gas or Unusual Increase in Delivery: A possible gas leak may be indicated when there is an unusual shortage when reconciling inventory or when it is noted that the gallons delivered have an unusual increase over previous deliveries without any known reason.

3.0 Leak Detector Solution: A suitable leak detector solution can pinpoint the location of a leak on an exposed pipe, on the riser, or the meter.

4.0 Leak Detection Instruments: Gas leak indicators are sophisticated instruments that require regular care, maintenance and calibration, and should be used by trained personnel. Two types are commonly used by the gas industry for surveying and pinpointing leaks:

4.1 Combustible gas indicator (CGI); and,

4.2 Flame ionization gas detector (FI).

5.0 For LP-Gas systems: The only method for a leak detection survey that is recommended by RSPA is a subsurface gas survey using a CGI unit with a bar hole survey.

6.0 Combustible Gas Indicator:. The CGI consists of a meter, probe and a rubber bulb. The bulb is pumped by hand to bring a sample of air into the probe and the instrument. The dial on the instrument indicates the percentage of flammable gas-in-air or percent of the lower explosive limit (LEL). The CGI must be calibrated for propane.

6.1 The CGI is not suitable for sampling unconfined air over a pipeline or near the ground surface; instead it was designed primarily for use in a confined space. Its two main applications for outside surveys are for "available openings" and "bar holing". A bar hole is a small diameter hole made in the ground in the vicinity of gas piping to extract a sample of the ground atmosphere for leak analysis. The CGI instruments are also useful in building surveys and confined areas within the building, such as heater closets.

6.2 This survey should be conducted with a CGI capable of detecting 10 percent of the LEL at sample point. The survey should be conducted by performing tests with a CGI in a series of bar holes immediately adjacent to the gas facility and in available openings (confined spaces and small substructures) adjacent to the gas facility.

6.3 The location of the gas facility and its proximity to buildings and other structures should be considered when determining the spacing of sample points. Spacing of sample points along the main or pipeline will depend on soil and surface conditions, but should never be more than approximately 20 feet apart. Where the facility passes under paving for a distance of approximately 20 feet or less, tests should be made at the entrance and exit points of the paved area. Where the paved area over the facility is approximately 20 feet or greater in length, sample points should be located at intervals of approximately 20 feet or less.

6.4 In the case of extensive paving, permanent test points should be considered, particularly in low places. The sampling pattern should include tests of potential leak locations, such as threaded or mechanical joints and at building walls at the service riser or service line entrance. All available openings adjacent to the facility should be tested.

6.5 When testing available openings for LP-gas, readings should be taken at both the top and bottom of the structure. When testing larger confined spaces and basements, the floor areas, including floor drains, should be tested thoroughly. Since migrating gas may not always enter at the pipeline entrance, a perimeter survey of the floors and walls is recommended.

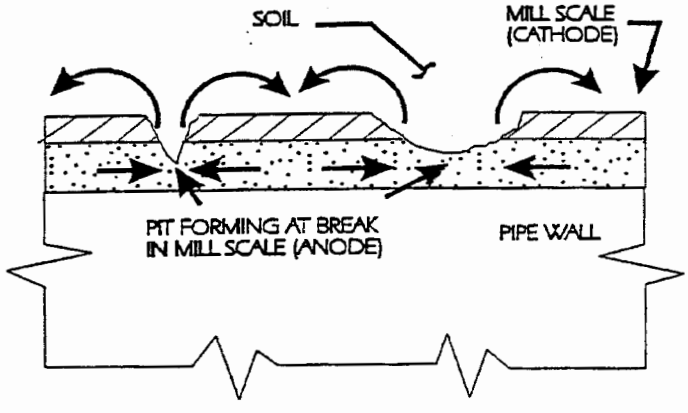
Appendix B

This appendix gives operators who have little or no experience in the cathodic protection field, some of the general principles and practices of cathodic protection. Common causes of corrosion, types of pipe coatings, and criteria for cathodic protection are typical topics discussed. A check list containing steps which an operator of a small bas system may use in determining his/her needs for cathodic protection is also included. Basic definitions and illustrations are used to clarify the subject. This appendix does not go into great depth. Therefore, reading this appendix alone will not qualify an operator to design and implement cathodic protection for a piping system.

Basic Terms

Corrosion is the deterioration of a metal pipe. The corrosion is caused by a reaction that takes place between the metallic pipe and its surroundings. As a result, the pipe deteriorates and may eventually leak. The corrosion can be retarded or stopped with cathodic protection (See Figure F-1.)

Figure F-1 - Bare Pipe - Not under cathodic protection

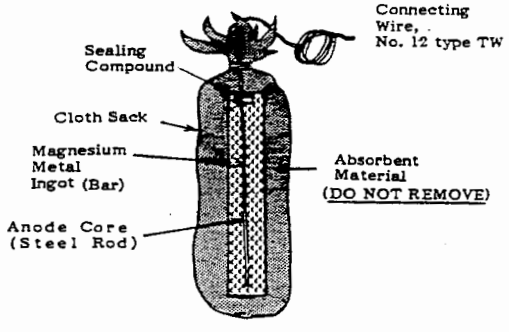


This is an example of bare steel pipe installed for gas service. Note the deep corrosion pits that have formed. Operators should never install bare steel pipe underground. Operators should use either PE pipe manufactured according to ASTM D2513 or coated steel pipe as new or replacement pipe. If steel pipe is installed, that pipe must be coated and cathodically protected.

Cathodic Protection is a procedure by which an underground metallic pipe is protected against corrosion. A direct current is impressed onto the pipe by means of either a sacrificial anode or a rectifier. Pipe will not corrode where sufficient current flows onto the pipe.

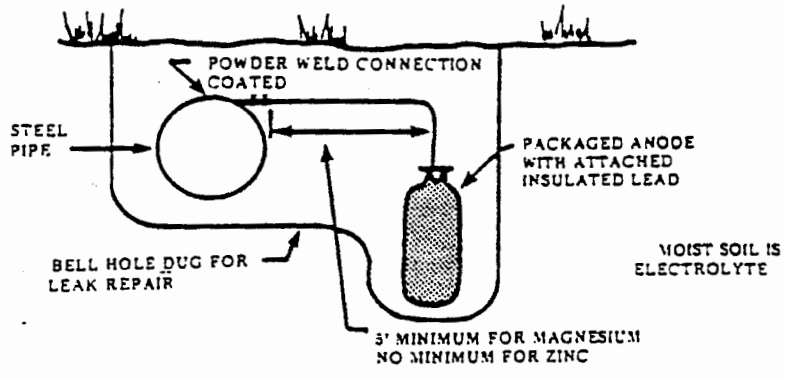
Anode (sacrificial) is an assembly consisting of a bag usually containing a magnesium or zinc ingot and other chemicals which is connected by wire to an underground metal piping system. It serves essentially as a battery which impresses a direct current on the piping system to retard corrosion (See Figure F-2.)

Figure F-2 - Typical Magnesium (Mg) Anode



Sacrificial protection means the reduction or prevention of corrosion of a metal (usually steel in a gas system) in an electrolyte (soil) by galvanically coupling the metal (steel) to a more anodic metal (magnesium or zinc). (See Figure F-3.) The magnesium or zinc will sacrifice itself (corrode) and prevent the steel pipe from corroding.

Figure F-3

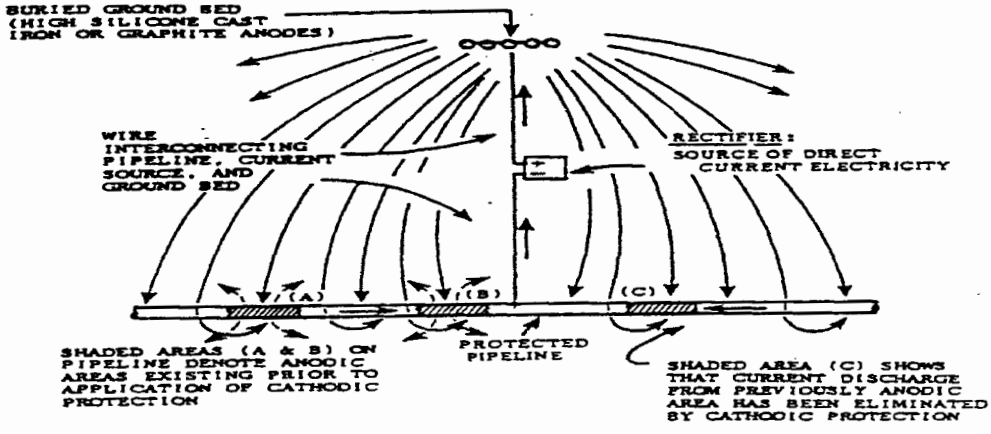


SINGLE PACKAGED ANODE INSTALLATION

Zinc and magnesium are more anodic than steel. Therefore, they will corrode, and provide cathodic protection for the steel pipe to which is connected.

