

**ARIZONA CORPORATION COMMISSION
OFFICE OF PIPELINE SAFETY
1300 WEST WASHINGTON STREET, SUITE 220
PHOENIX, ARIZONA 85007**

This manual was developed by the Arizona Corporation Commission, Office of Pipeline Safety, for use by Small Gas Operators (Master Meters) in the operation of their gas system.

The contents provide the operator with the required written plans and records necessary to be in compliance with the **minimum** requirements prescribed by the Code of Federal Regulations, Title 49, Part 192 and the Arizona Administrative Code.

This manual is intended as a guideline only. The Master Meter Operator is responsible to determine if their needs are met or not. Additional information may be required because of circumstances to a particular gas system.

For this manual to be considered valid and approved for use, an operator representative shall attend the pipeline safety seminar given by the Arizona Corporation Commission's Office of Pipeline Safety at intervals not to exceed 3 years.

At anytime, if operators have questions or need additional information, please call the Arizona Corporation Commission's Office of Pipeline Safety, at the number listed below:

Phoenix Office (602) 262-5601

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OQ PLAN AND DIMP PLANS/PROCEDURES

SECTION/TAB # 1

OPERATOR QUALIFICATION PROGRAM

Facility Name: _____

SCOPE

This plan was developed to ensure that all personnel (responsible facility representative, other facility employees, and all contractor personnel) have the required knowledge, ability, and skills to conduct all operations and maintenance activities in a safe and correct manner, and to react to and correct, any abnormal operating conditions (AOC) that may be encountered when operations and maintenance activities are conducted.

The overall objective of this plan is to ensure that all activities that are conducted on the piping system are in such a way that will protect the safety of both personnel who are conducting the activities and protect the general public. In addition, when operations and maintenance activities are conducted in a safe and correct manner, it will also ensure the safety, integrity, and reliability of the piping system.

NOTE: In order for this plan to be considered valid, and for all persons to be properly evaluated under this plan, the responsible facility representative or designee, shall attend the Master Meter Seminar given by the Arizona Corporation Commission's Office of Pipeline Safety at intervals not to exceed 3 years.

COVERED TASKS

A covered task is defined as any operations and maintenance activity performed on the piping system in which the person (facility employee or contractor personnel) that conducts such task must be evaluated and qualified in accordance with this plan. In order for an activity to be considered a covered task, it must conform to each of the following questions listed below:

- Is the activity performed on the piping facility?
- Is the activity required as part of this system's operations and maintenance plan?
- Is the activity conducted to comply with any requirement of Code of Federal Regulations (CFR), Title 49, Part 192?
- Does the activity affect the safe operation and/or integrity of the piping facility?

Based on the questions listed above, the covered tasks shall include, but are not limited to, the following activities:

Leak survey	Regulator station annual maintenance and testing
Exterior/interior leak investigation	Relief valve testing
Odorant sniff testing	Pipeline locating and marking
Valve maintenance	Service regulator testing
Cathodic protection annual survey	Purging
Rectifier inspection and testing	External and internal corrosion visual inspection
Atmospheric corrosion survey	*Hot tapping
Patrolling of mains (both aboveground and underground)	

*For persons who conduct hot tapping activities, these persons shall be re-evaluated at intervals not to exceed 12 months.

QUALIFICATION OF PERSONNEL

All personnel who perform covered tasks shall be initially qualified through either job classification training or receive training provided by a contractor using a program in compliance with all requirements of CFR, Title 49, Part 192, Subpart N and recognized by the Arizona Corporation Commission's Office of Pipeline Safety.

The evaluation of personnel during the initial qualification training shall be conducted using a written test and/or hands-on simulation training.

The criteria for initial qualification is that all personnel shall successfully pass all written testing for each covered task that the persons are attempting to qualify to. All test questions shall be reviewed with the qualifying persons following completion of the written testing. If hands-on simulation training is used, the personnel attempting to qualify shall demonstrate the necessary knowledge, ability, and skills to perform the covered task in a safe manner.

When personnel are re-evaluated, the re-evaluation shall be conducted using one of the methods listed below:

- Written exam.
- Oral exam during on-the-job training.
- Observation during on-the-job training.
- Observation during simulation.

NOTE: Observation during performance of the task shall not be used as the only method of evaluation but must be combined with either a written exam, oral exam, or hands-on simulation testing. The re-evaluation shall document that the person has successfully passed the written/oral exam and/or the simulation.

ABNORMAL OPERATING CONDITIONS

Both the initial qualification training (including test questions) and all re-evaluation training shall include information about normal operating criteria for each covered task that will allow personnel (both facility employees and/or contractors) to recognize and react to any abnormal operating conditions that may be encountered while performing the task.

Abnormal operating conditions that may be reasonably expected to be encountered on the pipeline system shall include, but are not limited to, the following:

- Any unplanned escape of gas from the pipeline system, or any leak that is discovered on the system.
- Any fire or explosion that is not intentionally set by facility personnel.
- Any unplanned pressure reduction or unplanned pressure increase in the piping system.
- Any discovery of pipeline damage, regardless of cause, that requires prompt repairs.
- Any unusual readings within the piping system's cathodic protection system, if the underground piping is steel.
- Any indication of atmospheric corrosion if the piping is aboveground steel.
- Any activation of a safety device.
- Any discovery of a system valve that is inoperative.
- Any unplanned or unexpected change in the status of the piping system (examples: any valve opening or closure without being directed to do so, or unable to locate an underground facility).

RESPONSE TO ABNORMAL OPERATING CONDITIONS

The appropriate actions to take may include but are not limited to, the following:

- Making the necessary adjustments to bring the equipment or settings back to normal operating conditions.
- Replacing the component(s).
- Immediately notifying the appropriate management of the abnormal operating condition and initiating emergency response procedures.
- Completing the appropriate paperwork to initiate the necessary corrective action.
- Notifying appropriate emergency response personnel.

NON-QUALIFIED PERSONNEL

Personnel who have not been qualified under this plan, or personnel who are in the qualification process but have not yet completed their training, may perform a covered task only while under the direct supervision of a qualified person. The qualified person must be in close enough proximity to immediately recognize and correct any abnormal operating conditions that may be encountered by the non-qualified person. There shall be only one non-qualified person to work under the control of the qualified person.

EVALUATION OF QUALIFICATIONS

If the performance of a covered activity cannot be ruled out as the probable cause of an incident (as defined in the emergency plan), then the person(s) who performed the activity shall be evaluated as part of the post-incident (incident) investigation. If the investigation determines that the task performance was not adequate, then the qualifications of the involved person(s) shall be suspended until the affected person is re-evaluated and re-qualified. A written record shall be made and kept of the results of the post-incident evaluation and re-qualification (if required).

If at any other time, there is reason to believe that the person(s) is unable to safely conduct a covered activity, then the affected person(s) shall not be allowed to conduct any covered activity until the involved person(s) is re-evaluated and qualifications are renewed. This includes both facility employees and/or contractor personnel.

If re-qualification of facility employees and/or contractor personnel is required at any time, the re-evaluation of the affected person(s) shall be conducted in accordance with the information listed in the QUALIFICATION OF PERSONNEL section within this plan.

PROCEDURE AND / OR EQUIPMENT CHANGES

Anytime that there is a change in a written procedure that specifies how a covered activity is conducted, then each person(s) who performs the activity (both employees and/or contractor personnel) shall be re-evaluated and re-qualified. The revised procedure must be reviewed with each affected person(s) during the re-qualification training, and the test questions shall be revised to reflect the changes.

Anytime there is a change in equipment used to conduct covered activities, then each person(s) who conducts the affected activity, shall be trained in the use of the new equipment and then re-qualified for the activity. Any instructions from the new equipment manufacturer shall be incorporated into the re-evaluation testing.

All changes shall be communicated to each affected person(s) (both employees and contractors) by formal training and review.

RE-QUALIFICATION INTERVALS

All persons (employees and/or contractors) shall be re-evaluated and re-qualified, for all covered activities listed on page 1 of this plan, at intervals not to exceed 36 months.

For persons who conduct hot tapping activities, these persons shall be re-evaluated at intervals not to exceed 12 months.

For person(s) who conduct plastic pipe fusions, the affected person(s) shall be re-tested and re-qualified on the fusion procedures at least once each calendar year with intervals between testing not to exceed 15 months. The testing shall be conducted in accordance with CFR, Title 49, Part 192.285.

For persons who conduct steel pipe welding, the affected person(s) shall be tested and re-qualified in accordance with CFR, Title 49, Part 192.229 and Arizona Administrative Code R14-5-207 (J).

QUALIFICATION OF CONTRACTORS

Qualification programs used by contractors or personnel who are qualified by other programs may be acceptable if the program meets the following:

- Standards for qualification are considered to be acceptable.
- The program complies with all provisions as required by Title 49, CFR Part 192, Subpart N.

All persons shall receive training on facility-specific procedures before any outside person(s) is allowed to perform covered activities on the piping system that is covered by this plan. A written record shall be made and kept of each person that receives facility specific procedure training.

All contractor personnel shall provide records that demonstrate the following:

- The person(s) has successfully passed written and/or oral exams.
- Hands-on simulation training and/or on-the-job training was demonstrated to be acceptable.

If contractor personnel are qualified using the contractor's qualification program, the program shall be reviewed to determine if the contractor's program meets the requirements listed above, and the program must be considered acceptable. Once it has been determined that the outside qualification is adequate, then the qualifications of person(s) can be accepted. A written record shall be made and kept of each outside qualification program that was evaluated and accepted.

QUALIFICATION RECORDKEEPING

Written records (either paper or electronic) shall be made and kept that must include the following information:

- Identification of each person that is qualified.
- Identification of the covered task(s) that each person is qualified to perform.
- The method(s) used to qualify each person for each individual covered task.
- The date that the qualification of each person was completed.

Records shall be kept for as long as each person is performing covered activities.

All records of prior qualification(s) and records of persons who are no longer performing covered activities shall be kept for a minimum of 5 years.

INDIVIDUAL QUALIFICATION RECORD

NAME OF INDIVIDUAL AND EVALUATOR	TASK PERFORMED	DATE OF QUALIFICATION	METHOD(S) OF QUALIFICATIONS	
<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> Individual (Print) <hr style="border: none; border-top: 1px solid black; margin-top: 10px; margin-bottom: 5px;"/> Evaluator (Print) <hr style="border: none; border-top: 1px solid black; margin-top: 10px; margin-bottom: 5px;"/> Evaluator (Signature)			Written Examination	<input type="checkbox"/>
			Oral Examination	<input type="checkbox"/>
			Observation During On The Job Training	<input type="checkbox"/>
			Observation During Simulation	<input type="checkbox"/>
			Qualified Using Outside OQ Plan	<input type="checkbox"/>
<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> Individual (Print) <hr style="border: none; border-top: 1px solid black; margin-top: 10px; margin-bottom: 5px;"/> Evaluator (Print) <hr style="border: none; border-top: 1px solid black; margin-top: 10px; margin-bottom: 5px;"/> Evaluator (Signature)			Written Examination	<input type="checkbox"/>
			Oral Examination	<input type="checkbox"/>
			Observation During On The Job Training	<input type="checkbox"/>
			Observation During Simulation	<input type="checkbox"/>
			Qualified Using Outside OQ Plan	<input type="checkbox"/>
<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> Individual (Print) <hr style="border: none; border-top: 1px solid black; margin-top: 10px; margin-bottom: 5px;"/> Evaluator (Print) <hr style="border: none; border-top: 1px solid black; margin-top: 10px; margin-bottom: 5px;"/> Evaluator (Signature)			Written Examination	<input type="checkbox"/>
			Oral Examination	<input type="checkbox"/>
			Observation During On The Job Training	<input type="checkbox"/>
			Observation During Simulation	<input type="checkbox"/>
			Qualified Using Outside OQ Plan	<input type="checkbox"/>
<hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> Individual (Print) <hr style="border: none; border-top: 1px solid black; margin-top: 10px; margin-bottom: 5px;"/> Evaluator (Print) <hr style="border: none; border-top: 1px solid black; margin-top: 10px; margin-bottom: 5px;"/> Evaluator (Signature)			Written Examination	<input type="checkbox"/>
			Oral Examination	<input type="checkbox"/>
			Observation During On The Job Training	<input type="checkbox"/>
			Observation During Simulation	<input type="checkbox"/>
			Qualified Using Outside OQ Plan	<input type="checkbox"/>

**MASTER METER
DISTRIBUTION INTEGRITY MANAGEMENT PLAN**

Facility Name: _____

Address: _____

DEFINITIONS:

Building – Any structure intended for supporting or sheltering any occupancy.

Excavation damage – Any impact that results in the need to repair or replace an underground facility due to a weakening or the partial or complete destruction, of the facility, including, but not limited to, the protective coating, lateral support, cathodic protection, or the housing for the line device or facility.

Hazardous leak – A leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous.

Non hazardous leak - Any above ground leak, other than one on a pressure regulator or relief device, that poses no existing or probable threat to life, property or health and that can be eliminated by maintenance such as, lubrication, adjustment, tightening or reassembling of any pipe or component and does not require the shut down of any part of the distribution system (main or service line) upstream of a service line valve to complete the repair.

KNOWLEDGE OF THE DISTRIBUTION SYSTEM

This plan was developed based on the design, construction, operation and maintenance records, including but not limited to; incident and leak history, corrosion control records, continuing surveillance records, patrolling records, maintenance history, and excavation damage experience, as well as the judgment and knowledge of our employees. In the event there is a gap in information due to missing, inaccurate, or incomplete records, we will review for accuracy the Annual Reports and prior inspection reports that are maintained by the Arizona Corporation Commission’s Office of Pipeline Safety (“AZOPS”) and gain additional knowledge over time through our normal activities conducted on the pipeline (for example, design, construction, operations, maintenance, and/or repair activities).

This Plan will be reviewed at a minimum of every 5 years for the purpose of continually refining and improving this Plan.

Records for all piping systems installed after the effective date of this plan shall be captured and retained. This will include the date and location where all new and/or repaired piping and appurtenances are installed and the material of which they are constructed.