Rectifier is an electrical device which changes alternating current (A.C.) into direct current (D.C.). This current is then impressed on an underground metallic piping system to protect it against corrosion. (See Figure F-4.)

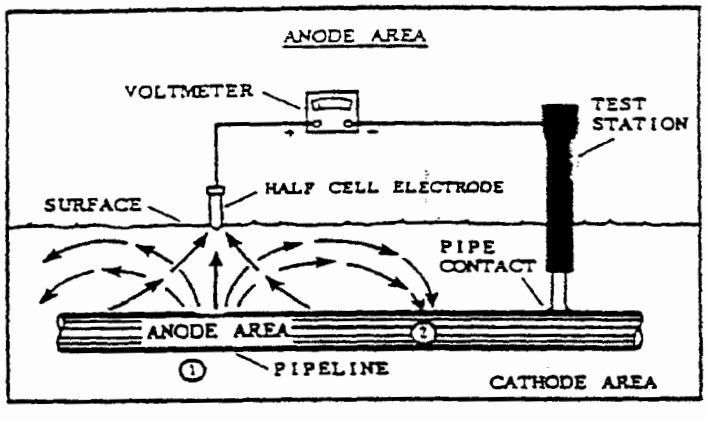
Figure F-4



This illustrates how cathodic protection can be achieved by use of a rectifier. Make certain the negative terminal of the rectifier is connected to the pipe. Note: If you do the reverse (positive terminal to pipe), you will corrode the pipe – FAST.

Potential means the difference in voltage between two points of measurement. (See Figure F-5.)

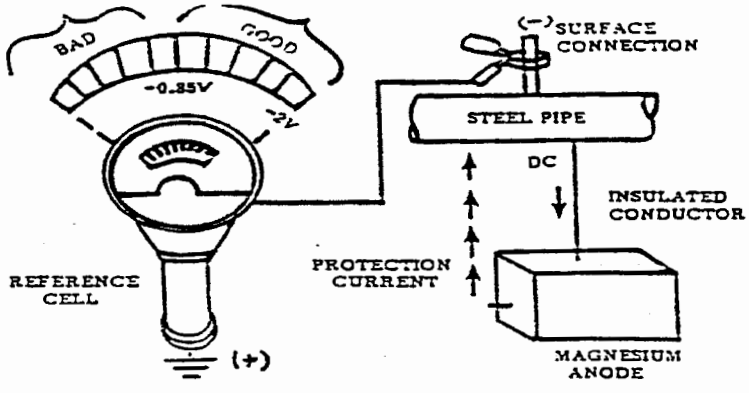
Figure F-5



The voltage potential in this case is the difference between points 1 and 2. Therefore, the current flow is from the anodic area (1) of the pipe to the cathodic area (2). The half cell is a copper-copper sulfate electrode ($Cu\text{-}CuSO_4$).

Pipe to soil potential means the potential difference between a buried metallic structure of piping system and the soil surface. The difference is measured with a half cell reference electrode (see definition of reference electrode which follows) in contact with the soil. (See Figure F-6.)

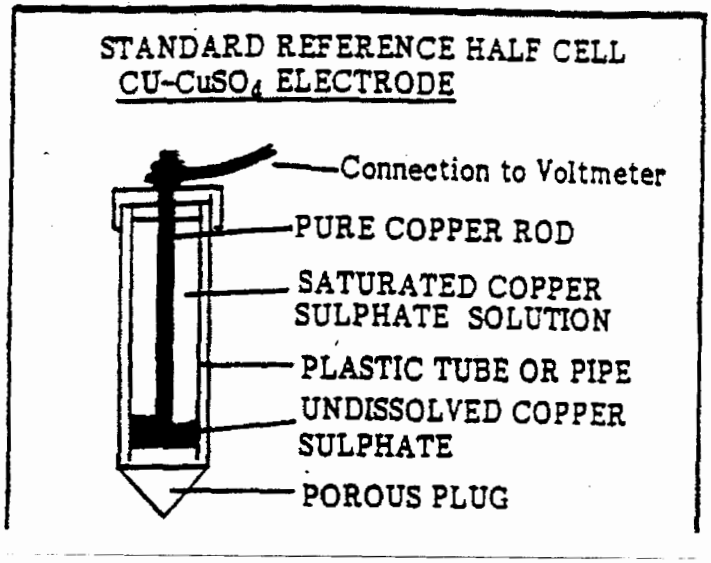
Figure F-6



If the volt meter shown reads at least -0.85 volts, the operator can usually consider that the steel pipe has cathodic protection. Note: Be sure to take into consideration the voltage (IR) drop which is the difference between the voltage at the top of the pipe and the voltage at the surface of the earth.

Reference electrode means a device which usually has copper immersed in copper sulfate solution. The open circuit potential is constant under similar conditions of measurement. (See Figure F-7.)

Figure F-7

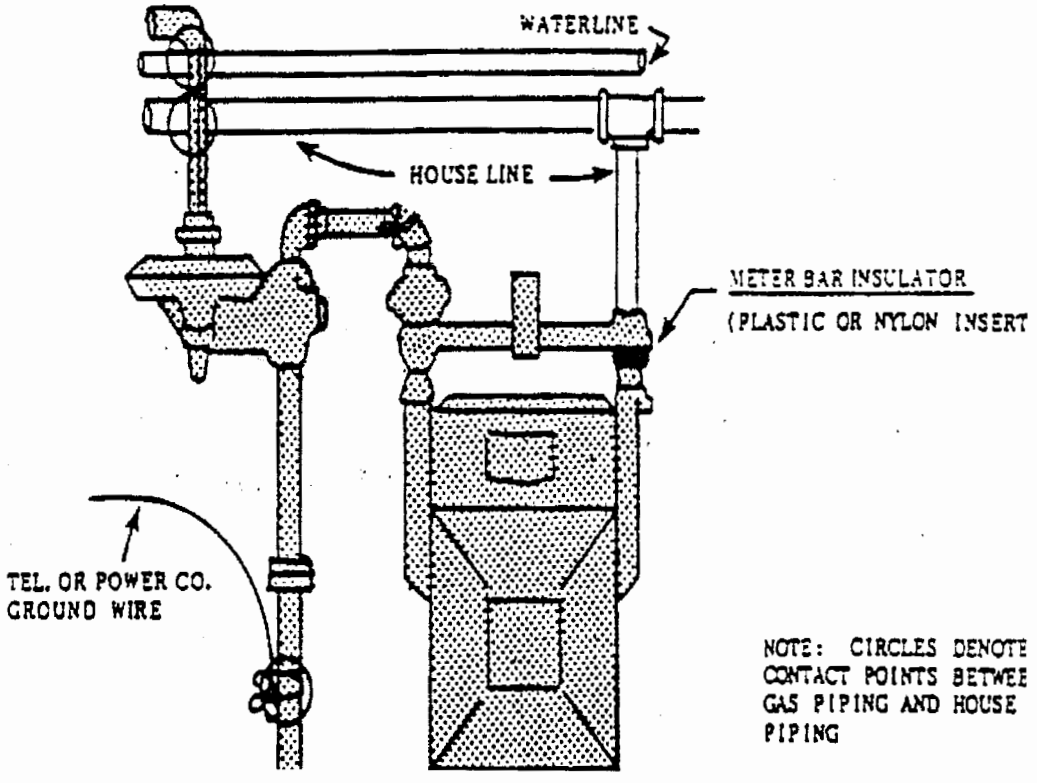


Reference Electrode - Saturated copper - copper sulfate half cell.