DISTRIBUTION SYSTEM OVERVIEW:

The distribution system consists of the following:

<u>TYPE MATERIAL</u>	<u>FT ABOVE GROUND</u>	<u>FT BELOW GROUND</u>	<u>TOTAL FEET</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

PLAN IMPLEMENTATION:

Implementation of the required actions listed in this Plan will be the responsibility of:

_____ and/or _____
(Title only) (Title only)

IDENTIFICATION OF THREATS:

We have used all reasonably available information to identify existing and potential threats on our Master Meter System including, but not limited to:

- Corrosion (both underground and atmospheric)
- Natural Forces (flooding, fire, soil subsidence or movement, snow/ice damage)
- Excavation Damage
- Other Outside Force Damage (vehicle damage, trailer pull out)
- Material or Weld Failure (including fusion, solvent, and mechanical joint failures)
- Equipment Failure
- Incorrect Operation
- Other Threats

RISK RANKING:

The risk ranks for each identified threat is based on the piping material and leak history from the previous 5 years at our facility.

CONSEQUENCE RANKING:

The AZOPS has prioritized all Master Meter Systems in the State of Arizona based on the following criteria:

- All priority one (1) facilities (schools, churches, hospitals, day care centers, prisons) will be assigned a consequence number of 1.25, due to these locations being more difficult to safely evacuate in the event of an emergency.
- All priority two (2) facilities (apartments, mobile home parks, businesses/industrial plants, etc.) will be assigned a consequence number of 1, since these facilities are easier to evacuate in the event of an emergency.

Our facility is a Priority _____ which will have a consequence rating of _____.

Numerous variables have been taken into consideration and it has been determined that any risk would have system-wide consequences.

THREAT ASSESSMENT:

Our threat assessment will identify those threats needing possible further consideration of additional actions based on the probability of each threat using the following criteria:

- 0 (low risk)
- 1 (moderately low risk)
- 2 (medium risk)
- 3 (high risk)

THREAT ASSESSEMENT CHART (check each yes box that applies)

THREAT CATEGORY	PIPING TYPE	DISCRIPTION OF THREAT	THREAT PROBABILITY SCORE	YES
Leak Failure	All	Five (5) or more leaks in the previous five (5) years, regardless of any cause or material involved.	3	
Other threats	All	Unknown; pipe material, fittings, joints, equipment, history.	3	
Corrosion	Underground steel	No underground leaks in previous five (5) years AND all annual CP survey readings have been adequate for the previous five (5) years.	1	
Corrosion	Underground steel	At least one (1) but less then five (5) underground leaks in the previous 5 years OR annual CP survey readings have not been adequate and required remedial action was taken.	2	
Corrosion	Aboveground steel	No leaks in the previous five (5) years.	0	
Corrosion	Aboveground steel	At least one (1) but less than five (5) leaks in the previous five (5) years.	1	
Internal corrosion	All	No indications in the previous five (5) years.	0	
Internal corrosion	All	Any indications in the previous five (5) years.	1	
Material failure	PVC plastic	All underground PVC plastic, regardless of age or leak history.	2	
Material failure	PE plastic	No underground leaks in previous five (5) years.	0	
Material failure	PE plastic	At least one underground leak in the previous five (5) years and/or if any M7000/M8000 HDPE piping is identified in the system.	2	
Material failure	PE plastic	No underground leaks in the previous five (5) years, AND system has mechanical joints.	1	
Material failure	PE plastic	At least one (1) but less than five (5) underground leaks in the previous five (5) years AND system has mechanical joints.	2	
Excavation	All underground	Any excavation damages to piping, regardless of material in the previous five (5) years.	2	
Excavation	All underground	No excavation damages on the piping system in the previous five (5) years.	1	
Natural forces	All aboveground	Areas where natural forces have caused damage or leaks in the previous five (5) years. (ex. Snow accumulation, flooding, lightening strikes, soil subsidence, etc).	1	
Natural forces	All aboveground	All other areas where natural forces have not caused damage or leaks in the previous five (5) years.	0	
Other outside forces	All aboveground	No damages or leaks caused by outside forces in the previous five (5) years.	1	
Other outside forces	All aboveground	At least one (1) but less than five (5) leaks and/or damage caused by outside force in the previous five (5) years.	2	
Equipment failure	All aboveground	No leaks in the previous five (5) years.	1	
Equipment failure	All aboveground	At least one (1) but less than five (5) leaks in the previous five (5) years where defective equipment was replaced or repaired.	2	
Incorrect operation	All	No incidents in previous five (5) years.	0	
Incorrect operation	All	Any incorrect operation that results in a State reportable incident as defined in our Emergency Plan.	2	
Other threats	All	Incident where emergency event resulted in a State reportable incident as defined in our Emergency Plan.	1	

TOTAL THREAT SCORE
(add the total score of all categories checked yes)

Date: _____

OVERALL RISK RANKING

The overall risk ranking is determined by the following steps:

- Take the total threat score that you determined from the threat assessment chart and multiply the threat score by the consequence score (1.25 for priority 1; 1.0 for priority 2).
- Then divide the number determined in the step above by the total number of threat categories identified that were checked (number of categories checked “yes” in the threat assessment chart). This is your final overall risk score for your system.

Probability is the total threat score derived from the threat assessment chart.

Consequence is based on the priority number given by the AZOPS.

Risks are all system wide, and we have validated the results of the threat assessment and risk evaluation.

<input type="text"/>	x	<input type="text"/>	÷	<input type="text"/>	=	<input type="text"/>		
Probability		Consequence		Number of Categories		Risk Rank Score	Date	_____

<input type="text"/>	x	<input type="text"/>	÷	<input type="text"/>	=	<input type="text"/>		
Probability		Consequence		Number of Categories		Risk Rank Score	Date	_____

<input type="text"/>	x	<input type="text"/>	÷	<input type="text"/>	=	<input type="text"/>		
Probability		Consequence		Number of Categories		Risk Rank Score	Date	_____

<input type="text"/>	x	<input type="text"/>	÷	<input type="text"/>	=	<input type="text"/>		
Probability		Consequence		Number of Categories		Risk Rank Score	Date	_____

<input type="text"/>	x	<input type="text"/>	÷	<input type="text"/>	=	<input type="text"/>		
Probability		Consequence		Number of Categories		Risk Rank Score	Date	_____

<input type="text"/>	x	<input type="text"/>	÷	<input type="text"/>	=	<input type="text"/>		
Probability		Consequence		Number of Categories		Risk Rank Score	Date	_____

<input type="text"/>	x	<input type="text"/>	÷	<input type="text"/>	=	<input type="text"/>		
Probability		Consequence		Number of Categories		Risk Rank Score	Date	_____

<input type="text"/>	x	<input type="text"/>	÷	<input type="text"/>	=	<input type="text"/>		
Probability		Consequence		Number of Categories		Risk Rank Score	Date	_____

BASED ON THE OVERALL RISK RANKING SCORE, THE FOLLOWING ACTIONS WILL BE TAKEN;

Risk score less than or equal to 1.5 – Monitor system; no additional actions required

Risk score greater than 1.5 but less than 2.5 – Identify threat, periodically monitor, plan and schedule remedial action to be taken to mitigate risk(s) and provide a written plan to AZOPS within 30 days for approval.

Risk score 2.5 or greater – Identify threat, continuously monitor, plan and schedule remedial action to be taken to mitigate risk(s) and provide a written plan to AZOPS within 30 days for approval.

MANDATORY AND RISK BASED; ADDITIONAL ACTIONS, GENERAL:

To reduce risk of the threats identified by our threat assessment, the following additional actions above and beyond the minimum requirements of Title 49 CFR Part 192 shall be implemented.

- Leak surveys shall be conducted once each calendar year not to exceed 15 months (Arizona Administrative Code R14-5-207 (O));
- Odorant sniff tests shall be conducted 4 times a year;
- Minimum criteria that will be used for determining adequate cathodic protection is -0.850 volts (Arizona Administrative Code R14-5-207 (L));
- New underground steel pipeline systems shall have adequate cathodic protection before placing into service. Repairs, partially replaced, or relocating an existing system shall have adequate cathodic protection within (45) days (Arizona Administrative Code R14-5-207 (L));
- New construction and repair of pipelines shall be inspected by the AZOPS;
- System maps shall be maintained for the life of the system (Title 49, CFR, Part 192.605);
- All leaks shall be classified in accordance with GPTC G-192-11 (2022 edition) (Arizona Administrative Code R14-5-207 (O));
- All leaks are to be repaired promptly. AZOPS approval is required before any leaks are graded and classified in accordance with section 5 of GPTC G-192-11 (2022 edition) (PIPES 2020, Section 114);
- Any mains and/or services that have been identified as having an issue with leakage in accordance with the threat identification and resulting risk assessment shall require a written plan to replace such leak prone piping facilities as soon as possible (PIPES 2020, Section 114);
- If any HDPE M7000 or M8000 material is identified at facilities located within higher temperature areas, this material shall have leak surveys conducted quarterly until the suspect material has either been replaced and/or abandoned (PIPES 2020, Section 114);
- Underground pipelines discovered under a “building” (as defined in this plan) shall be relocated or gas service will be discontinued or the building shall be relocated within 180 days of discovery. New pipelines shall not be installed under any building (Arizona Administrative Code R14-5-207 (E));
- All plastic piping shall be installed with a minimum 14 gauge coated and conductive tracer wire (Arizona Administrative Code R14-5-207 (G));
- All underground pipelines shall be buried with at least 6 inches of sandy type soil, free of any rock, debris, or materials injurious to the pipe coating, surrounding the pipe for bedding and shading (Arizona Administrative Code R14-5-207 (H));

(Continued Mandatory and Risk Based; Additional Actions, General)

- The AZOPS shall be notified at least thirty (30) days prior to any construction on the pipeline system and shall be provided copies of all construction plans for their review (Arizona Administrative Code R14-5-207 (N));
- All failures shall be investigated to determine their cause and to prevent a recurrence. If the cause of any failure cannot be determined, laboratory testing shall be conducted in accordance with (Arizona Administrative Code R14-5-207 (P));
- We shall track the number of leaks and submit an Annual Report by April 15th of each year to the AZOPS with the number of leaks on the pipeline system and their cause from the previous calendar year (Arizona Administrative Code R14-5-207 (Q)).

MANDATORY PERFORMANCE MEASURES

We will monitor and record, as a performance measure, the number of leaks eliminated and/or repaired on our pipeline system and the causes of each leak (PIPES 2020, Section 114).

PERIODIC EVALUATION AND IMPROVEMENT

Re-evaluation of this Plan shall occur anytime there are events or changes to the pipeline system that may change the identified risks of failure.

A complete re-evaluation of this Plan will be conducted no less than every 5 years. Trends in each of the performance measures listed in the previous section will be reviewed during the re-evaluation. If any performance measure indicates that any of the additional action taken is not effective in reducing the risk it is intended to address, we will consider implementing additional actions to address that risk.

Any changes to this plan will be made available to appropriate operator personnel immediately and a copy submitted to the AZOPS within 30 days of the effective date.

RECORD KEEPING

The following records must be maintained for a minimum of 10 years.

- This Plan including any superseding plans;
- Copies of previous written DIMP Plans;
- Records of data required to be collected to calculate performance measures;
- Records necessary to show implementation and compliance of this Plan;
- Records for all piping systems installed after the effective date of this plan, including the date and location where all new and/or repaired piping and appurtenances are installed and the material of which they were constructed.

**MASTER METER
DISTRIBUTION INTEGRITY MANAGEMENT PLAN
(DIMP)
PROCEDURES**

The following procedures are intended to serve as a guideline to assist staff in understanding and accurately filling out our distribution integrity management plan. In order for this plan to be effective, it is vital that all personnel responsible for the implementation of this plan must understand the information contained in this plan and implement the action criterion that is detailed within this plan.

FACILITY NAME AND ADDRESS:

As with the information contained within our operations and maintenance manual, this plan is not in effect until all pertinent information is filled in by the person(s) who are responsible for the operations and maintenance of our gas pipeline system.

DEFINITIONS:

Definitions are provided to assist personnel in evaluating our gas pipeline system.

KNOWLEDGE OF THE DISTRIBUTION SYSTEM:

The purpose of this section is to assist personnel to gain knowledge of our gas pipeline system. It is the intent of our DIMP plan to assure that we, as the operator, know and understand the risks associated with the operation of our gas pipeline system. This section lists several resources available to personnel to acquire the necessary knowledge.

DISTRIBUTION SYSTEM OVERVIEW:

This section provides an overview of our gas pipeline system and also provides documentation to demonstrate that we have acceptable knowledge of our system. In addition, this section provides valuable information that can be used by personnel to assure a smooth transition from staff to staff. Personnel shall review and transfer the information from our current operations and maintenance plan into this section of our plan. Information that is not available in our manual may be found on our annual report that is filed each year with the Arizona Office of Pipeline Safety (“AZOPS”). In the event that necessary information is not available, personnel will be required to determine the piping type and approximate total footage by whatever means possible, including dig and inspect, if needed. Personnel must identify additional information needed and provide a plan for gaining knowledge over time through normal activities conducted on the pipeline (for example, design, construction, operations or maintenance activities)

PLAN IMPLEMENTATION:

List the position (job title) of the person(s) who will be responsible for the maintenance and implementation of this DIMP plan, not the name of the person.

IDENTIFICATION OF THREATS:

This section lists the most common threats associated with our master meter system. It is our responsibility as an operator to determine the threats that are applicable to our gas system. If there are any other specific threats other than those listed in this section that you may believe apply to our system, we shall also evaluate the specific threat(s).

RISK RANKING:

Each threat has an assigned risk ranking score. Risk is determined by the type of piping material in our system (steel and/or plastic), and the leak history for the previous 5 years.

CONSEQUENCE RANKING:

Based upon our priority as determined by the AZOPS our consequence rank will be entered on the consequence line in this section of our DIMP plan.

THREAT ASSESSMENT:

This section identifies various threats to our pipeline system. Each threat shall be given a score that is based on the piping material and the system leak history for the previous 5 years. The scores range from 0 (low risk) to 3 (high risk).

THREAT ASSESSMENT CHART:

Personnel must evaluate each threat to determine if it is applicable to our system; check each box that applies.

Once all the threats have been evaluated and checked, you must add up the scores for each threat checked.

NOTE: If we do not know the material or footages of piping in our system; or if we have experienced five (5) or more hazardous leaks on our system for any reason in the previous five (5) years, our threat probability score will be 3 with only one threat category checked as applicable.

OVERALL RISK RANKING:

The overall risk ranking shall be determined by using the following steps:

Take the total threat score that you determined from the threat assessment chart and multiply the threat score by the consequence score (1.25 for priority 1; 1.0 for priority 2).

Then divide the number determined in the step above by the total number of threat categories identified that were checked (number of categories checked “yes” in the threat assessment chart). This is our final overall risk score for our system.

Each time we evaluate our overall risk ranking we must include the date that each risk ranking was determined.

BASED ON RISK RANKING SCORE THE FOLLOWING ACTIONS WILL BE TAKEN:

The section provides criteria for additional actions to be taken based on our overall system risk ranking. If the overall risk ranking is 1.5 or higher, we will identify the threat(s) that need to be corrected monitor our system and submit a written plan to the Arizona Corporation Commission's Office of Pipeline Safety for evaluation within 30 days. If the overall risk score is less than 1.5, then no additional actions, other than normal operation and maintenance activities and system monitoring, shall be taken.

MANDATORY AND RISK BASED; ADDITIONAL ACTIONS, GENERAL:

Additional identified steps taken are based on annual activities that are specified in our operations and maintenance manual, as well as additional requirements based on the Arizona Administrative Code.

MANDATORY PERFORMANCE MEASURES:

Keep all written records for each leak that is located and repaired on our system. The written record must identify information about the cause of each leak that was found and repaired. Each leak shall be included on our annual report.

PERIODIC EVALUATION AND IMPROVEMENT:

Anytime there are changes to our system (new piping installations, replacements, etc.) or an emergency event as defined in our emergency plan, we shall conduct a re-evaluation of the risks to our system based on incidents or changes. We shall use a new threat assessment chart and recalculate our risk ranking as necessary.

In the event that there are no changes or events on our gas pipeline system, we, as the operator will re-evaluate this plan at least once every 5 years. If we determine that any additional actions may not be effectively reducing the risk on our system, personnel will be responsible to determine if any additional actions will be needed to meet the objectives of this plan.

RECORD KEEPING:

All written records shall be kept for at least 10 years to demonstrate our plan is being implemented and followed.

**OPERATION &
MAINTENANCE
(O & M) PLAN**

SECTION/TAB # 2

OPERATION AND MAINTENANCE PLAN

Facility Name: _____

Address: _____

SCOPE

This operation and maintenance plan was developed to assist _____ by providing specific instructions for conducting and documenting (See Section 5, Maintenance Records) operations and maintenance activities on the gas pipeline system.

The personnel responsible for the operations and maintenance of the gas system (responsible facility representative(s) and/or contractor) must be trained in the use of the procedures contained within this Operations and Maintenance Plan, and they must be qualified to conduct operations and maintenance activities (refer to the Operator Qualification Plan for more information).

This Operations and Maintenance plan shall be reviewed at intervals not to exceed 15 months, but at least once each calendar year, by all personnel who have responsibilities for the operations and maintenance of the gas system. A record of each review conducted shall be maintained (record annual O&M plan reviews on the last page of this plan).

This operations and maintenance plan, the emergency plan (Section 3), all system maps and records shall be kept in a location where they are made easily available to all appropriate responsible facility representative and/or contractor personnel and any representative of the Arizona Corporation Commission's Office of Pipeline Safety (AZOPS). The location where the plans, maps and all operation, maintenance, repair, new construction, and any other documentation that is relevant to the system is located at: _____.

PROCEDURE EVALUATION

At least once every 2 years, but more often as needed, normal operations and maintenance work done by responsible facility representative(s) and/or contractor personnel shall be observed and reviewed by the responsible facility representative(s). This observation is NOT conducted to review the person(s) who are conducting the operations and maintenance activities, but the review is done to evaluate the procedures that are being used to conduct the normal operations and maintenance activities.

If the review determines that the operations and maintenance procedures are not effective or if the procedures direct the work to be conducted in an unsafe manner, then the procedure(s) shall be revised as needed to ensure that activities are being conducted in a safe manner.

A written record shall be made and kept of each work review that is conducted. This record shall identify the person who is conducting the observation, the date that the observation was conducted, the person(s) who are conducting the specific operations and maintenance activity, the procedure(s) that are used to conduct such activities, and whether the procedure is satisfactory or unsatisfactory (See Section 5, Record No. 11).

If a procedure must be revised as a result of the work review, then a written record shall also be made and kept, to document the procedure revision showing the date the revision was made, the person who made the revision, and the reason for the procedure revision.

DISTRIBUTION SYSTEM

The distribution system consists of the following:

DIAMETER OF PIPE	TYPE MATERIAL	FT ABOVE GROUND	FT BELOW GROUND	TOTAL FEET	DATE INSTALLED
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

SYSTEM OPERATING PRESSURE

At the time of the very first inspection of the system, the maximum allowable operating pressure (MAOP) shall not exceed the pressure that is being provided by the gas supplier.

The MAOP of the pipeline system shall be determined by **lowest** value of the following:

1. The documented working pressure ratings of all piping and components. Steel mains and services shall use the design formula as listed in Title 49 CFR Part 192.105. Plastic mains and services shall use the design formula as listed in in Title 49 CFR Part 192.121. All components shall have a working pressure rating either marked on the component or have a written record that includes the pressure rating.
2. Pressure testing of the system. Refer to the pressure test section of this plan for more information. If test records are available, then the MAOP shall be determined by dividing the test pressure by 1.5.
3. If the system was constructed between 1965 and 1970, and there are records available to document the operating pressure between January 1, 1965 to December 31, 1970, then the MAOP shall be that operating pressure.
4. All new or replaced piping that is installed in the system shall be pressure tested to establish the MAOP that is the same as the current system pressure. The new or replaced segment may be pre-tested prior to installation. Refer to the pressure testing section of this plan for more information. A written record of each pressure test conducted on the system shall be made and kept for the life of the pipeline facility.
5. In the absence of any documentation that is listed in items 1-4 listed above, the MAOP shall not exceed the operating pressure provided by the gas supplier.

The MAOP of the system is _____ psi. This pressure was determined by item ____ (identify by the numbered item listed above)

CONTINUING SURVEILLANCE

The system shall be monitored on a continuous basis. This is accomplished by observing the physical condition of the system while conducting normal operations and maintenance activities on the system and observing system conditions at all other times. Appropriate corrective action shall be taken when any of the following conditions are observed, which shall include, but are not limited to, the following:

- Any failures of pipe or components which would require repair or replacements.
- Any increase in leaks, or changes in leak history.
- Any indications of corrosion if the underground piping is steel.
- Any changes in requirements for adequate cathodic protection if the underground piping is steel.
- Any other operating or maintenance condition that is determined to be unusual.

If any of the conditions listed above are observed, then action taken shall be towards minimizing hazards to life and property. Refer to the remedial measures section of the integrity management plan for more information about corrective action to be taken, based on the observed condition.

If any segment of main or service is found to be in unsafe condition, then steps shall be taken immediately to either repair the segment, replace the segment, take the segment out of service, or reduce the operating pressure. Any segments of mains and/or service lines that are determined to be prone to leakage must be replaced as soon as possible in accordance with the DIMP plan (PIPES Act 2020, Section 114).

All leaks discovered are to be considered hazardous and shall be responded to and repaired immediately.

SYSTEM STARTUP / SHUTDOWN

When occasions require that the system must be shutdown for maintenance, repairs, or for an emergency event, the system valves shall be used. Individual buildings may be isolated by using valves located on the inlet riser. If the entire system must be isolated, use the main valve located on the downstream side of the master meter set if available. The inlet valve to the master meter set may also be used, but that valve is the property of the gas supplier and only the gas supplier may re-open the valve.

Gas service shall be started up and/or restored by conducting the following steps listed below:

- Install pressure gages at various locations on the system to monitor the system pressure.
- Open the valve(s) slowly to avoid damage to regulators and any other equipment.
- Observe the pressure gages during the startup to ensure that the system pressure does not exceed the system maximum allowable operating pressure.

Following system startup, all service regulators shall be tested for proper operation. Refer to the service regulators section of this plan for more information.

CUSTOMER NOTIFICATION

If the system is located within a mobile home park, and features sub-meters for each mobile home unit, where the tenant is responsible for ownership and maintenance of the piping from the sub-meter to the mobile home unit, then the tenant shall be notified of their responsibility to maintain the gas piping that is not maintained by the mobile home park. The Customer Notification handout is located in Section 5, Record No. 12.

The tenant shall receive the customer notification handout no later than 90 days after service to the tenant has commenced.

The information may be given to the tenant directly by either mail, e-mail, or hand delivery. If this option is used, then a written record shall be made that documents the identified tenant and the date that the handout was delivered to the tenant. This record shall be kept on file for a minimum of 5 years.

As an alternative to delivering the information to the tenants individually, a copy of the customer notification handout shall be posted at all times on the property at a location that is accessible to the public/tenants.

PUBLIC EDUCATION / AWARENESS

The public awareness notice is located in Section 5, Records No. 8. It is the responsibility of the facility to fill in the blanks on the handout to make it site-specific to the facility. The notice shall be made available to the tenants of the property by using one of the following methods:

- The public awareness notice shall be delivered to each individual tenant at least twice each calendar year by either hand delivery, mail, e-mail, etc. If this option is chosen, then a written record shall be made that identifies each tenant that the handout was delivered to and the date of delivery. This record shall be kept on file for at least 5 years.
- As an alternative to individual hand delivery, a current copy of the public awareness notice shall be posted at all times at a location on the property that is accessible to the public. A record shall be made and kept that documents the posting of the notice along with the date and location of the posting. This record shall be kept on file for at least 5 years.

In addition to delivering the notice to tenants, a copy of the notice shall be given to any excavator that makes a request to locate the pipeline system on the property prior to excavation activities (refer to the damage prevention section of this plan for more information). A written record shall be made that identifies the excavator and documents the date that the notice was given. This record shall be kept on file for at least 5 years.

DAMAGE PREVENTION

No person or company shall begin any excavation on the property where the pipeline system is located without first notifying the responsible facility representative(s).

If a request for a locate is received, Arizona state law requires a positive response to the locate request. The locate request shall be reviewed to determine if any mains and/or services are within the proposed excavation area. This review shall be conducted within 10 working days after the request has been received. Refer to Section 8 of this manual for more information about the responsibilities of the facility owner as stated in the Arizona Underground Facilities Law.

If the property is an apartment complex or mobile home park, Arizona state law requires these facilities to register with the Arizona 811 Center as a landlord. Contact the Arizona 811 Center for more information about the registration process.

A copy of the public awareness handout notice (Section 5, Record No. 8) shall be given to the excavator that makes a request for a locate. A written record shall be made that identifies the excavator, and the date the handout was given.

If the pipeline facility needs to be located and marked, it shall be conducted in accordance with the following:

- If the facility was installed after 1988, then Arizona state law requires that maps and/or installation records be consulted to verify location of the affected facility in addition with the physical locating method. For facilities installed before 1988, maps and installation records may be used, but are not required.
- The equipment used to locate the underground facility shall be operated in accordance with the manufacturer's instructions. It is recommended to use a conductive locate, where the locating transmitter is connected directly to the piping system through a locate wire (for plastic facilities), risers, and/or test station wires (for steel facilities).
- Markings shall be spaced close enough to allow the excavator to reasonably determine the location of the affected pipeline facilities. Markings must be placed at service tees and locations where the pipeline changes direction in addition to all mains and services within the excavating area. All marks for gas pipeline facilities shall be yellow in color, and are made using paint, stakechasers, or flags.
- If there are no facilities within the area to be excavated, then the excavator shall be notified by either placing no conflict markings at the excavation site, or sending a message to the excavator using telephone, e-mail, etc. A written record shall be made and kept of each no-conflict notification.

If there is any reason to believe that excavation activities might result in possible damage to the piping facilities, then an inspection shall be conducted during and after the excavation activities to check for damage. This shall include a leak survey if the excavation involves blasting (refer to the leak survey and leak investigation sections of this plan). If any damages were the result of boring excavations, then the inspection shall include a leak investigation.

A written record shall be made of each locate request received, and each time that locating and marking activities are completed (See Section 5, Record 14).

INVESTIGATIONS OF FAILURES

Any event that is a result of failure of pipe or components, the cause of the failure shall be investigated by the responsible facility representative(s). This investigation is conducted to determine the cause of the failure and to determine what corrective action must be taken to prevent a recurrence.

If the cause of failure cannot be determined during the initial investigation, then the failed pipe or component must be removed from the system for analysis by an outside laboratory. The AZOPS shall be contacted (602-262-5601) prior to removal, then the failed sample must be dealt with in accordance with Arizona Administrative Code R14-5-207(P) (See Section 9 of this manual for more information).

TAPPING PIPELINES UNDER PRESSURE

If tapping mains under pressure is performed, the operation shall be conducted in accordance with a detailed written procedure. Many mechanical and fusion tees for plastic lines will have a factory procedure to complete the tap. If this is the case, the factory procedure shall be followed. If contractor personnel use their own detailed procedures for conducting tapping, then reviews shall be conducted to ensure that the written procedures are being followed.

It is mandatory that all personnel (both responsible facility representative(s) and/or contractor) shall be properly trained and qualified on all tapping procedures that are being used (Refer to Section 1, Operator Qualification Plan for more information).

PURGING GAS LINES

Purging of air and/or gas from mains and services shall be conducted in accordance with a detailed written procedure. The Purging Guidelines are located in Section 15 of this manual must be followed to ensure the purging is conducted in a safe manner. If another purging procedure is used, it shall contain the following:

- The air or gas must be released into the pipeline in a rapid and continuous flow.
- A combustible gas indicator (CGI) shall be used to verify readings of 0% gas (if purging with air), or 100% gas (if purging with gas).
- If air or gas cannot be supplied in enough amounts to ensure that no hazardous gas/air mixture is created inside the main or service, then a slug of inert gas (Nitrogen, etc.) must be used before introducing gas or air into the facility.
- The purge stack shall extend far enough above grade (minimum of 6 feet) to safely vent the gas or air away from the purging area. In addition, the stack shall be properly grounded to prevent the buildup of static electricity using grounding rods and clamps, and the purge stack shall not be directed towards persons or buildings.
- Every effort shall be made to minimize the amount of gas being purged into the atmosphere by either ensuring that the gas is consumed within the pipeline segment to be purged prior to conducting the purging, or by making the segment to be purged as small as possible. The use of flaring to burn off the gas as it is being expelled from the pipeline is prohibited (PIPES Act 2020, Section 114).

It is mandatory that all personnel (both responsible facility representative(s) and/or contractor(s)) shall be properly trained and qualified on all purging procedures that are being used (Refer to Section 1, Operator Qualification Plan for more information).

ODORIZATION

To ensure that the gas is properly odorized, a sniff test shall be conducted at least 4 times each calendar year with intervals not to exceed 4 months.

The sniff test is conducted by releasing a small amount of gas into the atmosphere while making an attempt to detect the distinctive odor with a sense of smell. The use of 2 persons to conduct this test is recommended. In addition to the sniff test, documentation may also be obtained from the gas supplier that verifies that the gas supplied to the system is adequately odorized.