Short or corrosion fault means an accidental or incidental contact between a cathodically protected section of a piping system and other metal structures (water pipes, buried tanks, or unprotected section of a gas piping system..) (See Figure F-8.)

Figure F-8 - Typical Meter Installation Accidental Contacts

(Meter Insulator Shorted Out by house Piping, etc.)



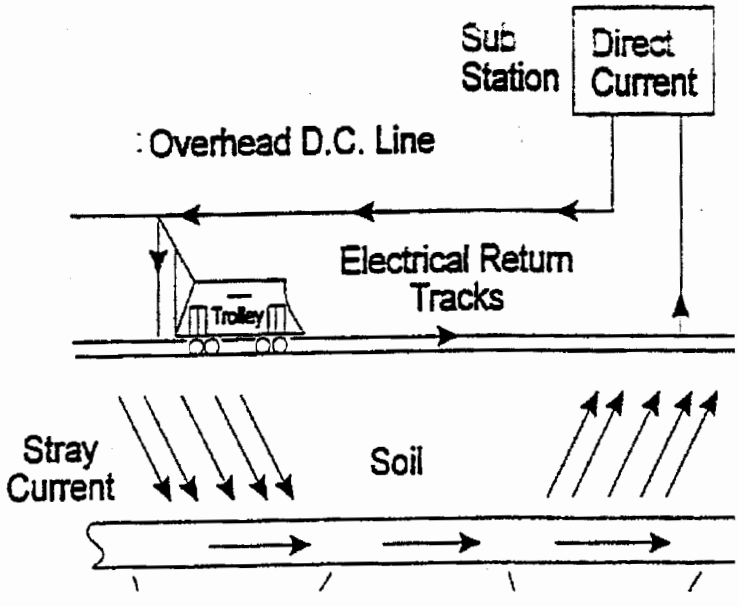
Shaded piping shows company piping from service entry to meter insulator at location shown on sketch above. Unshaded areas show house piping, BX cables, etc.

The locations that are circled are typical points at which the company piping (shaded) can come in metallic contact with house piping. This causes shorting out or "by-passing" the meter insulator.

The only way to clear these contacts permanently is to move the piping that is in contact. The use of wedges, etc., to separate the piping is not acceptable. If you cannot move the piping, install a new insulator between the accidental contact and the service entry.

Stray current means current flowing through paths other than the intended circuit. (See Figure F-9.)

Figure F-9



This drawing illustrates an example of stray D.C. current getting onto a pipeline from an outside source. This can cause severe corrosion in the area where the current eventually leaves the pipe. Expert help is needed to correct this type of problem.

Stray current corrosion means metal destruction or deterioration caused primarily by stray D.C. current in the soil around a pipeline.

Galvanic series is a list of metals and alloys arranged according to their relative potentials in a given environment.

Galvanic corrosion occurs when any two of the metals in Table 1 (following) are connected in an electrolyte (soil). This galvanic corrosion is caused by the difference in potentials of the two metals.

Table 1

Metal	Potential Volts *	
Commercially pure magnesium	-1.75	Anodic
Magnesium alloy (6% Al, 3% Zn 0.15 % Min	-1.6	
Zinc	-1.1	
Aluminum alloy (5% zinc)	-1.05	
Commercially pure aluminum	-0.8	
Mild steel (clean and shiny)	-0.5 to -0.8	
Mild Steel (rusted)	-0.2 to -0.5	
Cast iron (not graphitized)	-0.5	
Lead	-0.5	
Mild steel in concrete	-0.2	
Copper, brass, bronze	-0.2	
High silicon cast iron	-0.2	
Mill scale on steel	-0.2	
Carbon, graphite, coke	+0.3	Cathodic

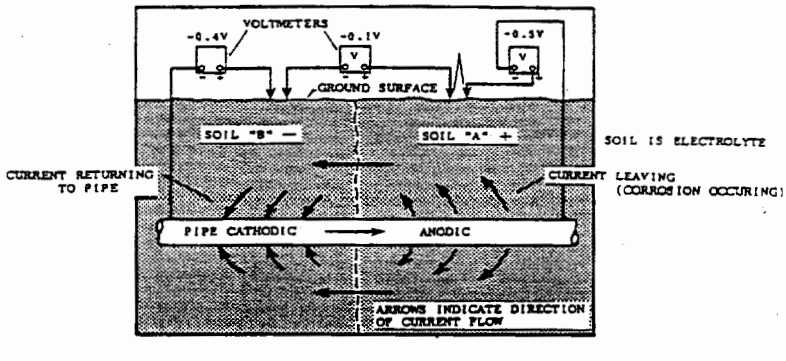
Typical potential normally observed in natural soils and water, measured with respect to copper sulfate reference electrode.

When connected together in an electrolyte, any metal in the table will be anodic (corrode relative to) any metal below it. (That is, anode sacrifices itself to protect the metal (pipe) lower in the table).

Fundamental Corrosion Theory

In order for corrosion to occur there must be four elements: electrolyte, anode, cathode, and a return circuit. A metal will corrode at the point where current leaves the structure. (See Figure F-10.)

Figure F-10



CORROSION FROM DISSIMILAR SOILS

A corrosion cell may be summed up as follows:

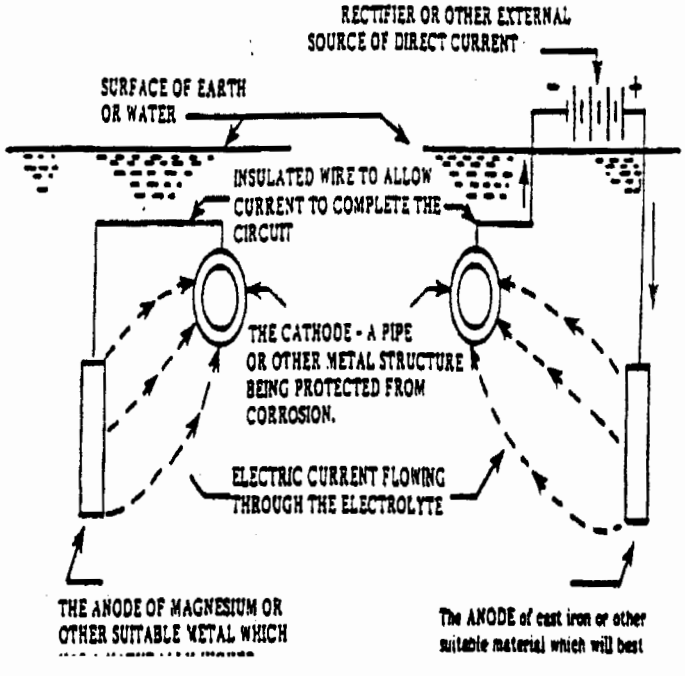
- Current flows through the electrolyte from the anode to the cathode. It returns to the anode through the return circuit.
- Corrosion occurs wherever current leaves the metal (pipe, fitting, etc.) and enters the soil (electrolyte.) The point where current leaves is called anodic. Corrosion, therefore, occurs in the anodic area.
- Current is picked up at the cathode. No corrosion occurs here. The cathode is protected against corrosion. Polarization (Hydrogen film buildup) occurs at the cathode. When the film of hydrogen remains on the cathode surface, it acts as an insulator and reduces the corrosion current flow.
- The flow of current is caused by a potential (voltage) difference between the anode and the cathode.

Types of Cathodic Protection

There are two basic methods of cathodic protection: The galvanic anode system and the impressed current system.

Galvanic anodes are commonly used to provide cathodic protection on gas distribution systems. Impressed current systems are normally used for transmission lines. However, if properly designed, impressed current can be used on distribution system. (See Figure F-11.)