The safest locations to conduct the sniff test are at gas grills or gas stoves, since gas can be released into the atmosphere without having to disconnect any piping or fittings. Do not disconnect any pipe or fittings inside buildings or near ignition sources to conduct the test. If there are no places inside buildings to safely conduct the test without having to disconnect the pipe or fittings, then conduct the test outdoors at risers or at the master meter set.

It is recommended to conduct the test at the far ends of the system to ensure that odorant is reaching all parts of the system.

If odorant is not detected, the gas supplier shall be notified immediately for action to be taken to odorize the system. The AZOPS shall be notified when odorant is not detected at (602) 252-4449.

A written record shall be made and kept of each sniff test that is conducted (See Section 5, Record No. 1).

PATROLLING

Patrols are visual inspections of mains that are in locations where anticipated physical movement of the facility may result in damage or leakage. These inspections are done to watch for, and correct, any conditions that may result in failures/leaks and include, but are not limited to, the following:

- Movement of aboveground piping on wall or roof supports.
- Application of roofing foam on rooftop piping.
- Risers and other aboveground piping in locations that may be subject to damage from motor vehicle traffic.
- Encroachments of buildings over underground mains and/or services.

Mains at priority 1 facilities (schools, churches, hospitals, day care centers, adult care centers, prisons, etc.) where outside forces may result in damages or leaks, shall be patrolled at intervals not exceeding 4 ½ months, but at least 4 times each calendar year.

Mains at priority 2 facilities (apartments, mobile home parks, campgrounds, industrial plants, etc.) where outside forces may result in damages or leaks, shall be patrolled at intervals not exceeding 7 ½ months, but at least 2 times each calendar year.

If there are any conditions observed during patrols that are identified as being in an unsatisfactory condition, then corrective action to minimize the hazard shall be conducted within 30 days of the discovery. Refer to the preventative measures section of the written integrity management plan for more information about corrective action.

A written record shall be made and kept of each patrol that is conducted (See Section 5, Record No. 10).

LEAKAGE SURVEYS AND INVESTIGATION

Leak detection surveys are conducted using specialized equipment that is capable of detecting both underground and aboveground leaks. Leak surveys shall be conducted using the types of equipment that is listed in TABLE 2 of GPTC G-192-11 (2022 edition).

Leak survey equipment shall be tested and calibrated before each use in accordance with manufacturer's instructions and sections 4.6 and 4.7 of GPTC G-192-11 (2022 edition).

Both surface and sub-surface leak surveys shall be conducted in a manner that is in accordance with sections 4.4(a) and 4.4(b) of GPTC G-192-11 (2022 edition). An entire system pressure test may be used as an alternative to an instrument leak survey (refer to the pressure test section of this plan for more information).

Leak surveys shall be conducted at intervals not to exceed 15 months, but at least once each calendar year.

A written record shall be made and kept of each leak survey conducted and all leaks that have been identified and repaired (See Section 5, Record No. 2 and Record No. 2A). These records shall identify the instrument used to conduct the survey, instrument calibration information, and results of the survey. Records also must identify each main and service that has been leak surveyed.

If an initial leak survey indicates the possible presence of an underground leak, then an investigation using a combustible gas indicator (CGI) shall be conducted immediately to pinpoint the location of the leak and determine the spread of underground gas. The CGI shall be operated in accordance with the instructions from the equipment manufacturer.

Samplings shall be taken over the main or service line, and at locations on both sides of the facility. The maximum spacing between initial samples shall not exceed 10 feet.

If there are any indications of underground gas/air mixtures, then additional samples shall be taken at locations that are more closely spaced together. Continue to take additional samples until the highest reading location is identified.

To determine the leak spread over the main or service, take samples moving in both directions over the pipeline away from the positive readings until there are 2 consecutive readings of 0 percent gas to air mixture.

To determine leak spread from the pipeline, take samples while moving away from the pipeline in both directions perpendicular to the main or service. Continue to take samples until there are 2 consecutive readings of 0 percent gas to air mixture.

If there is a building located within 20 feet, then samples shall be taken at the building wall. If there are any indications of gas/air mixtures at the building wall, then the investigation shall continue inside the building. The leak shall be considered as hazardous which means that the emergency plan shall be followed to protect life and property.

NOTE: The only instrument that can be used for safely conducting an indoor leak investigation is a CGI. DO NOT use a flame ionization instrument inside of any building.

A written record shall be made and kept of each leak investigation that is conducted. The record shall identify the locations where samples were taken, the results of each sample, and the date and time that the investigation was conducted.

NOTE: All leaks are to be repaired promptly. AZOPS approval is required before any leaks are graded and classified in accordance with section 5 of GPTC G-192-11 (2022 edition) and shall conform to the repair timelines listed below:

- All grade 1 leaks, which are considered hazardous, must be repaired immediately following discovery.
- All grade 2 leaks shall be identified and repaired within 30 days of discovery.
- All grade 3 leaks shall be identified and repaired within 60 days of discovery.

NOTE: If the facility uses sub-meter sets to provide gas to tenants, the volume of gas billed by the provider through the master meter set is compared to the total volume amount that was measured through all of the sub-meter sets to determine if any lost and/or unaccounted gas is identified. If there is any lost and/or unaccounted gas, then a leak investigation shall be conducted. For non sub-metered facilities, monitor for the total volume of gas billed by the provider to determine if there is any unusually high usage being billed when compared to previous billing statements. If a high bill is noted, the provider shall be contacted as soon as possible to assist in the leak investigation (PIPES Act 2020, Section 114).

VALVE MAINTENANCE ON DISTRIBUTION SYSTEMS

Exterior valves in the distribution system that have been identified as valves that may be used in an emergency event to isolate the entire system, or portions of the system, shall be maintained and tested to ensure proper operation. The valves are inspected by partially operating them by moving the valve operating mechanism enough to partially close the valve, then moving the mechanism back to the open position. If any maintenance is needed to be performed on a valve, the maintenance work shall be conducted in accordance with instructions from the valve manufacturer.

Valves shall be inspected, operated, and serviced (if necessary) at intervals not to exceed 15 months but at least once each calendar year.

If any valve is found to be inoperable during the annual inspection, then corrective action shall be conducted within 30 days. The action shall be to either repair the valve, replace the valve, or to designate another valve.

A written record shall be made and kept of each valve inspection/maintenance that is conducted (See Section 5, Record No. 4).

REGULATOR STATION INSPECTION

If the piping system uses regulator sets and/or relief valves to protect the system from overpressure, then the regulator equipment and/or relief valves shall be inspected and tested for proper operation.

Regulators are tested for proper operation by observing the set-point and lockup pressures by conducting the following:

- Attach a calibrated pressure gage between the regulator(s) and an isolation valve located downstream from the regulator(s).
- Observe the outlet pressure on the regulator. This is the regulator set-point pressure.
- Close the downstream isolation valve to simulate no-load conditions. The pressure reading should go up slightly then stop. The reading where the pressure stops rising is the lockup pressure.

If the station is a worker/monitor design, the worker regulator is tested using the steps listed above then the monitor regulator is also tested the same as the worker regulator. The lockup pressure of the monitor regulator shall not exceed the system MAOP plus allowable buildup pressure.

If the regulator fails to lockup (the pressure continues to rise even with the downstream valve closed), then corrective action must be immediately taken to repair or replace the regulator. The regulator repair shall be conducted in accordance with written maintenance instructions provided by the regulator manufacturer.

Regulator stations shall be inspected and tested for proper operation at intervals not to exceed 15 months, but at least once every calendar year.

If a relief valve is used for overpressure protection, then the capacity must be determined annually using either a full capacity test or calculation reviews. If any equipment is changed, then a new calculation for adequate relief valve capacity must be determined. If a full capacity relief valve test is used, every effort shall be made to minimize the amount of natural gas released by using either compressed air or nitrogen gas (PIPES Act 2020, Section 114).

If any changes are planned to be made to existing regulator stations, then AZOPS shall be contacted to review the proposed changes to ensure compliance with all applicable regulations (PIPES Act 2020, Section 114).

A written record shall be made and kept of each regulator station that is inspected (See Section 5, Record No. 14).

If relief valves are tested or reviewed, a written record shall be made and kept of each test or calculation review that is conducted (See Section 5, Record No. 15).

CORROSION CONTROL - GENERAL

All underground metallic mains and services shall be maintained and protected against rust (corrosion).

Facility employees and/or contractor personnel who are responsible to carry out the procedures contained in this section shall be trained and qualified in corrosion control methods (Refer to Section 1, Operator Qualification plan for more information).

All new installed steel mains and services that are installed underground shall have both a protective coating and cathodic protection at the time of pipe installation but no later than 45 days following installation. All segments of steel mains and services that are used to replace older piping shall also have a protective coating and be installed with cathodic protection.

All segments of steel mains and services that are used to replace older piping shall also have a protective coating and be installed with cathodic protection.

CORROSION CONTROL – EXTERNAL CORROSION INSPECTION

Whenever a segment of buried steel main or service is exposed for any reason, a visual inspection shall be conducted on the exposed piping to determine the condition of the coating and to look for any evidence of external corrosion.

If external corrosion is observed, then the exposure of the underground main or service shall be extended both longitudinally (in both directions away from the corrosion area) and circumferentially (around the entire outer surface of the facility) until all of the external corrosion area is identified. Once the area of external corrosion is identified, then the corroded area shall be repaired immediately, by cleaning the area, removing the corrosion from the main or service, then applying a new protective coating (Refer to Section 10, Chapter VIII, pages 21-22 of this manual for more information about coating application). If a tape coating is used, make sure you adequately overlap and extend the new wrap to at least 12 inches from the repaired area in both directions.

A written record shall be made and kept for each exposed pipe visual inspection that is conducted, including information on any additional investigations and repairs as necessary. Records for external corrosion visual inspections shall be kept for the life of the pipeline facility.

CORROSION CONTROL – ANNUAL SURVEYS

To determine the effectiveness of the cathodic protection system, an annual pipe-to-soil survey shall be conducted at intervals not to exceed 15 months, but at least once each calendar year.

Equipment used includes a copper/copper sulfate reference cell and a high-impedance voltmeter. Operation and maintenance of the equipment shall be conducted in accordance with the equipment manufacturer's written instructions.

The voltmeter has two test leads which are red and black in color. The red test lead is connected to the positive terminal of the voltmeter (indicated by red) and to the reference cell. The black test lead is connected to the common terminal of the voltmeter (indicated by black) and to the pipe. The voltmeter must be set to read, Direct Current Volts, which will be indicated on the display screen by the symbol VDC.

When taking a voltage reading, place the tip of the reference cell into the soil. If the ground is hard and dry, apply some water to the ground before placing the reference cell (this helps to reduce the electrical resistance). If taking a reading on a riser, make sure there is good metallic contact between the voltmeter lead and the steel riser. For readings at test leads, make sure the wire is cleaned off to ensure metallic contact with the voltmeter lead.

Voltage readings must be taken at a sufficient number of locations and near mid-points between sacrificial anodes to assure that steel piping is being adequately protected.

The reading on the voltmeter shall be at least -0.850 DC volts for adequate cathodic protection. Any readings below -0.850 DC volts shall require corrective action to be taken within **30 days** following discovery. Refer to the remedial action section of this plan for more information.

A written record shall be made and kept for each cathodic protection annual survey that is conducted (See Section 5, Record No. 5). All records of annual pipe-to-soil surveys shall be kept for the life of the pipeline facility.

CORROSION CONTROL – RECTIFIER INSPECTION

If the facility uses rectifiers as the source of protective electrical current, then the rectifiers must be inspected and tested for proper operation at intervals not to exceed 2 ½ months, but at least 6 times each calendar year using the steps listed below:

- Use a high impedance voltmeter to conduct the test.
- Set the voltmeter to read direct current (DC) volts, then connect the red voltmeter lead to the anode or (+) terminal on the rectifier and connect the black voltmeter lead to the pipe or (-) terminal on the rectifier. Read and record the voltage reading.
- If the rectifier has a shunt, then connect the voltmeter leads to each end of the shunt. Read the voltage across the shunt. To determine the DC current, you must divide the voltage reading by the electrical resistance of the shunt (given in Ohms). If there is no shunt on the rectifier, then you must use the voltmeter setting to read current and follow the voltmeter manufacturer's instructions for how to read DC current.

A written record must be made and kept, to document the voltage and current output of the rectifier (See Section 5, Record No. 6) each time a rectifier is inspected and tested.

CORROSION CONTROL – REMEDIAL ACTION

Anytime a reading taken during an annual survey is less than -0.850 DC volts, then corrective action must be conducted immediately. The issue shall be investigated to determine the cause of inadequate cathodic protection, then once the cause is known, then repairs must be conducted to correct the condition. Refer to troubleshooting guidelines listed in Section 10 of this manual for more information. **All corrective action shall be completed within 30 days following discovery.** If the corrective action will take longer than 30 days to complete, then detailed written records shall be made to demonstrate the reason for corrective action that will take longer than 30 days to complete and shall document progress towards completion of the corrective action.

A written record shall be made of each corrective action that is conducted on the system and shall be kept for the life of the pipeline facility.

CORROSION CONTROL – ELECTRICAL ISOLATION

All aboveground pipe shall be electrically isolated from underground pipe by the use of isolating unions or flanges (unions and/or flanges that have a non-conductive electrical gasket separating the two parts). If it is suspected that an isolating fitting has failed, then take pipe-to-soil readings on both sides of the isolating fitting. If the difference between the readings is less than 0.100 DC volts, then the isolating fitting must be replaced within the time period as mentioned above for remedial action.

CORROSION CONTROL – TEST LEAD AND / OR ANODE INSTALLATION

If the piping system includes large amounts of footage between service risers, then installing a test lead wire must be considered. Test wires are usually attached to the pipe surface by the means of an exothermic weld (often known as a Cadweld). The test wire must be installed in such a manner as to minimize stresses on the wire (Refer to Section 10, Chapter III, page 15 (Figure III-12) of this manual for more information about how a test wire is installed using a Cadweld process).

For installing a galvanic anode, it is recommended to attach a separate test wire to the pipeline, then run the wire up above grade and attach the test wire to the anode lead in an aboveground test station. Connecting the anode in this way allows for easier testing of the anode and for troubleshooting of the cathodic protection system.

If the anode is installed close enough to a service, then the anode lead may be directly attached to the riser using a grounding clamp.

Anytime a Cadweld process is used to install leads on a buried steel main or service, the area of the weld shall be coated in the same manner as a pipeline coating (Refer to Section 10, Chapter III, page 20 of this manual for more information about coating application). If a tape coating is used, make sure you adequately overlap and extend the new wrap to at least 12 inches from the Cadweld area in both directions.

CORROSION CONTROL – INTERNAL CORROSION INSPECTION

Whenever a segment of buried steel main or service line is cut out and removed from the system, the inside surface of the cut-out piping shall be visually inspected for evidence of internal corrosion. If internal corrosion is observed, then an investigation shall be conducted to determine the cause of the internal corrosion, and corrective actions shall be conducted as needed to resolve the issue.

A written record shall be made and kept for each internal corrosion visual inspection that is conducted, including information on any additional investigations and repairs as necessary. Records for internal corrosion visual inspections shall be kept for the life of the pipeline facility.

CORROSION CONTROL – ATMOSPHERIC CORROSION INSPECTION

All aboveground piping shall be protected from atmospheric corrosion by the use of paint or other coatings. This will place a barrier between the pipe and the outside elements. This protection must be suitable to prevent corrosion caused by moisture (rain, fog, sprinklers, coolers, or any other source of water). This protection is vital for locations of the piping at the interface between the soil and the atmosphere.

Aboveground piping shall be visually inspected for evidence of atmospheric corrosion at intervals not to exceed 15 months, but at least once each calendar year. Inspections may be conducted while performing patrols or during the annual leak survey.

If there are any locations of piping that show atmospheric corrosion, then immediate action shall be taken to clean and re-paint the locations. Corrective action shall be completed within 30 days following discovery.

A written record shall be made of each atmospheric corrosion inspection along with any corrective action that was conducted as a result of the inspection. Records of atmospheric corrosion inspections shall be kept for the life of the pipeline facility. Use the Pipeline Patrolling Record (See Section 5, Record No. 10) for atmospheric corrosion inspections and corrective actions taken.

ABANDONMENT OF DISTRIBUTION GAS LINES

If the gas lines are to be abandoned in place, they shall be physically disconnected from the gas system. The open ends of the lines shall be plugged or capped. Purging the abandoned lines to prevent the development of a potentially hazardous condition, will be done by filling the line with water or an inert material. Abandoned gas lines shall be indicated on the system maps. A written record shall be made and kept for each segment of gas line that is abandoned.

All abandoned gas valve boxes shall be filled to grade with sand or a suitable substitute.

DISCONTINUED SERVICE

Whenever gas service to a unit, tenant, or building is discontinued, one of the following steps must be conducted:

- The valve that is closed to prevent the flow of gas into the building must be provided with a locking device or other means designed to prevent the opening of the valve by persons other than those authorized by the facility operator.
- A mechanical device or fitting that will prevent the flow of gas must be installed in the service line riser.
- The building must be physically disconnected from the gas supply and all open pipe ends shall be capped or sealed.

PREVENTION OF ACCIDENTAL IGNITION

Actions shall be taken to minimize and/or eliminate all sources of ignition in all environments where the presence of natural gas or propane vapors may constitute a hazard of fire or explosion.

Procedures shall be developed to address the prevention of accidental ignition covering any task on the pipeline that may result in the release of natural gas or propane, including but not limited to; venting, purging, tapping, cutting, repairing and replacing pipeline, etc. Procedures must include situations where warning signs and fire extinguishers must be provided to minimize hazards.

Do not perform any cutting, welding, or other work that is considered an ignition source on the piping facility that potentially contains a mixture of natural and/or LP gas and air.

ANNUAL REPORT

An annual report shall be filed with the Arizona Corporation Commission's Office of Pipeline Safety by no later than April 15. The report is for the preceding calendar year (January 1 to December 31). See Section 6, Annual Report in this manual for a sample copy of the annual report.

This information shall include the types of material in the system (either steel or plastic) and accurate footages of each material. In addition, if there were any leaks on the system during the previous calendar year, they must be reported with the cause of the leak identified. If there were any leaks that were present at the end of the calendar year that have not yet been repaired, these leaks must be reported, and there must be a documented reason why the leak(s) was not yet repaired.

The mailing address for the annual report is: Arizona Corporation Commission, Office of Pipeline Safety, 1300 West Washington Street, Suite 220, Phoenix, Arizona 85007. Alternatively, the annual report may be e-mailed to safety@azcc.gov.

PRESSURE TEST REQUIREMENTS

All Installations of new pipe and components, and repairs will be inspected by AZOPS.

Each new, replacement, reinstated or uprated pipe will be subjected to the pressure test required in accordance with Title 49 CFR 192 Subpart J, K prior to being filled with gas and put in service.

Pressure testing medium shall be air, water, or inert gases (such as Nitrogen). Do not use natural gas or LPG as the test medium.

Each pressure test that is conducted shall use a pressure gage that has been calibrated for proper operation, either using a field test with a master gage, or using a newly purchased gage with documentation from the gage manufacturer to demonstrate accuracy and proper operation of the gage. If pressure charts or deadweights are used, these shall also be calibrated to the same standards as for pressure gages.

All pressure tests shall be conducted for a minimum time of one (1) hour.

All pressure tests will be witnessed by AZOPS and an operator representative.

The testing for new pipe (including pre-tested pipe), replaced pipe, or re-located pipe shall be conducted in accordance with the following:

- **All steel piping, regardless of operating pressure:**

The minimum test pressure shall be 90 pounds per square inch (psi), or 1 ½ times the system MAOP, whichever is greater. The pressure gage used for the test shall read in 1 psi increments and shall have a scale that is greater than 90 psi.

- **PE plastic mains and services, regardless of operating pressure:**

The minimum test pressure shall be 60 psi, or 1 ½ times the system MAOP, whichever is greater. The pressure gage used for the test shall read in 1 psi increments and shall have a scale that is greater than 60 psi.

If a new component (valve, regulator) is installed, the component shall have a written record from the component manufacturer that documents the working pressure rating of the component. As an alternative to a written record, the pressure rating must be marked on the component. The tie-in joints for the new component shall be soap-tested at normal operating pressure.

New pipe may be **pre-tested** before installation then soap tested at tie- in joints at normal operating pressure. Pre-tests of new pipe must be documented and witnessed by the operator. A record shall be made of each pre-test that is conducted (See Section 5, Record No. 3) and kept for the life of the pipeline facility.

When new pipe is installed into the system without a pre-test, the part of the system that was taken out of service along with new pipe installed, will be tested as new and the test will be witnessed by AZOPS.

If any local jurisdiction requires testing that exceeds any of the standards listed above, then the pressure test shall be in accordance with the standards that are most restrictive.

RE-ESTABLISHMENT OF SERVICE

All existing pipe and components will be subjected to the following pressure test requirements:

- Regardless of material, the test shall be conducted at either 10 psi or 1 ½ times the system MAOP, whichever is greater. The pressure gage used for the test shall read in 1/10 psi increments and shall have a scale that is greater than 10 psi.
- All existing pipe and components isolated through disconnection will be pressure tested at 10 psi or 1 ½ times the system MAOP, whichever is greater. However, an existing service that is disconnected from the main shall be pressure tested from the point of disconnect to the service valve in the same manner as new pipe testing before reinstatement.
- Any physical damage to the system (ex.: third party damage, vehicle traffic, etc.), the affected main(s) and/or service(s) shall be tested at 10 psi or 1 ½ times the system MAOP, whichever is greater.

Do not conduct a pressure test against a closed valve if there is either natural gas or LPG on the other side of the closed valve. The valve shall be opened and capped for conducting the pressure test.

A written record shall be made for each pressure test that is conducted (See Section 5, Record No. 3). This record shall be kept on file for the life of the pipeline facility.

SHUTOFF BY GAS SUPPLIER

If the system is shut off due to any issues upstream from the master meter on the gas supplier's side, the system will not require a pressure test as described in the pressure test procedure, unless the system fails a pressure drop-test that is performed by the gas supplier. The gas supplier shall notify the AZOPS prior to re-establishing service to the system.

CONSTRUCTION STANDARDS

MATERIALS

All materials that will be installed within the system shall be approved for use with gas service, and they shall be clearly marked to demonstrate to what standard that the material was manufactured to.

Steel pipe shall comply with one of the following standards:

- ASTM A53 (grade B, grade A, grade X42, etc.)
- ASTM A106
- API 5L

All plastic pipe and fittings shall comply with the standard ASTM D2513, and be marked with the lettering CD, CE, CF or CG. This verifies that the pipe material has been rated for elevated temperature service.

All valves, regulators, and other components shall be marked with the manufacturing standard that the component is in compliance with. Valves shall be marked with the working pressure rating of the component (WOG 150, Case 100 psi, etc.).

Flanges shall be marked with the appropriate ANSI class rating.

If no markings are present on the pipe or component, then written documentation shall be available from the component manufacturer that demonstrates the standard that the material was manufactured to. This written documentation shall be kept on file for the life of the facility.

WELDING

All joints in steel mains and services that are made by welding shall be conducted using welding procedures that have been written and qualified in accordance with API 1104 (Welding of Steel Pipelines). The welding procedure must include a record of the destructive test that was done to qualify the procedure. Copies of the welding procedures and qualification test records shall be kept on file for the life of the pipeline facility.

All welders that are engaged in joining together steel mains and services shall be qualified to the welding procedures that are being used prior to conducting the work. Qualification is done by having the welder make a test weld then have the test weld evaluated by either destructive testing or by radiograph (X-ray). If an x-ray test is used, then the weld shall conform to the standards of API 1104 – Section 9 (current referenced edition in state rules). Alternatively, a welder may qualify to weld in accordance with the destructive test that is specified in Title 49 CFR Part 192, Appendix C. A written record shall be made of each welder's qualifying test(s) and kept for the life of the pipeline facility.

All welds made on steel mains or services shall be inspected to ensure that the welding procedure(s) was followed, and that the weld meets the standards of workmanship that is specified in API 1104 – Section 9. All personnel that conduct inspections of welded joints shall be qualified to inspect by appropriate training and experience to conduct such inspections. Since the piping usually will not operate at the same pressures as a transmission pipeline, and is usually less than 6 inches in diameter, then a visual inspection is all that is required. If non-destructive testing is conducted (x-ray, magnetic particle, liquid penetrant, ultrasonic), then the testing shall be done in accordance with a detailed written procedure and be conducted by persons who are trained and qualified in conducting non-destructive testing. Qualification is usually achieved by the person possessing a level II or level III certification of training from the American Society of Non-Destructive Testing (ASNT). A written record shall be made of each weld that is non-destructively tested and/or visually inspected and kept for the life of the pipeline facility.

Welding operations must be protected from weather and other adverse conditions that may affect the quality of the completed weld by using shelters or waiting for a day when weather conditions are ideal.

No miter weld joints are allowed within the system.

PLASTIC PIPE JOINING

All joints in plastic piping shall be joined by either heat fusion or mechanical joints. Threaded plastic pipe joints for gas services are prohibited.

All fittings (couplings, tees, elbows, etc.) used in making joints shall be marked with the appropriate information as required by ASTM D2513.

Joints made by heat fusion shall be made using a detailed written joining procedure(s). Plastic pipe manufacturer(s) have written/qualified fusion procedures available. If the manufacturer's procedure(s) is used, a copy of the procedure(s) and the destructive test results that qualify the procedure(s) shall be kept on file for the life of the pipeline facility. All equipment used to make fusion joints shall be operated in accordance with the equipment manufacturer's instructions and the written joining procedure(s).

If the system contains PVC pipe, then all solvent/cement used for joints must conform to ASTM D2513-99 and be used in accordance with the written manufacturer's procedure(s). These solvent cement joints shall be limited to installing a PVC cap or a PVC/PE transition fitting that is used for repairs.

All joiners of plastic pipe by heat fusion shall be qualified by the appropriate destructive testing that is specified in Title 49 CFR Part 192.285 and the qualification bulletin(s) supplied by the pipe manufacturer(s). A written record shall be made of each joiner's qualifying test(s) and kept for the life of the pipeline facility.

Joints made by mechanical fittings shall be done in accordance with the detailed written procedure that is provided by the fitting manufacturer. A copy of the procedure(s) that is used shall be kept on file for the life of the pipeline facility. All mechanical fittings shall have a rigid internal stiffener.

All plastic pipe joints shall be visually inspected by personnel who are qualified by appropriate training or experience to conduct joint inspections. All new mechanical fitting locations shall be noted by additions to the system map and/or records (Refer to Section 1, Distribution Integrity Management Plan for more information).

INSTALLATION – GENERAL

Refer to drawing located in Section 14 of this manual and to the following procedures for more information about proper system installation.

NOTE: If a local jurisdiction has standards for gas piping installation that are more restrictive than the requirements of Title 49 CFR Part 192, Arizona Administrative Code, NFPA 58/59 (for LPG systems), then the piping must be installed in accordance with the standards that are the most restrictive.

DEPTH OF COVER

The distance for depth of cover is measured from the top of the pipe up to the elevation of the final finished grade (regardless of material used):

- For buried mains, regardless of location, the minimum amount of cover shall be at least 24 inches.
- For service lines located under areas of vehicle traffic (driveways, parking lots, etc.), the minimum amount of cover shall be at least 18 inches.
- For service lines not located under areas of vehicle traffic, the minimum amount of cover shall be at least 12 inches.

BEDDING AND SHADING

All mains and services shall have at least 6 inches of sandy-type soil installed completely surrounding the pipe. The soil must be able to filter through a Number 4 sieve (about ¼ inch openings). Native soil may be used for bedding and shading material, but it must be free of large rocks and other debris that may damage the plastic pipe wall, or the coating on the steel pipe.

Once the bedding and shading material has been installed, then the backfill on top of the shading may be native material that was originally excavated out of the trench.

TRACER WIRE

All plastic mains and services that are installed underground shall have a tracer wire installed with the new piping to allow for the pipeline to be located in the future as needed. The wire shall have a minimum size of 14 gage (larger gage sizes 12, 10, 8, etc. may be used). In addition, the tracer wire shall have a protective coating and must be electrically conductive to allow for the wire to carry a locate signal. It is recommended to install the tracer wire on top of the shading above the pipe.

Wrapping the tracer wire around the pipe is prohibited.

OTHER INSTALLATION REQUIREMENTS

If the main or service is installed using a trenchless method (i.e. boring), then any new main or service shall be run inside a protective sleeve. Sleeving must be approved sleeving material, yellow in color from the manufacturer or painted yellow. Sleeving must be at least 1 ½ times larger than carrier pipe. Steel carrier pipe may not be inserted into plastic sleeving. The ends of the sleeve must be prepared so that the pipe wall will not be damaged during the installation. For plastic pipe installed in this way, the requirements for tracer wire remain the same as listed above.