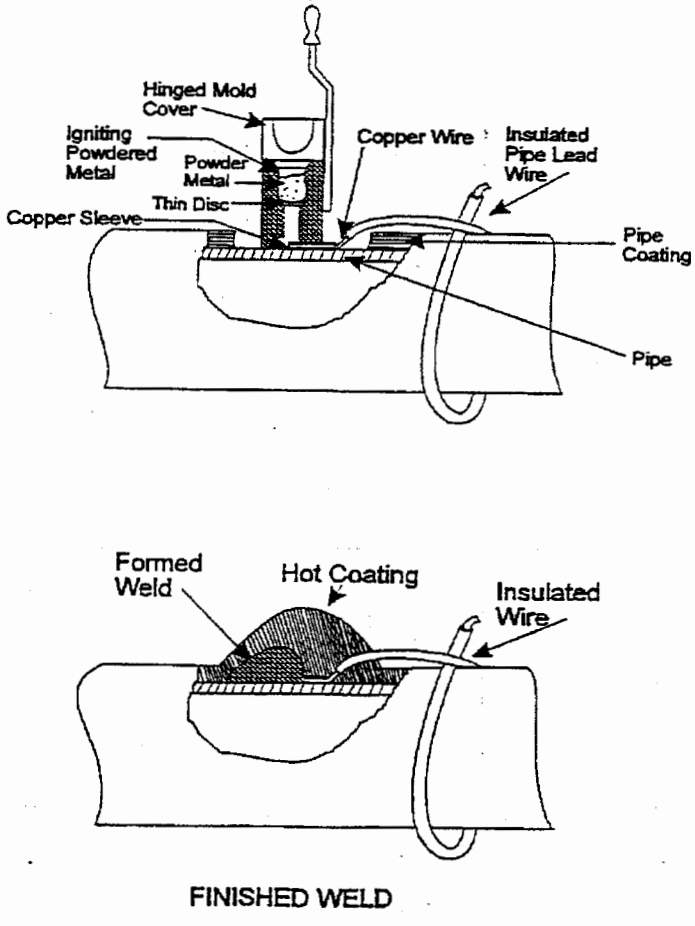
Figure F-11



Any current, whether galvanic or stray, that leaves the pipeline causes corrosion. In general, corrosion control is obtained as follows:

Galvanic Anodes System. Anodes are "sized" to meet current requirements of the resistivity of the environment (soil.) Anodes are made of materials such as magnesium, zinc, or aluminum. They are usually installed near the pipe and connected to the pipe with an insulated conductor. They are sacrificed (corroded) instead of the pipe. (See Figures F-3, F-11, and F-12.)

Figure F-12



Impressed Current Systems. These systems are normally used along transmission pipelines where there is less likelihood of interference with other pipelines. The principle is the same except that the anodes are made of corrosion resistant material such as graphite, high silicon cast iron, lead-silver alloy, platinum, or scrap steel. The anodes are connected to a direct current source, such as a rectifier or generator.

Initial Steps In Determining The Need To Cathodically Protect a Small Gas Distribution System

1. Determine type(s) of pipe in system:_____bare steel_____coated steel_____cast iron_____ plastic_____ galvanized steel _____ ductile iron _____or other_____

2. Date gas system was installed:

   _____ Year pipe was installed (steel pipe installed after July 1, 1971 must be cathodically protected in its entirety.

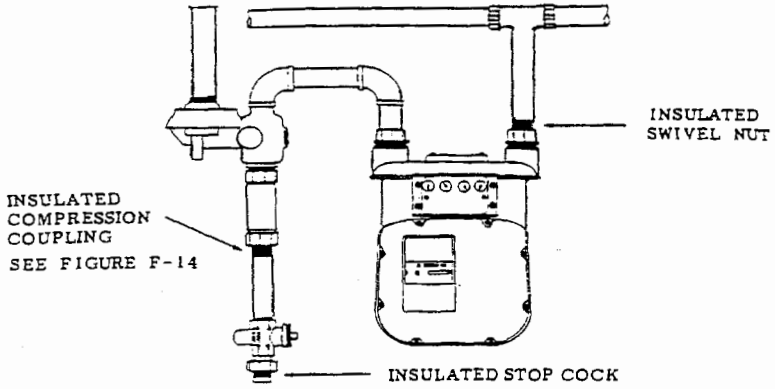
   _____ Who installed pipe. (By contacting the contractor and the operators who had pipe installed by same contractor, operators may be able to obtain valuable information.

   - Type of pipe in ground.
   - If pipe is electrically isolated.
   - If gas pipe is in common trench with other utilities.

3. _____ Pipe Location - map/drawing. Locate old construction drawings or current system maps. If no drawings are available, a metallic pipe locator may be used.

4. _____ Before the corrosion engineer arrives, it is a good idea to make sure that customer meters are electrically insulated. If system has no meter, check to see if gas pipe is electrically insulated from house or mobile home pipe. (See Figure F-13.)

5. _____ Contact an experienced corrosion engineer or consulting firm. (See Appendix E for techniques of compliance). Try to complete steps 1 through 4 before you get a consultant.



Places where a meter installation may be electrically isolated.

Figure F-14

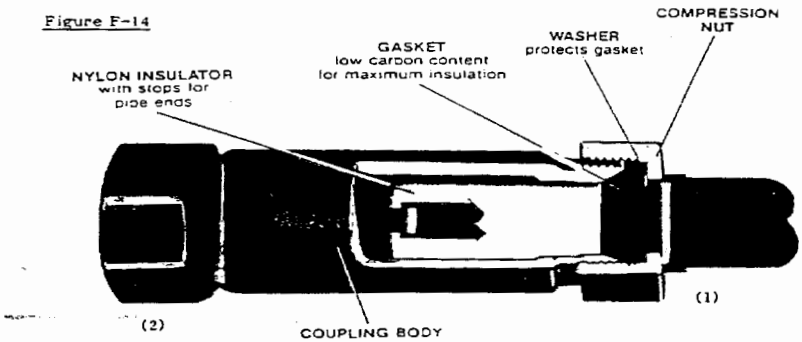


Illustration of an insulted compression coupling used on meter sets to protect against corrosion. Pipe connection by this union will be electrically insulated between the piping located on side one (1) and the piping located on side two (2).

Figure F-15 Insulation Tester

This Insulator Tester consists of a magnetic transducer mounted in a single earphone headset with connecting needle point contact probes. It is a "go" or "no go" type tester which operates from low voltage current present on all underground piping systems thus eliminating the necessity of outside power sources or costly instrumentation and complex connections.

By placing the test probes to metallic surface on either side of the insulator a distinct audible tone will be heard if the insulator is performing properly. Absence of audible tone indicates faulty insulator. Insulator effectiveness can be determined quickly using this simple, easy to operate tester.

Use of Consultant

A sample method which may be used by a consultant to determine cathodic protection needs is the following:

- An initial pipe-to-soil reading will be taken to determine whether the system is under cathodic protection.
- If the system is not under cathodic protection, the consultant should clear underground shorts, or any missed meter shorts. (He/she will probably use a tone test.)
- After the shorts are cleared, another pipe-to-soil test should be taken. If the system is not under cathodic protection a current requirement test should be run to determine how much electrical current is needed to protect the system.

- Additional tests, such as a soil resistivity test, bar hole examination, and other electrical tests may be needed. The types of tests needed to be run will vary by each specific gas system.

Cathodic Protection Design

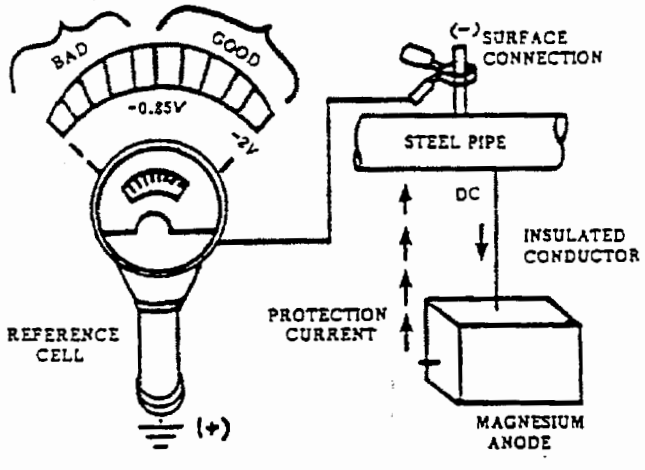
The experienced corrosion engineer or gas consultant, based on the results of testing, will design a cathodic protection system that best suits your piping system.