Trenchless installation methods shall be limited to installation of plastic mains and services only.

MASTER METER EMERGENCY PLAN

SECTION/TAB # 3

MASTER METER EMERGENCY PLAN NATURAL GAS SYSTEM

Facility Name: _____ Date revised: _____

SCOPE

This plan is to provide for steps to be taken to ensure the safety of this facility in case of an emergency event that takes place on the facility (refer to the definition of emergency as listed below).

All actions taken as a result of this plan shall be to protect life safety first and property safety second. If there are any doubts about if the situation is considered an emergency event, then the local fire department and the gas supplier shall be notified for additional assistance.

This emergency plan shall be reviewed at intervals not to exceed 15 months, but at least once each calendar year, by all facility personnel who have responsibilities to carry out this plan in the event of an emergency. A written record shall be made for each plan review that is conducted and shall be kept for the life of the facility (refer to the emergency plan annual review record located on the last 2 pages of this plan).

EMERGENCY INCIDENT DEFINITION

An “emergency” condition exists when any facility personnel or other responsible person(s) has determined that extraordinary procedures, equipment, manpower, and supplies must be employed to protect the safety of the public and/or property (protecting the safety of the public is always the first priority) from any existing or potential hazard. These hazards shall include, but are not limited to, the following:

- Any gas leak that is discovered next to a building, or any gas leak discovered inside a building.
- Any fire, gas ignition, or explosion that is not intentionally set by facility personnel.
- Any gas pressure in the system that exceeds the gas system’s maximum allowable operating pressure.
- Any gas pressure in the system that is low enough to result in an outage or interruption of gas service to buildings.
- Any uncontrolled, escaping gas.
- Any natural disasters (floods, earthquakes, storms, etc.) or other severe forces of nature which make emergency provisions necessary.
- Any outdoor hazardous leak. This leak represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous.

GAS ODOR / LEAK REPORT

The first person receiving a report of a gas leak or odor will complete a leak report (See Section 5, Record No. 7). All reports of leaks on the property will receive priority **with top priority going to a reported leak inside a building.**

GAS LEAK LOCATED INSIDE BUILDING

1. Evacuate the building immediately.
2. Do not operate any electric switches, lights, or appliances.
3. Do not use a cell or landline phone inside the building to either make or receive phone calls.
4. Do not use matches, cigarettes or other possible sources of ignition.
5. Do not allow anyone to enter the affected building until it has been made safe.

Any strong odor of gas inside a building must be assumed to be hazardous. Proceed as follows:

1. An employee will be dispatched immediately to the location of the reported leak to evaluate the situation.

NOTE: When conducting a leak investigation inside the building, use a combustible gas indicator (CGI) to determine the location of the leak, and to determine the concentration of gas inside the building (follow the equipment manufacturer instructions for use). When taking readings, take a sample at the highest location in the room (if the leak is LPG, take a sample at the lowest part of the room). Do not use a flame ionization unit (FI) as it uses an open flame and it is not safe for indoor use.

2. If necessary, service valves, main valves, or master meter valves shall be shut off to stop the flow of gas to the affected area.
3. Call your local fire department at _____, or 911, if necessary.
4. Call your local gas supplier at _____, if necessary.
5. Call the Arizona Corporation Commission's Office of Pipeline Safety (AZOPS) at (602) 252-4449, if necessary.
6. If local first responders and/or gas supplier personnel are called to the scene, a designated employee shall be made available to communicate with the responding parties to coordinate what actions will be taken to minimize hazards to life and property.

GAS LEAK LOCATED OUTDOORS

At the first report of a gas leak located outdoors and away from a building, an employee or qualified contractor shall be immediately dispatched to the affected area to conduct a leak investigation using a CGI (use the Leakage Surveys and Investigation procedures located in Section 2, Pages 8 and 9 of the Operations and Maintenance Plan) and to assess the danger to the public, surrounding buildings, and property. If the assessment determines that the exterior leak is hazardous, then proceed as follows:

1. If necessary, evacuate and/or assist all persons to safety. Once all persons have been evacuated, do not allow any unauthorized persons back into the affected area until it has been made safe.
2. If necessary, call your local fire department at _____ or 911.
3. If necessary, call your local gas supplier at _____.
4. If a hazardous condition exists, shut off the supply of gas to the affected area using main valves, service valves, or master meter valves.
5. If necessary, barricade the area.
6. If local first responders and/or gas supplier personnel are called to the scene, a designated employee shall be made available to communicate with the responding parties to coordinate what actions will be taken to minimize hazards to life and property.

NOTE: If the leak investigation determines that underground gas is detected next to the wall/foundation of a building, the investigation shall continue inside the building to determine if any gas is detected inside. If gas is detected indoors, **immediately evacuate the building then follow the steps for dealing with a gas leak inside a building (listed in the gas leak inside a building section of this plan).**

FIRE, GAS IGNITION, EXPLOSION, NATURAL DISASTER OR CIVIL DISTURBANCE

The first employee to arrive at the scene of a fire, explosion, gas ignition, natural disaster, or civil disturbance shall take every corrective action necessary to protect life and property from danger by proceeding as follows:

1. Assess danger to public, surrounding building occupants and property.
2. If necessary, evacuate and/or assist all persons to safety.
3. If necessary, notify Fire and Police Departments (at 911), ambulances and local gas supplier.
4. If it is determined that a hazardous condition may exist, shut off the gas supply to the affected area at service valves, main valves or master meter valves.
5. If necessary, barricade the area.
6. If local first responders and/or gas supplier personnel are called to the scene, a designated employee shall be made available to communicate with the responding parties to coordinate what actions will be taken to minimize hazards to life and property.

EMERGENCY CHECK LIST

1. Have persons been evacuated?
2. Has Fire Department been called?
3. Has local gas supplier been called?
4. Has area been barricaded?

RESTORATION OF SERVICE DUE TO OUTAGE

If in the event that the gas supply is shut off to an area within the facility, the gas shall not be turned back on in the area until all individual services to each occupant and/or building has been shut off.

Both the actions of shutting off individual services and then restoring gas service to the same services, shall be conducted using a building to building operation. The individual service to each building shall be shut off, either at the meter or service riser valves. In restoring service to each individual building, all gas piping and meters must be purged and appliances relit. All purging operations shall be conducted using the purging procedures that are located in Section 2, Page 6 of the Operations and Maintenance Plan and Section 15, Purging Guidelines. All purging operations must be done by persons who are qualified to conduct purging operations in accordance with the written procedures.

The person in charge is to coordinate this operation and be responsible for the purging and the safe restoration of all gas service. The responsible person will contact the AZOPS. The gas service will not be turned on until the AZOPS has been contacted.

POST-EMERGENCY REVIEW OF ACTIONS TAKEN

After the emergency event has been resolved, and the affected facility/area has been made safe, all personnel who were involved in responding to the emergency event shall meet and review the actions that were taken during the event. The review shall include the following to be discussed and analyzed:

- Did all personnel follow the procedures as given in this emergency plan?
- Was this emergency plan effective in clearly stating actions to be taken to minimize hazards to life and property?

The review is not meant to evaluate personal actions of each person, but it is to determine strengths and weaknesses of the emergency response and identify areas for future training and improvement of the emergency response.

A written record shall be made of each post-emergency review that is conducted with all employees following an emergency event and shall be kept for the life of the pipeline facility.

An investigation shall be conducted as part of the post-emergency review to determine the cause of the event and to determine what actions are required to be taken to prevent a recurrence. Refer to the Investigation of Failures Section 2, Page 5 of the Operations and Maintenance Plan for more information.

EMERGENCY PLAN PERSONNEL TRAINING

At least once each calendar year, all employees and other responsible persons who have responsibilities under this emergency plan shall receive training on the procedures contained in this plan and shall have knowledge of their responsibilities. Training methods may include mock drills, tabletop discussions, or any other method to share information about emergency response with all involved personnel.

A written record shall be made of each person that is trained along with the date(s) that the training took place. This record shall be kept for the life of the pipeline facility (refer to the Emergency Plan Annual Training record on the last page of this plan).

LIAISON WITH LOCAL EMERGENCY FIRST RESPONSE AGENCIES

A copy of the system map, along with the First Responder Notice (Section 5, Record No. 9) shall be sent by certified mail to each local fire department and law enforcement agency that can respond to the facility in the event of an emergency. A certified mail receipt shall be retained to demonstrate when the notice and map was sent and to whom the notice and map was sent. This record must be kept for the life of the pipeline facility.

EMERGENCY EQUIPMENT

All personnel who have responsibilities under this emergency plan shall be responsible for the availability, maintenance and condition of all equipment that may be used during a response to an emergency event.

Emergency equipment shall include, but is not limited to, valve wrenches, shovels and fire extinguishers.

Fire extinguishers shall be maintained in accordance with the manufacturer’s requirements.

The location of the emergency equipment is: _____

EMERGENCY CALL LIST

Fire Department _____

Police Department _____

Gas supply company _____

Arizona Corporation Commission (AZOPS)
24-hour Emergency phone (602) 252-4449

Operator personnel _____

CONTRACTOR EMERGENCY CALL LIST

Contractor’s name: _____

Address: _____

24-hour telephone number: _____

FACILITY NAME: _____

TELEPHONIC INCIDENT REPORTING

Gas pipeline incidents that occur must be reported to the AZOPS by the responsible facility representative in charge, or whoever the responsible facility representative designates, provided that the incident meets any of the requirements listed below:

State Requirements (R14-5-207 (Q)):

- A. Release of natural gas or LPG which results in any of the following events:
 - 1. A death or personal injury requiring hospitalization.
 - 2. Injury to any individual resulting in the individual's loss of consciousness.
 - 3. Estimated property damage, including the value of all released gas, in excess of \$5,000.
 - 4. Resulted in gas igniting, explosion or fire that is not intentionally set by personnel.
 - 5. A news media inquiry.
 - 6. An "evacuation" as defined in Arizona Administrative Code R14-5-201.
 - 7. An "outage" as defined in Arizona Administrative Code R14-5-201.
- B. An event involving overpressure of a pipeline system as defined in Arizona Administrative Code R14-5-207 (Q)(b).
- C. An event involving permanent or temporary discontinuance of service to the piping system or any portion of the piping system due to a failure of a leak test or for any purpose other than to perform routine maintenance (R14-5-207 (Q)(c)); or
- D. A significant incident, in the judgment of the responsible facility representative, even though it does not meet the above criteria (R14-5-207(Q)(d)).

The telephonic report, if required, shall be made immediately upon discovery. It must be reported to:

ARIZONA CORPORATION COMMISSION
OFFICE OF PIPELINE SAFETY
24 HOUR EMERGENCY NUMBER

(602) 262-5601 during normal business hours 7 a.m. – 4 p.m.

(602) 252-4449 at all other times outside of normal business hours

In addition to notifying the AZOPS, the National Response Center (NRC) must be notified if the release of natural gas or LPG from the facility results in any of the following:

- 1. A death.
- 2. A personal injury that requires in-patient hospitalization (the injured person is admitted to the hospital for medical treatment).
- 3. Estimated property damage including the value of all released gas, in excess of \$50,000.

The telephonic report must be made at the earliest practicable moment following discovery, but not more than 1 hour after discovery by the responsible facility representative in charge, or whosoever the responsible facility representative designates. It must be reported to:

NATIONAL RESPONSE CENTER

1-800-424-8802

In accordance with the definitions of “Intrastate Pipeline System” and “Provider”, as listed in Arizona Administrative Code R14-5-201, and with the requirements of Arizona Administrative Code R14-5-207, a written incident report is not required to be filed.

MAP OF GAS SYSTEM

SECTION/TAB # 4

MAP

OF

GAS

SYSTEM

RECORDS # 1 - 15

SECTION/TAB # 5

ODORANT TEST RECORD

To verify odorant levels on small gas systems conduct the “Sniff Test”. The use of two persons is recommended. Select one or more locations but it’s preferable to use a remote location from the gas supply inlet. Vent/release a small amount of gas and determine if the odorant can be detected with your nose. If you cannot detect the odorant have the second person try. If odorant is detected, its concentration is adequate. If odorant cannot be detected, contact the gas supplier and the AZOPS to inform of potential issue. Record the results of all tests and corrective action made. To ensure that the gas is properly odorized, a sniff test shall be conducted at least 4 times each calendar year with intervals not to exceed 4 months.

Date	Test Location	Odorant Detected Y/N	This Test made by

GAS LEAK SURVEY RECORD

The following information must be recorded when a gas leak survey is made. This includes the date, who made the survey, name of facility tested, description of area surveyed, **leak survey instrument ID #, calibration date, and results of leak survey.** All leak detection instruments must be checked prior to and after the survey, to verify a valid survey.

Gas leak surveys are required once each calendar year with intervals not to exceed fifteen (15) months.

FACILITY NAME:

DATE	LEAK SURVEY INSTRUMENT ID #, CALIBRATION DATE, DESCRIPTION	SURVEY BY

GAS LEAK / REPAIR RECORD

The following information must be recorded when a gas leak repair is made. This includes the date, who made the repair, name of facility and action taken to repair the leak.

Gas leaks shall be repaired upon discovery.

FACILITY NAME:

DATE	GAS LEAK REPAIR DESCRIPTION	REPAIRED BY

PIPELINE PRESSURE TEST RECORD

A pressure test is required to confirm the proposed Maximum Allowable Operating Pressure (MAOP) and to discover all potentially hazardous leaks. This must be completed before placing in service or returning to service, any new segment, existing segment that has been replaced or relocated or a service line that has been disconnected for any reason. Records of each test must be made and retained for the life of the facility.

FACILITY NAME: _____

FACILITY ADDRESS: _____ PHONE: () _____
(Include City)

LOCATION OF TEST SECTION: _____

LENGTH OF TEST SECTION: _____

PIPE MATERIAL: _____

PIPE SIZE: _____

TEST INFORMATION Gauge ID No. _____ Cal. Date _____

TESTED WITH: NITROGEN _____ AIR _____ NATURAL GAS _____ WATER _____ OTHER _____

TEST DATE: ____/____/____ TIME STARTED: ____:____ TIME ENDED: ____:____

TEST PRESSURE AT START: _____ TEST PRESSURE AT END: _____

PRESSURE TEST DESCRIPTION:

TEST CONDUCTED BY (Company Name): _____

OPERATOR REPRESENTATIVE: _____

Attach sketch of piping layout or make one on reverse side of this form.

VALVE INSPECTION RECORD

NOTE: Certain important information must be recorded when valves are inspected. This includes who conducted the inspection, the name of facility inspected, valve identity, condition of valve, if operated, repairs needed or made, and the date of the inspection. Record details in remarks column.

Facility Name:

Valve ID	Date Inspected	Inspected by	Remarks

CATHODIC PROTECTION TEST DATA
PIPE-TO-SOIL READINGS

The following information must be recorded when testing a Cathodic Protection system to verify proper operation. This includes the test date, test location, test reading and who conducted the test. Pertinent remarks that may be useful later should be placed in the remarks. Examples: Soil wet or dry, insulator shorted, test lead broken, etc. Cathodic protection system shall be tested to verify proper operation once each calendar year with intervals not to exceed 15 months. Minimum electrical criteria is -.850 volts DC. Readings less than -.850 volts DC require repairs.

Repairs are to be completed within 30 days of discovery.

Facility Name:

Test Location	Pipe-to-Soil Readings	Tested By	Remarks	Date

RECTIFIER INSPECTION RECORD

Rectifiers must be checked periodically to verify proper operation. Rectifiers must be operational and produce the minimum amount of current (amperes) required to protect the attached piping.

Title 49 CFR Part 192.465 (b) requires an inspection of each rectifier six (6) times each calendar year with intervals not to exceed 2 1/2 months. Inspections must be recorded.

DATE	DC VOLTS	DC AMPERES	CONDUCTED BY	REMARKS

GAS ODOR / LEAK REPORT

Facility Name: _____

Report Received From:

Name: _____ Date Reported: _____

Address: _____ Time Reported: _____

_____ Received by: _____

Telephone: _____

LOCATION OF ODOR/LEAK

Address: _____

DESCRIPTION OF PROBLEM

1. Odor/leak inside _____ or outside _____
2. Can escaping gas be heard? YES _____ NO _____
3. Size of broken gas line _____ Unknown _____
4. Was there a fire? _____ Explosion? _____ Ignition? _____
5. Fatalities _____ Injuries _____ Property Damage _____
6. Number of Services Out _____
7. Additional Information: _____

ACTION REQUIRED

DATE / TIME

- | | | | |
|----------------------------------|-------|---|-------|
| 1. Operator Personnel Dispatched | _____ | / | _____ |
| 2. Fire Department Notified | _____ | / | _____ |
| 3. Gas Supply Company Notified | _____ | / | _____ |
| 4. AZOPS Notified | _____ | / | _____ |

Incident resolved by: _____

PUBLIC AWARENESS NOTICE

(Name of master meter facility)

EXCAVATIONS:

Excavation activities done prior to determining the location of underground natural gas pipeline facilities may cause damage to natural gas lines which may result in an explosion, fire, personal injury or death.

Any underground excavation activity shall not be allowed on _____ property without first notifying both the Arizona 811 Center (call **811** or **602-263-1100** or **1-800-782-5348**) AND the property management personnel at _____ at least ten (10) working days prior to the start of any excavation.

Locate marks for all underground natural gas pipelines will be yellow in color.

LEAKS:

Natural gas is lighter than air, colorless, tasteless, and odorless. Therefore, a chemical is added to the natural gas to make it smell like rotten eggs. Signs of a possible gas leak may include a smell like rotten eggs, hissing noise coming from a natural gas line, abnormal death of vegetation, or an unusually large number of insects located around gas facilities. Anytime an odor of gas is found inside a building, it must be assumed to be hazardous. All reports of gas leaks will be thoroughly investigated. If you suspect or detect a natural gas leak, the following steps must be taken to ensure your personal safety:

- Evacuate the building and/or affected area immediately.
- DO NOT operate any electrical lights, switches, or appliances.
- DO NOT use a cell or landline phone inside the building to either make or receive phone calls.
- DO NOT use matches, cigarettes, open flames, or other possible ignition sources.
- DO NOT allow anyone else to enter the affected area until the area has been made safe.
- Call the property personnel at _____ and/or call **911**. Make sure you make the call(s) from a safe area away from the affected area of the gas leak.

FIRST RESPONDER NOTICE

(Name of master meter facility)

(Address of master meter facility)

(Phone number of master meter facility)

The property listed above is a natural gas master meter system that serves multiple buildings from a single meter source. In the event of an emergency that involves our natural gas distribution system, the property does have the capabilities to respond to the event to protect life and property that may include, but is not limited to, the following:

- We have a written emergency response plan that includes steps to be taken in the event of an emergency to protect life first, then property.
- We have a system map that shows the location of mains, services, master meter location(s), and valve(s).
- We have a main system shutoff valve located at the master meter set. The master meter set can be identified by a line marker that is placed at the meter set by our natural gas supplier.
- Our emergency plan includes the requirement to call local fire and police departments, and our gas supplier if necessary.
- If needed, our gas supplier can respond to our facility to assist. Our gas supplier contact is:

(Name of natural gas supplier)

(Emergency phone number of gas supplier)

If the valve used to shut off the gas supply to the property is located before the meter set, that valve is the property of the natural gas supplier, therefore, the valve will need to remain closed until our gas supplier receives clearance to re-open the valve. Prior to resuming gas service, the gas system must be secured, repairs made (if needed), and a pressure test done to ensure that there are no leaks in the system. Our supplier will then need to obtain a clearance from the Arizona Corporation Commission's Office of Pipeline Safety before gas service is restored. Once service is restored, then our tenants will have their gas appliance(s) re-lit using a service restoration procedure that is included in our written emergency plan.

If you have any questions, please do not hesitate to contact us. Thank you for your attention in this matter.

PIPELINE PATROLLING RECORD

Date of Patrol: _____

Conducted by: _____

		SATISFACTORY	UNSATISFACTORY	N/A
1.	CONDITION OF WALL/ROOF PIPING SUPPORTS AND EASEMENTS			
2.	CONDITION OF SERVICE REGULATORS, RISERS, AND SUB- METER SETS			
3.	CONSTRUCTION ACTIVITY			
4.	ABOVEGROUND PIPING ATMOSPHERIC CORROSION			

OTHER:

NOTES:

Date of Patrol: _____

Conducted by: _____

		SATISFACTORY	UNSATISFACTORY	N/A
1.	CONDITION OF WALL / ROOF PIPING SUPPORTS AND EASEMENTS			
2.	CONDITION OF SERVICE REGULATORS, RISERS, AND SUB- METER SETS			
3.	CONSTRUCTION ACTIVITY			
4.	ABOVEGROUND PIPING ATMOSPHERIC CORROSION			

OTHER:

NOTES:

GAS CUSTOMER NOTIFICATION
(TITLE 49 CFR PART 192.16)

All natural gas customers that have buried gas piping located on this property that is individually owned and not maintained by the property owner or management, please be advised of the following information:

BURIED GAS PIPING SHOULD BE:

- 1. Periodically inspected for leaks.**
- 2. Periodically inspected for corrosion, if the piping is metallic.**
- 3. Repaired if any unsafe condition is discovered.**
- 4. When excavating near buried gas piping, the piping should be located in advance and the excavation done using hand tools (shovel, sharpshooter, etc.).**

PIPELINE LOCATING AND MARKING RECORD

Date: _____

Excavator: _____

Excavator address: _____

Excavator phone: _____

Locate ticket number (if applicable): _____

Facilities in conflict with area of excavation work? YES _____ NO _____

If no facilities are in conflict, date that excavator was notified: _____

(if yes, then fill out information listed below):

Feet of main located and marked _____

Number of services located and marked _____

Date locate completed: _____ Located by: _____

Comments _____

Show location on back of this record to identify area where the pipeline locating was performed.

REGULATOR INSPECTION REPORT

Operator _____ Date _____

Location _____ Orifice Size _____

Make: _____ Type: _____ Size: _____

Pressure Rating: Inlet _____ Outlet _____

MAOP of System to Which it is Connected: _____

Operating Pressure: Inlet _____ Outlet (Set Point) _____

Lock Up Pressure: _____

Monitoring Regulator Relief Setting: _____

General Condition of Station

- Atmospheric Corrosion: S ___ U ___
- Support Piping Rigid: S ___ U ___
- Station Guards: S ___ U ___
- Area Clean of Weeds and Grass: S ___ U ___

Remarks:

(Signature of Technician)

RELIEF VALVE INSPECTION REPORT

Operator

Date

Location

Make: _____

Type: _____

Size: _____

Orifice Size: _____

Operating Range: _____

Pressure Setting: _____

Connection Pipe Size: _____

Vent Stack Size: _____

Relief Valve Capacity: _____

Regulator Failed Capacity: _____

Any Changes in Regulator or Orifice Size? Yes _____ No _____

If yes, What is the New Failed Capacity? _____

Is Relief Valve Capacity Adequate? Yes _____ No _____

If No, What Corrective Action was Taken?

Relief Valve Tampering Protection: S _____ U _____

Atmospheric Corrosion: S _____ U _____

Relief Valve Proper Operation: S _____ U _____

(Signature of Technician)

ANNUAL REPORT

SECTION/TAB # 6

**ARIZONA CORPORATION COMMISSION OFFICE OF PIPELINE SAFETY
TO BE FILED NOT SOONER THAN JANUARY 1st AND NO LATER THAN APRIL 15th for the preceding year**

**ANNUAL REPORT FOR CALENDAR YEAR _____
SMALL OPERATORS OF GAS DISTRIBUTION SYSTEM**

<u>FACILITY INFORMATION</u>		<u>OPERATOR/OWNER</u>	
NAME OF FACILITY _____		NAME _____	
ADDRESS OF FACILITY _____		ADDRESS _____	
CITY _____	COUNTY _____	CITY _____	
STATE _____	ZIP CODE _____	STATE _____	ZIP CODE _____
FACILITY E-MAIL ADDRESS _____		OPERATOR E-MAIL ADDRESS _____	
AREA CODE _____	TELEPHONE _____	AREA CODE _____	TELEPHONE _____

FACILITY TYPE: MHP _____ APT/CONDO _____ SCHOOL _____ BUSINESS _____ # OF BLDG _____

SYSTEM INFORMATION		FEET OF PIPE	FOR UNDERGROUND STEEL SYSTEMS DATE OF LAST C/P CHECK IN _____ ____ / ____ / ____ <small>(If no tests were conducted, please write "None Conducted")</small>
UNDERGROUND STEEL PIPE			DATE OF LEAK SURVEY CONDUCTED IN _____ ____ / ____ / ____ <small>(If no tests were conducted, please write "None Conducted")</small>
ABOVEGROUND STEEL PIPE			
UNDERGROUND PE PLASTIC PIPE			TOTAL LEAKS IN SYSTEM DURING LAST CAL. YEAR _____ CAUSE: CORROSION _____ THIRD PARTY DAMAGE _____ CONSTRUCTION DEFECT _____ MATERIAL DEFECT _____ OTHER _____ NUMBER OF KNOWN LEAKS AT END OF YEAR _____
UNDERGROUND PVC PLASTIC PIPE			
TOTAL FEET OF PIPE IN SYSTEM			
NOTE: (if you have any comments or concerns, please note in this box)			

PREPARED BY (TYPE OR PRINT) _____	AREA CODE _____	TELEPHONE _____
NAME AND TITLE PERSON SIGNING _____	AUTHORIZED SIGNATURE _____	

MAIL TO: 1300 West Washington Street, Suite 220, Phoenix, AZ 85007

FAX TO: (602) 262-5620 – OR EMAIL TO: safety@azcc.gov

**ANNUAL
INSPECTION
REPORT**

SECTION/TAB # 7

**ARIZONA CORPORATION COMMISSION - OFFICE OF PIPELINE SAFETY (AZOPS)
ANNUAL INSPECTION REPORT - Gas System Operators**

Inspection Date: _____ **Last Inspection Date:** _____

Name of Facility: _____ **OPID #:** _____ **Phone:** _____

Cell Phone: _____ **Fax:** _____ **Email:** _____

Address of Facility: _____ **City:** _____

State: _____ **Zip:** _____ **Contact Person:** _____

Operator Name: _____ **Phone:** _____

Operator Address: _____ **City:** _____

Please check box if this is to be the mailing address. **State:** _____ **Zip:** _____

Facility Type: _____ **Priority:** _____ **Number of Buildings:** _____

Last OQ Inspection Date: _____ **Last DIMP Inspection Date:** _____

Gas System Type: _____ **Number of Meters:** _____ **Gas Supplier:** _____

Gas System History		
Pipe Type	Operating Pressure	Date Installed

1. Has a written operation and maintenance plan been established meeting the requirements of the regulations and review records maintained?	
2. Has a written emergency plan been established and does operating personnel have knowledge of emergency procedures and are records maintained?	
3. Has a map of the gas system been developed showing meter and valve locations, mains, and service lines?	
4. Are operation and maintenance personnel qualified and are OQ records maintained?	
5. Has all above ground pipe been maintained?	
6. Has cathodic protection been tested at proper intervals and records maintained? Does it meet the negative voltage of at least 0.85 volt?	
7. Have required valves been checked and serviced at intervals not exceeding 15 months but at least once each calendar year and records maintained?	
8. Have periodic odorization checks been conducted and records maintained?	
9. Has a leak survey of the system been conducted at intervals not exceeding 15 months but at least once each calendar year and records maintained?	
10. Has operator filed annual report?	
11. Has a written Master Meter Integrity Management Program (IMP) been established meeting the requirements of the regulations and records maintained?	
12. Has new construction and repairs been completed in accordance with State and Federal requirements and inspected by the ACC?	

Last Year On File: _____

**ARIZONA CORPORATION COMMISSION - OFFICE OF PIPELINE SAFETY (AZOPS)
ANNUAL INSPECTION REPORT - Gas System Operators**

Question ____:

Answer:

Violation Codes:

Findings:

Notes:

Additional Notes:

Total Violations Found: _____

By signing you are confirming that Arizona Corporation Commission's Office of Pipeline Safety (AZOPS) Staff conducted an inspection of your facility in the presence of an operator representative. Further, by signing, you accept and confirm receipt of AZOPS' inspection report.