Criteria For Cathodic Protection

There are five criteria listed Appendix D of Part 192 which qualify as cathodic protection. The operators can meet the requirement of any one of the five to be in compliance with the pipeline safety code. Most systems will be designed to Criteria 1. (Only Criteria 1 is mentioned here.)

Criteria 1: With the protective current applied, a voltage of at least -0.85 volts measured between the pipeline and a saturated copper-copper sulfate half cell. This measurement is called the pipe-to-soil potential reading. (See Figure F-16.)

Figure F-16



This is a pipe-to-soil voltage meter with reference cell attached. This is a simple meter to use and is excellent for simple "go-no-go" type monitoring of a cathodic protection system. If meter reaches at least -0.86 volts, the operator knows that the steel pipe is under cathodic protection. If not, remedial action must be taken promptly. Note: Be sure to take into consideration the voltage (IR) drop which is the difference between the voltage at the top of the pipe and the voltage at the surface of the earth.

Coatings

There are many different types of coating on the market. The Better the coating application the less amount of electrical current is needed to cathodically protect the pipe.

Mill Coated Pipe

When purchasing steel pipe for underground gas services, operators should purchase mill coated pipe. (i.e., pipe coated during manufacturing process.) Some examples of mill coatings are:

- Extruded polyethylene or polypropylene plastic coatings.
- Coal tar coatings.
- Enamels.
- Mastics.
- Epoxy.

A qualified (corrosion) person can help you select the best coating for your system. A local gas utility may be able to give master meter operators the name and location of nearby suppliers of mill coated gas pipe. Remember when you purchase steel pipe to verify that the pipe was manufactured according to one of the specifications listed in Chapter VI of this manual. This can be verified by a bill of lading or by the markings on mill coated pipe.

Patching of Pipe Coating

Tape material is a good choice for external repair of mill coated pipe. Tape material is also a good coating for both welded and mechanical joints made in the field. One advantage is that these tapes may be applied cold. Some tapes in use today are:

- PE and PVC tapes with self-adhesive backing applied to a primed pipe surface.
- Plastic films with butyl rubber backing applied to a primed surface.
- Plastic films with various bituminous backings.

Consult your pipe supplier before purchasing tapes. Tapes must be compatible with the mill coating on the pipe.

Coating Application Procedures

When repairing and installing metal pipe be sure to coat bare pipes, fittings, etc. It is absolutely essential that the instructions (supplied by the manufacturer of the coating) are followed precisely. Time and money is wasted if the instructions are not followed.

Some general guidelines for installation of pipe coatings:

- Properly clean pipe surface. (Remove soil, oil, grease, and any moisture.)

- Use careful priming techniques (avoid moisture, follow manufacturer's recommendations.)

- Proper application of coating materials (be sure pipe surface is dry - follow manufacturer's recommendations.) Make sure soil or other foreign material does not get under coating during installation.

- Only backfill which is free of objects capable of damaging the coating should be allowed to strike the coated pipe directly. Severe coating damage can be caused by careless backfilling operations when rocks and debris strike and break the coating.

Common Causes of Corrosion In Gas Piping Systems

Figure F-17

An example of a galvanic corrosion cell being set up. The tenants of this building have "shorted" out this meter by storing metallic objects on meter set. Never allow customers or tenants to store material on a meter installation.

Figure F-18

This pipe will corrode at the threads or where it is scratched. Remember to repair all cuts or scratches in the coating before burying the pipe. Always coat and/or wrap pipe at all threaded or weld connections before burying pipe.

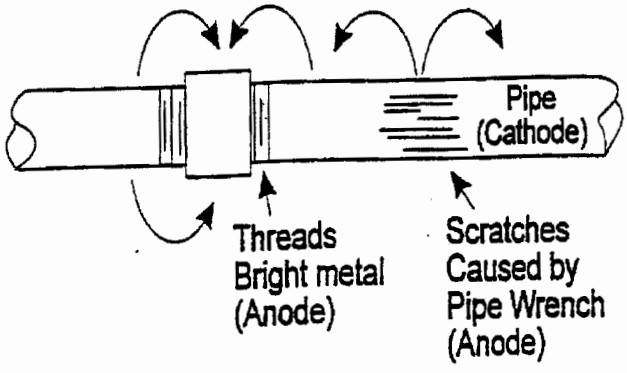
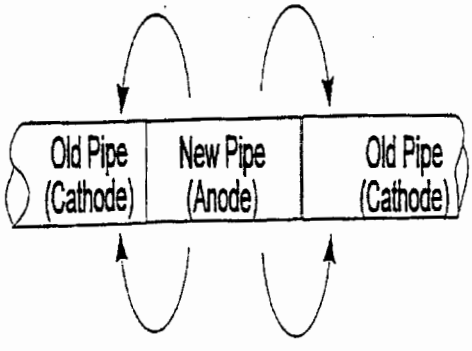
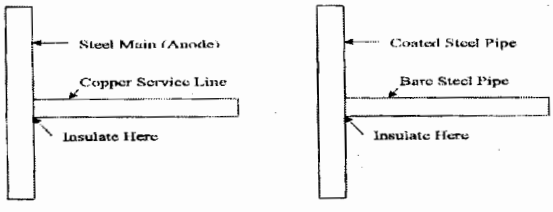


Figure F-19 - Galvanic Corrosion



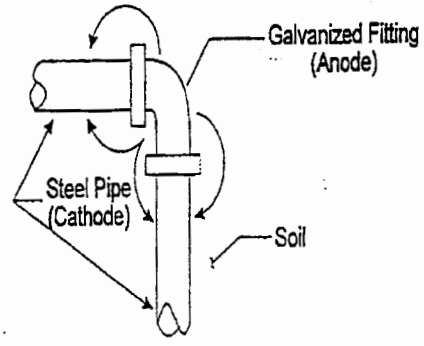
Remember all new steel pipe must be coated and cathodically protected. The new pipe can either be electrically isolated from old pipe, or the new and old pipe must be cathodically protected as a unit.

Figure F-20 - Galvanic Corrosion



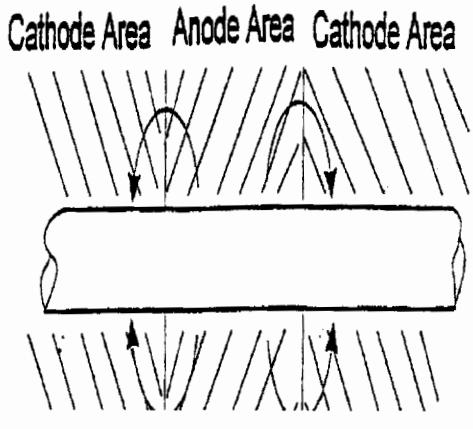
Steel is above copper in the galvanic series in Table 1 of this Appendix. Therefore, steel will be anodic to the copper service. That means the steel pipe will corrode. The copper service should be electrically isolated from the steel main. Remember, steel and cast iron or ductile iron should not be tied in directly. Steel and cast iron should be electrically isolated. Also, coated steel pipe should be electrically isolated from bare steel pipe.

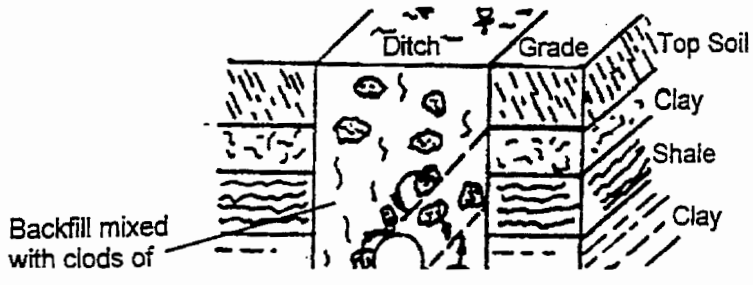
Figure F-21 - Galvanic Corrosion



The galvanized elbow will act as an anode to the steel and will corrode. Do not install galvanized pipe or fittings in system, if possible. However, if you use galvanized fittings you must electrically isolate the fittings.

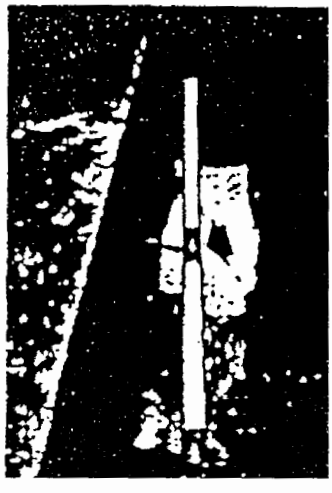
Figure F-22 - Galvanic Corrosion





A corrosion cell can be set up when pipe is in contact with dissimilar soils. This problem can be avoided by the installation of a well coated pipe under cathodic protection.

Figure F-23 - Poor Construction Practice



This is an example of a main which was buried without a coating or wrapping at the service connection. Also you can see (at the bottom of the photo) that the main was not coated. Note that corrosion has occurred at both locations. There are repair clamps at bottom of photo. This corrosion problem could have been avoided by properly coating and cathodically protecting the pipe.

Figure F-24 - Atmospheric Corrosion

This is an example of atmospheric corrosion at a meter riser. This can be prevented by either jacketing the exposed pipe or by keeping it properly painted. Corrosion is usually more severe at the point the pipe comes out of the ground.

Appendix C

Maximum Allowable Operating Pressure

Each O and M plan must contain procedures specific to a particular gas system for the establishment of MAOP's. MAOP's are created as follows:

1. For plastic (PE) pipe:
   a) The test pressure (50 psi) is divided by a factor of 1.5

Example: 50 psi (test pressure for PE)
Divided by 1.5
= 33.3 psi (MAOP)

2. For steel pipe:
   a) Steel pipe operated at 100 psi or more, the test pressure is divided by a factor in accordance with the following table:

Installed Class Location	Installed Prior to 11-12-70	Converted Prior to 11-11-70	Under 192.14
1.....	1.1	1.1	1.25
2.....	1.25	1.25	1.25
3.....	1.4	1.5	1.5
4.....	1.4	1.5	1.5

Example: Class 2 location, installed after 11/11/70, test pressure of 250 psi

250 psi (test pressure)
Divided by 1.25
= 200 psi (MAOP)

   a) Steel pipe operated between 1 psi and 100 psi, multiply the test pressure by 85%

Example: 50 psi (test pressure)
X 85%
= 42.5 (MAOP *)

* Normally these pipelines are operated between 10 psi and 20 psi. In no case should the MAOP equal the test pressure (See 5.17 - 2), and should not be less than 30 psi.

Procedures to calculate and verify relief capacities (internal relief of regulators) 192.743

The purpose of this requirement is to verify that the capacity of the relief (s) is greater than the capacity of the regulator, should a full - failure occur. It is also to ensure the relief discharge is of sufficient capacity so that the pressure does not exceed the MAOP.

The following formula is to be used to determine the relief valve capacity for high pressure, first stage regulators.

$$Q^{3`}\ 40\ DP$$

In which:

Q is the pressure-relief valve discharge in cubic feet (m 3 x 35.31) air per hour;

40 is a constant;

D is the diameter of regulator orifice in inches (mm x 0.04); and,

P is the inlet pressure to relief valve psig (kPa x 0.145) above the start-to-discharge setting of the relief valve.

Contact the specific regulator manufacture for the needed figures to perform the calculation. See NFPA 58, 1998 Handbook for further information.

If there has been no change to the system (i.e., different pressure, regulator orifice, or regulator), the calculation(s) need only be reviewed and initialed annually. If, however, there has been a change to the system, a new calculation sheet must be prepared.

Obtain external in-line overpressure protection device calculations, or calculating factors, directly from the product manufacture or distributor.

Each O and M plan should include a regulator flow chart for the specific regulator (s) in the system. Contact the regulator manufacture for regulator capacity at full - failure. To ensure relief capacity is greater than the regulator capacity at full - failure, it is suggested to always install an external in - line relief, such as the Fisher 1805, and maintain the relief capacity chart in the O and M manual.

8.1 FORMS - REPRODUCE THESE FORMS AS NEEDED LOCALLY

The following forms are to be used where appropriate. Completed forms are to be filed in the O&M Plan for the specific gas system.

Form	Frequency	Form #	Page#
O&M Plan Identification	As required	OPS 1	52
Emergency Notification	As required	OPS 2	53
Plot Plan	As required	OPS 3	54
Anode Installation	As required	OPS 4	55
Key Valve Inspection Report	Annually	OPS 5	56
Regulator Inspection Report	Annually	OPS 6	57
"Sniff Test" Report	Monthly	OPS 7	58
Patrolling of Mains	Every 3 Months	OPS 8	59
Leak Survey Report	Residential - 5 yrs. Business - 1 yr.	OPS 9	60
Main/Service Line Inspection	As required	OPS 10	61
Atmospheric Corrosion Inspection	3 yrs. or As Required	OPS 11	62
Cathodic Protection Survey	Annually	OPS 12	63
Corrosion Control Rectifier Inspection	Every 3 months	OPS 13	64
Pipeline Test Report	As required	OPS 14	65

8.2 ATTACHMENTS

The following attachments are to be used where appropriate for customer notification.

OPERATION AND MAINTENANCE PLAN

FOR

_____

(Name)

_____

(Address)

_____ _____

(Phone) (Acct No.)

Description of System_____

_____

Date Installed_____

No. & Type of Customers_____

_____

LP-Gas Storage_____

Delivery Method_____

Contractors_____

_____

Supplier (District/Branch)_____

Prepared by_____

(Name) (Title)

Date_____

OPS1

EMERGENCY NOTIFICATION

Date Prepared_____

Name_____

Address_____

Resident Mgr/Maint._____

Agency	Location	Phone
Fire		
Police/Sheriff		
Highway Patrol		
LERC		
Emergency Medical		
Pipeline Control		
Fire Marshal		
Local EPA		

EMERGENCY EQUIPMENT AVAILABILITY

Item	Location

List other Districts/Branches for assistance on reverse side.

OPS2

PLOT PLAN

Prepared By:_____ Date Prepared:_____

System: Name_____

Location:_____

(System map showing tanks; main and service lines, with pipe sizes and distances; key valves; cathodic protection test points, rectifier, high pressure regulators and pressures; and other utility lines. See the General OPS Manual for sample.)

ANODE INSTALLATION

Gas System: Name_____

Location_____

Size of Anodes:_____ Installed:_____

Installed By:_____

Potential of Anodes:_____

_____

Potential: Pipe-to-soil:_____

_____

SKETCH OF ANODE LOCATIONS

OPS4

KEY VALVE INSPECTION REPORT

FREQUENCY: - Annually

System: Name_____

Location_____

Location/Type/Use	Results/Action

General Comments:_____

Inspected By:_____ Date:_____

OPS5

REGULATOR INSPECTION REPORT

FREQUENCY - Annually

System: Name_____

Location_____

Regulator #1: Location_____

Make_____Model_____Vent OK_____

Pressure: Inlet_____Outlet_____

Remarks:_____

Regulator #2: Location_____

Make_____Model_____Vent OK_____

Pressure: Inlet_____Outlet_____

Remarks:_____

Regulator #3: Location_____

Make_____Model_____Vent OK_____

Pressure: Inlet_____Outlet_____

Remarks:_____

General Condition:		Remarks
Atmospheric Corrosion:	Y____N____	_____
Support Piping Rigid:	Y____N____	_____
Area Clear of Weeds:	Y____N____	_____

Action to be taken:_____

_____

Inspected By:_____Date:_____

OPS6

"SNIFF TEST" REPORT

FREQUENCY - Monthly

System: Name_____

Location_____

* * * * * * * * * * * *

Test Point:_____

Date:_____Time: _____By:_____

Odor Level: Nil:_____ Barely Detectable:_____

Readily Detectable:_____ Strong:_____

Remarks:_____

_____

* * * * * * * * * * * *

Test Point:_____

Date:_____Time: _____By:_____

Odor Level: Nil:_____ Barely Detectable:_____

Readily Detectable:_____ Strong:_____

Remarks:_____

_____

* * * * * * * * * * * *

Test Point:_____

Date:_____Time:_____By:_____

Odor Level: Nil:_____ Barely Detectable:_____

Readily Detectable:_____ Strong:_____

Remarks:_____

_____

OPS7

PATROLLING OF MAINS

FREQUENCY - Every 3 months

Gas System: Name:_____

Location:_____

Areas covered:_____

_____

_____

_____

Describe any indications of leakage:_____

_____

_____

_____

Describe any unusual conditions at road or RR Crossing:_____

_____

_____

_____

Other factors which should receive attention:_____

_____

_____

_____

General Comments:_____

_____

_____

Inspected By:_____Date:_____

OPS8

LEAK SURVEY REPORT

FREQUENCY: - Residential - 5 yrs.
Business - 1 yr.
or
When a leak is reported on a distribution line.

System: Name:_____

Location:_____

Periodic Survey:_____Gas Leak Report:_____

Survey Made By:_____Date:_____Time:_____

Leaks Detected By: CGI_____Odor_____Bubble_____ Visual/Vegetation_____

Location: Main_____Service_____Valve_____Meter_____Stg Tank_____

Building_____Manhole_____Catch Basin_____Other_____

Actual Location: (Put sketch on back of form.)

Size of Leak:_____

Cause of Leak:_____

Action Taken:_____

_____

_____

Leak Corrected: Yes_____No_____ Date:_____

If Not, Who Was Notified? _____

Was a Work Order Prepared? Yes_____No_____ Date:_____

Repairs Performed and Date of Completion:_____

_____

_____

_____

OPS9

MAIN AND SERVICE LINE INSPECTION

FREQUENCY - Each time a distribution main or service line is uncovered for inspection, extension, replacement, etc.

(If you are not POSITIVE re any space, leave blank.)

System: Name _____

Location_____

Type of Line: Main or Service_____Size_____Age_____

Cathodic Protection: Yes_____No_____Anodes_____Rect_____

Coating: Yes_____No_____Type_____Condition_____

External Condition: Smooth_____Pitted_____Pit Depth_____

Internal Condition: Smooth_____Pitted_____Pit Depth_____

Soil: Sand_____Clay_____Loam_____Cinders_____Refuse_____

Packing: Loose_____Medium_____Hard_____

Moisture Content: Dry_____Damp_____Wet_____

General condition of pipe and supports:_____

_____

_____

Corrective measures to be taken:_____

_____

_____

_____

Inspected By:_____Date:_____

OPS10

ATMOSPHERIC CORROSION CONTROL INSPECTION

FREQUENCY - (3) years or whenever aboveground piping is inspected for corrosion from atmospheric conditions or corrosive conditions that cannot be cathodically controlled.

System: Name_____

Location_____

Type of Line: Main or Service_____ Size_____Age_____

Operating Pressure_____

Condition: Pipe - Wrapping/Coating_____

Paint_____

Supports_____

Tank(s)_____

Tank Valves_____

Meters_____

Fittings_____

Vaporizers & Other Equipment_____

_____

Corrective Measures to be Taken:_____

_____

_____

_____

_____

Inspected By:_____Date:_____

OPS11

CATHODIC PROTECTION SURVEY

FREQUENCY - Annually

System: Name_____

Location_____

Surveyed By:_____Date:_____

Starting Location of Survey:_____

_____

Ending Location of Survey:_____

_____

Take copper sulfate 1\2 cell readings at designated test points along the main service lines.

FT	RDG	FT	RDG	FT	RDG	FT	RDG	FT	RDG

OPS12

CORROSION CONTROL RECTIFIER INSPECTION

FREQUENCY - Every (2) months.

System: Name _____

Location: _____

Rectifier Description: _____

_____

DATE	SUPPLY VOLTAGE	OUTPUT VOLTS	OUTPUT AMPS	RECTIFIER CONDITION	REMARKS

OPS13

PIPELINE TEST REPORT

Frequency - For each newly installed or repaired main or service line.

Person Performing Test_____ Date_____

Type of Pipe_____ Size_____ Length_____

Location of Line - (Draw sketch of lines tested on back.)

Test Medium: Air_____Nitrogen_____CO2_____Propane Vapor_____

Time Test Started:_____Stopped_____

Pressure Loss Noted During Any Test? Yes_____ No_____

Leak(s) Corrected? Yes_____ No_____

Actions Taken_____

_____

_____

_____

_____

OPS14

Appendix D

AmeriGas
America's Propane Company

Instructions for Customer Notification Brochure

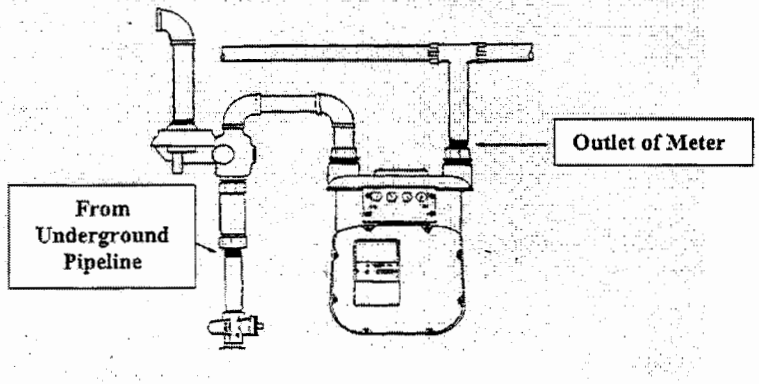
This notification is being mailed to all metered customers as required in 49 CFR 192.16.

This is to advise the customer that under OPS requirements, AmeriGas will only do the required testing and maintenance of the gas line up to the outlet of the meter (see example below). The underground line (if there is one) leaving the meter and going to the house or the primary gas utilization equipment is the responsibility of the customer to maintain. This does not include for OPS purposes, any branch lines that tee off the primary line and go to secondary equipment (i.e. pool heaters, barbecue grills, gas lights etc).

After the original mailing, it will be the District Manager or SSM's responsibility to ensure that each new customer on any OPS systems receives this notice at the time we turn their gas on.

Should you have any questions, please feel free to contact:

Your Region Safety Manager



AmeriGas
America's Propane Company

Office of Pipeline Safety Customer Notification

Gas Line Maintenance Requirements

The United States Department of Transportation (DOT) through the Office of Pipeline Safety (OPS) issued an order to all operators (i.e., AmeriGas) of gas systems requiring them to notify customers, who own buried gas piping not maintained by the operator, that the customer is responsible for maintaining the buried piping. "Maintain" means to monitor buried piping for corrosion (if metallic) and survey for leaks. If an unsafe condition is found, the customer must shut off the flow of gas and repair (or have repaired) the unsafe condition. For the purposes of this notification, "Customer's buried gas piping" means gas piping not owned by the operator, and does not include branch lines that serve yard lanterns, pool heaters, gas grills or other types of secondary equipment.

How Do I Know If I Own Buried Piping?

The portion of buried piping you own would be the portion of gas line that exits on the outlet side of the meter and enters the building to supply your appliances. Many customers do not own any buried gas line. If there is any question regarding ownership of a portion of underground gas line, contact your local AmeriGas office for clarification.

What Are The Customer's Responsibilities Regarding Buried Pipeline?

AmeriGas does not maintain customer owned buried gas piping. All customers should periodically inspect or have the buried piping inspected for leaks, check for signs of corrosion if it is metallic pipe, and make arrangements to have any unsafe condition that is discovered repaired by AmeriGas or a qualified contractor. If the buried piping is not maintained, it may be subject to corrosion and leakage.

How Do I Know If I Have A Gas Leak?

Signs of a gas leak include:

- Areas of dead vegetation directly above the buried gas piping.
- A meter dial that continues to move after all gas appliances have been shut off.
- Unexplained sudden increase in gas consumption.
- Distinct gas odor or a foul odor in the area of your gas piping. What you think may be a sewerage or dead animal odor may be a gas leak.
- A hissing sound in the area of the gas piping.

Under rare circumstances odor fade can occur when there is an underground gas leak. In such cases a leak could exist without having an odor. If you have reason to believe a gas leak exists, call your local AmeriGas office.
If you discover a gas leak in your piping contact your local AmeriGas office immediately.

What Could Happen If There Is A Leak?

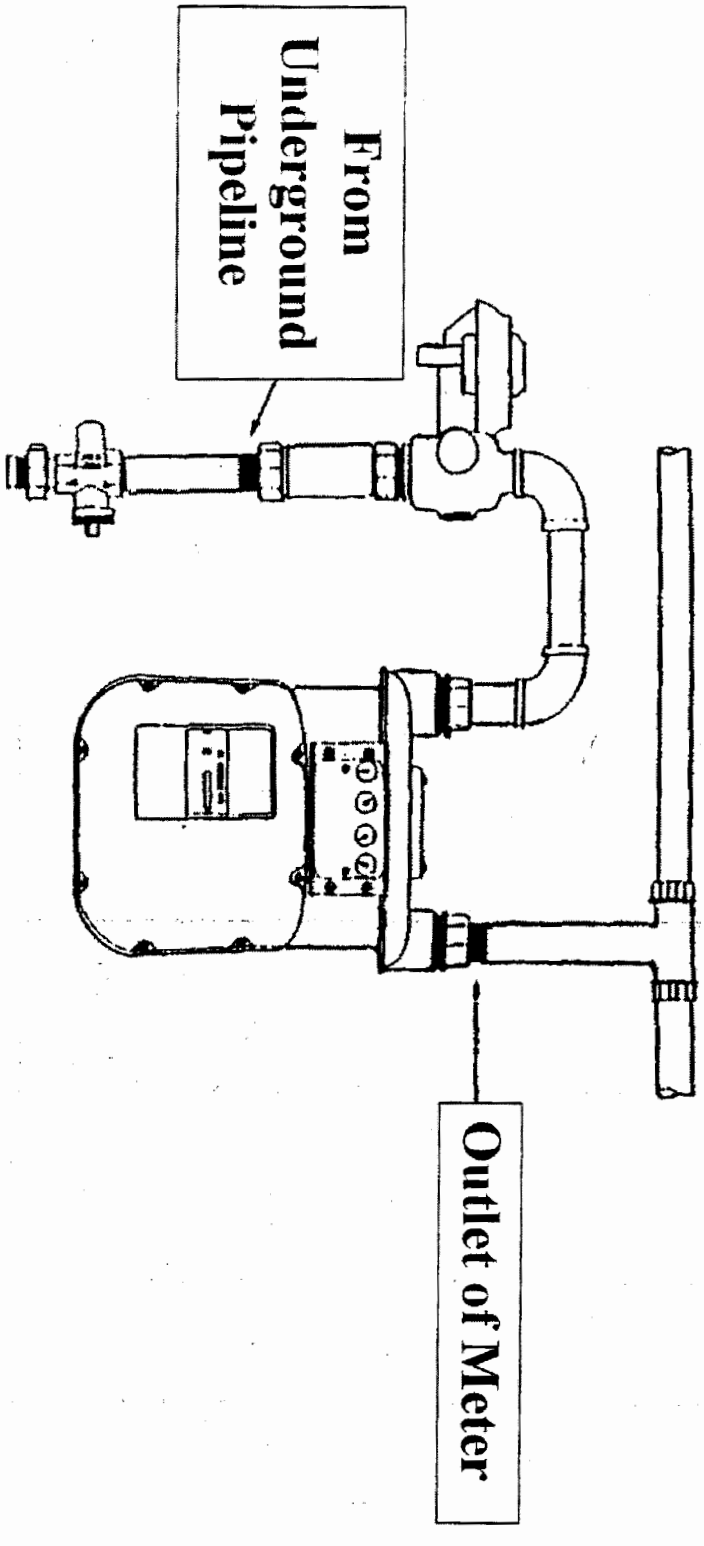
Propane is heavier than air and may initially collect in low-lying areas. Propane may cause a flash fire or an explosion if it accumulates in high concentrations. If AmeriGas becomes aware of an unsafe condition with respect to a customer's gas lines or equipment, service will be discontinued until the unsafe condition has been eliminated.

How Do I Locate Buried Piping?

When digging near buried gas piping, the piping must be located in advance and the digging done by hand. Call your local "call before you dig" phone number, which can be found in your local telephone directory, at least two days before digging for assistance in locating other underground utilities in the area.

Who Can Do The Maintenance For Me?

Customers may choose to have repairs, replacements or maintenance performed by any qualified contractor or by calling your local AmeriGas office. AmeriGas has fully qualified and trained service technicians to provide you with all your gas service requirements. Proper installation of buried gas piping is critical for operational safety. Only approved installation practices and materials can be used.


From Underground Pipeline
Outlet of Meter

AmeriGas®
America's Propane Company

Instructions for Public Education Brochure and Emergency Notification

The Public Education Brochure should be distributed to your Commercial OPS customers along with the Emergency Notification once it has been filled out with all the appropriate phone numbers. They should also be placed on the bulletin board in the Clubhouses of any Mobil Home Parks or other residential developments you may service. They could also be given to Contractors that we see working in the area of any of the OPS Systems we service.

Should you have any questions, please feel free to contact:

Your Region Safety Manager

HOW TO PREVENT A PROPANE GAS SYSTEM EMERGENCY

You can help prevent a gas system emergency by contacting your local AmeriGas office prior to excavating, drilling, blasting, or building within 50ft.of our gas lines. You should contact your local "Call Before You Dig Service" to locate the underground utilities. This phone number is located in the front of your local phone directory. If you observe any activity that could disrupt the ground in the vicinity of our gas lines (e.g., drilling, excavating, blasting, building), please immediately notify your local AmeriGas office. When your gas service is initially turned on, ask your AmeriGas representative to show you where the gas line to your home or business is located. This will indicate the area where you should not dig or disrupt the ground for any reason without first contacting an AmeriGas representative.

PROPANE EMERGENCIES

A propane emergency is any condition that effects the safe operation of a gas system.

Examples of a propane emergency include but are not limited to:

- Gas odor detected inside or near a building or public area.
- Fire or explosion near or involving a gas line.
- A leaking or ruptured gas line.

SHOULD A PROPANE EMERGENCY EXIST

1. Immediately evacuate the building or area where the emergency exists.
2. Contact the appropriate Emergency Response Agency (Fire or Police) from a phone away from the effected area.
3. Contact your local AmeriGas office from a phone away from the effected area.
4. Refer to the attached emergency notification list for phone numbers in your area.

PROPANE GAS PROPERTIES

- Propane has an odorant added that gives the gas a distinctive odor.
- Propane is heavier than air, and when released, it will settle in low-lying areas.
- Propane will burn if it is released, mixes with air and is ignited. Escaping gas can be ignited by open flames, sparks from electrical switches, motors, mechanical equipment and other heat sources.

EMERGENCY ACTIONS

- AmeriGas personnel will be dispatched immediately upon notification of an emergency with our gas system, and take the necessary actions and make the repairs as warranted by the emergency. AmeriGas will communicate with the local Fire and Police Departments and other Public Officials, as required by the nature of the emergency.
- If ignition has not occurred take precautions to prevent ignition (e.g., do not operate any switches, do not use a telephone in the effected area).
- If gas is ignited, take precautions to prevent the spread of the fire if safe to do so. ***Do not attempt to extinguish the flame until the supply of gas can be turned off.***

AmeriGas®
America's Propane Company

EMERGENCY NOTIFICATION

AmeriGas District Name: _____

Address: _____

24 Hour Emergency Phone Number: _____

LOCAL CONTACT NUMBERS

Agency	Phone Number	Location
Fire Department:	_____	_____
Police/Sheriff:	_____	_____
Emergency Medical:	_____	_____
State Pipeline Inspector:	_____	_____

WHAT IS A GAS EMERGENCY?

A Gas Related Emergency Is Any Situation That May:

- **Endanger Human Life**
- **Damage Property or Equipment**
- **Disrupt Normal Gas Service**