AZOPS Representative: _____

Date: _____

Additional AZOPS Rep: _____

Operator Representative: _____

Date: _____

**UNDERGROUND
FACILITIES LAW
AND
COLORS FOR
UNDERGROUND
FACILITIES**

SECTION/TAB # 8

ARIZONA BLUE STAKE

(Call)

1-800-STAKE-IT

(or)

602-263-1100

(or)

“811”

CALL BEFORE YOU DIG



Arizona Revised Statutes
Title 40 - Public Utilities and Carriers
Chapter 2 - PUBLIC SERVICE CORPORATIONS GENERALLY

Article 6.3 Underground Facilities

- **40-360.21 Definitions**
- **40-360.22 Excavations; determining location of underground facilities; providing information; excavator marking; on-site representative; validity period of markings; liability for misuse of locate requests; detectible underground locating devices; civil penalty**
- **40-360.23 Making excavation in careful, prudent manner; liability for negligence; notice; obliteration of marks**
- **40-360.24 Notice of damage to underground facility**
- **40-360.25 Injunction; mandamus**
- **40-360.26 Damage of underground facility; liability to owner; homeowner and tenant exemption**
- **40-360.27 Liability for attorney fees; administrative costs and expenses**
- **40-360.28 Civil penalty; liability**
- **40-360.29 Charters and ordinances of governments not affected; preemption**
- **40-360.30 Installation records of underground facilities**
- **40-360.31 Routine road maintenance; prior notification**
- **40-360.32 One-call notification center membership; termination; designated representatives**

40-360.21. Definitions

In this article, unless the context otherwise requires:

- 1. "Abandoned" means no longer in service and physically disconnected from a portion of the facility, or from any other facility, that is in use or still carries service.**
- 2. "Apartment community" means any real property that has one or more structures and contains five or more dwelling units for rent or lease that are subject to title 33, chapter 10. For the purposes of this paragraph "dwelling unit" has the same meaning prescribed in section 33-1310.**
- 3. "Building official" means the agency or officer employed by a political subdivision of this state and charged with the administration and enforcement of a building code to regulate the quality, type of material and workmanship of construction of buildings or structures.**
- 4. "Careful and prudent manner" means conducting an excavation in such a way that when the excavation is less than or equal to twenty-four inches from an underground facility that is marked with stakes or paint or in some customary manner, the facility is carefully exposed with hand tools, and the uncovered facility is supported and protected.**
- 5. "Carefully" means acting with reasonable care under the circumstances.**
- 6. "Cross culverts or similar roadway drainage facilities" means transverse drainage structures with both ends or openings visible including box culverts, drainage pipes or other covered structures.**
- 7. "Detectible underground location device" means any device that is installed underground and that is capable of being detected from above ground with an electronic locating device.**
- 8. "Excavation" means any operation in which earth, rock or other material in the ground is moved, removed or otherwise displaced by means or use of any tools, equipment or explosives and includes, without limitation, grading, trenching, digging, ditching, drilling, augering, boring, tunnelling, scraping, cable or pipe plowing and driving.**

9. **"Implied easement" means any easement or right-of-way on private property required to provide utility services by means of underground facilities in property of the owner requesting such service.**
10. **"Inactive" means:**
 - (a) **That portion of an underground facility that is not in use but is still connected to the facility, or to any other facility, that is in use or still carries service.**
 - (b) **A new underground facility that has not been connected to any portion of an existing facility.**
11. **"Installation records of an underground facility" means maps, drawings, diagrams, surveys, schematics, illustrations, sketches or any other depictions or descriptions of an underground facility that reflect the location at the time of installation of the underground facility and any surface extensions in a reasonably accurate manner.**
12. **"Homeowners' association" has the same meaning prescribed in section 33-2001.**
13. **"Landlord" has the same meaning prescribed in section 33-1310 for an apartment community and has the same meaning prescribed in section 33- 1409 for a mobile home park.**
14. **"Locator strip" means a type of detectible underground location device that consists of a plastic or other durable material ribbon containing a material capable of being detected from above ground with an electronic locating device and color coded by type of underground facility.**
15. **"Locator wire" means a type of detectible underground location device that consists of a copper wire or metallic, conductive, noncorrosive trace wire capable of being detected from above ground with an electronic locating device.**
16. **"Mobile home park" has the same meaning prescribed in section 33-1409.**
17. **"One-call notification center" means an organization of owners or operators of underground facilities that provides a telephone number notification service for the purpose of receiving and distributing to its members advance notifications from persons regarding planned excavations.**

18. **"Person" means any individual, firm, joint venture, partnership, corporation, association, homeowners' association, municipality, governmental unit, department or agency and shall include any trustee, receiver, assignee or personal representative thereof.**
19. **"Routine road maintenance grading" means the routine grading or resurfacing of the concrete, asphaltic or composite surface but not the subbase of a roadway by the state or a political subdivision of the state for the purpose of maintaining the surface condition of the road and includes recovery of material from a borrow ditch.**
20. **"Stakes or paint or in some customary manner" means marking the location of an underground facility by the colors established by the commission. These colors shall be restricted to the underground facility location.**
21. **"Underground facilities operator" means a public utility, municipal corporation, landlord or other person having the right to bury underground facilities in any public street, alley, right-of-way dedicated to the public use or public utility easement, in any apartment community or mobile home park or pursuant to any express or implied private property easement. Underground facilities operator does not include a homeowner or homeowners' association that owns a sewer facility in a public street, alley, right-of-way dedicated to public use or public utility easement.**
22. **"Underground facility" means any item of personal property that is buried or placed below ground for use in connection with the storage or conveyance of water, sewage, electronic, telephonic or telegraphic communications, electric energy, oil, gas or other substances, and shall include but not be limited to pipes, sewers, conduits, cables, valves, lines, wires, manholes, attachments and those portions of poles and their attachments below ground except cross culverts or similar roadway drainage facilities and landscape irrigation systems of two inches in diameter or less.**
23. **"Working day" means every day excluding Saturday of each week, the fourth Friday in November, Sunday of each week and other legal holidays as prescribed in section 1-301.**

40-360.22. Excavations; determining location of underground facilities; providing information; excavator marking; on-site representative; validity period of markings; liability for misuse of locate requests; detectible underground locating devices; civil penalty

- A. A person shall not make or begin any excavation in any public street, alley, right-of-way dedicated to the public use or public utility easement or in any express or implied private property utility easement or in any apartment community or mobile home park without first determining whether underground facilities will be encountered, and if so where they are located from each and every underground facilities operator and taking measures for control of the facilities in a careful and prudent manner. For all excavations in an apartment community or mobile home park, the excavator shall inform the landlord as promptly as practical that the excavator intends to submit an inquiry to the landlord that will trigger the landlord's obligations provided by subsection B of this section and the inquiry itself shall be made by certified mail to the landlord, using a form prepared by a one-call notification center. The inquiry to a landlord may be made by a one-call notification center for a reasonable fee to the excavator.
- B. Except as otherwise provided in this subsection, upon receipt of the excavator's inquiry, the underground facilities operator shall respond as promptly as practical, but in no event later than two working days, by carefully marking such facility with stakes or paint or in some customary manner. A landlord shall respond in the same manner and as promptly as practical, but in no event later than ten working days. No person shall begin excavating before the location and marking are complete or the excavator is notified that marking is unnecessary. If the excavator consents, an underground facilities operator may notify a one-call notification center that marking is unnecessary pursuant to a method established by the one-call notification center. An underground facilities operator may assign any marking or notification obligations required by this subsection to an agent or servant of the underground facilities operator. An underground facilities operator may notify the excavator that marking is unnecessary pursuant to any mutually agreeable method.

- C. On a timely request by the underground facilities operator, the excavator shall mark the boundaries of the area requested to be excavated in accordance with a color code designated by the commission or by applicable custom or standard in the industry. A request under this subsection for excavator marking does not alter any other requirement of this section.**
- D. Except as provided in subsection F of this section, a person shall not begin excavating in any apartment community or mobile home park before the landlord has completed marking the underground facility or the excavator is notified that marking is unnecessary. After underground facility markings are complete or the excavator has received notice that marking is unnecessary, an excavator shall notify the landlord if any of the following conditions exist:**
- 1. Visible and obvious evidence, such as pavement cuts, that would alert a reasonable excavator to the presence of an unmarked underground facility within the boundary of the intended area of excavation.**
 - 2. The excavator has concerns regarding the accuracy and meaning of the marks.**
 - 3. The excavator encounters an underground facility that has not been marked.**
 - 4. The excavator encounters an underground facility that has been incorrectly marked or marked in the wrong location.**
- E. For every excavation in an apartment community or mobile home park where the excavation method is boring:**
- 1. Every underground facilities operator shall be notified of this methodology.**
 - 2. The excavator shall ensure that sufficient clearance is maintained between the bore path and any marked underground facility.**
 - 3. The excavator shall visually check the drill head each time it passes through potholes, entrances and exit pits, including during pullback.**
 - 4. Each underground facilities operator shall be given a reasonable opportunity to inspect its facility before and during the boring operation.**
- F. If a landlord fails to respond to an excavator's request in a manner required by this article, an excavator does not violate this article and fulfills the standard of care of a reasonably prudent excavator if the excavator complies with all of the following:**
- 1. One working day before conducting the excavation, the excavator notifies the landlord in writing or by fax that the excavator has determined that the acts or omissions of the landlord is a refusal to respond to an excavator's request.**

2. **The excavator investigates for the presence of visible and obvious evidence that would alert a reasonable excavator to the presence of an unmarked underground facility within the boundaries of the area to be excavated.**
3. **The excavator carefully locates all unmarked facilities that are known to exist due to the excavator's investigation performed pursuant to paragraph 2 of this subsection using one of the methods listed in subsection G of this section and carefully marks the facilities with stakes or paint or in some customary manner. In addition, when a landlord provides verbal or written information regarding the location of underground facilities that are within the boundaries of the area to be excavated, the excavator carefully locates all such identified facilities using one of the methods listed in subsection G of this section and carefully marks the facilities with stakes or paint or in some customary manner.**
4. **The excavator takes measures to control all such located facilities in a careful and prudent manner.**
5. **The excavator shall not excavate if the excavator receives a response from the landlord that notifies or alerts the excavator to the presence of a mistake or an intention by the landlord to respond in a manner that is consistent with this article, even if the response will be untimely. A landlord's delay, failure to respond to a location request, failure to mark or other noncompliance is not excused by the excavator's or landlord's compliance with this subsection.**

- G. Except as otherwise provided in this section, in performing the marking required by subsection B of this section, the underground facilities operator of an underground facility installed after December 31, 1988 in a public street, alley or right-of-way dedicated to public use or public utility easement, but not including any express or implied private property utility easement, shall carefully locate the facility by referring to installation records of the facility that are in the possession of the underground facility operator and utilizing one of the following methods:**
- 1. Vertical line or facility markers.**
 - 2. Locator strip or locator wire.**
 - 3. Signs or permanent markers.**
 - 4. Electronic or magnetic location or tracing techniques.**
 - 5. Electronic or magnetic sensors or markers.**
 - 6. Metal sensors or sensing techniques.**
 - 7. Sonar techniques.**
 - 8. Underground electrical or radio transmitters.**
 - 9. Manual location techniques, including pot-holing.**
 - 10. Surface extensions of underground facilities.**
 - 11. Any other surface or subsurface location technique that is at least as accurate as the other marking methods in this subsection and that is not prohibited by the commission or by federal or state law. This paragraph does not obligate an underground facilities operator to be aware of and utilize every surface or subsurface location technique available.**
- H. Except as otherwise provided in this section, for an underground facility other than one installed after December 31, 1988, in a public street, alley or right-of-way dedicated to public use or public utility easement, in performing the marking required by subsection B of this section, the underground facilities operator may refer to installation records or other records relating to the facility to assist in locating the facility and shall carefully locate the facility utilizing one of the methods listed under subsection G of this section.**

- I. If an underground facilities operator is unable to complete the location and marking within the time period provided by subsection B of this section, the facilities operator shall satisfy the requirements of this section by providing prompt notice of these facts to the excavator and assigning one or more representatives to be present on the excavation site at all pertinent times as requested by the excavator to provide facility location services until the facilities have been located and marked or the excavator is notified that marking is unnecessary pursuant to any mutually agreeable method. A person that receives notice from the underground facilities operator of these facts shall not begin excavating before the underground facilities operator has completed marking the underground facility or the excavator is notified that marking is unnecessary. Except as provided in subsection J of this section, the underground facilities operator shall bear all of its own expenses associated with assigning representatives.**
- J. The marking required by subsection B of this section is valid for fifteen working days from the date of the marking. If the excavation will continue past the validity period of the marks as provided by this subsection, the excavator shall notify the underground facilities operator or an organization designated by the underground facilities operator at least two working days before the end of the validity period. All requests for facility markings and requests to extend the validity period of the markings shall be for the purpose of excavating within the validity period of the markings. An excavator that requests facility markings shall limit the request to an area that can reasonably be excavated within the validity period of the markings. A person who violates this subsection is liable to the one-call notification center and to all affected underground facilities operators for any damages proximately caused by the violation, including economic loss.**

- K. Nothing in this section shall be construed to prevent an excavator and an underground facilities operator from holding a preconstruction conference regarding marking and location of underground facilities and entering into a mutually agreeable written schedule for marking or excavating or written arrangement that may constrain the excavation methods or that may provide for the delivery of installation records to the excavator for the purpose of satisfying the requirements of this section, except that this subsection does not eliminate the excavator's obligation to notify the underground facilities operator to locate and mark excavation sites under subsection B of this section based on the actual construction schedule.**
- L. For abandoned and apparently abandoned underground facilities:**
- 1. The underground facilities operator shall notify the excavator whether the facility is active or abandoned. An inactive facility shall be considered active for purposes of this subsection. This section does not obligate any person to represent that an underground sewer facility in any public street, alley, right-of-way dedicated to public use or public utility easement is abandoned if it was installed on or before December 31, 2005 and it is not owned by an underground facilities operator of a sewer system. This paragraph does not obligate a landlord to represent that an underground facility in any apartment community or mobile home park is abandoned if it was installed before January 1, 2007.**
 - 2. For an underground facility abandoned after December 31, 1988 or covered by installation records prepared under section 40-360.30, the underground facilities operator may not advise or represent to the excavator that a facility or portion of a facility is abandoned unless the underground facilities operator has verified, by reference to installation records or by testing, that the facility or portion is actually abandoned and not merely inactive. For all other abandoned or apparently abandoned underground facilities, each one-call notification center shall establish a method of providing personnel from an underground facilities operator qualified to safely inspect and verify that the facility is abandoned or active. For the purposes of this article, an underground facilities operator shall not represent that an underground facility is abandoned unless the facility has been verified as abandoned pursuant to this subsection.**

- 3. For the purposes of this article, if an excavator encounters an apparently abandoned underground facility, the excavator shall not treat the underground facility as abandoned until the excavator has received notification that the underground facility is abandoned pursuant to paragraph 1 of this subsection or has notified the underground facilities operator of the apparent abandonment and has received verification of abandonment pursuant to paragraph 2 of this subsection.**
 - 4. Each one-call notification center may establish a method for reimbursing the verifying underground facilities operator for the expenses incurred under paragraph 2 of this subsection. The reimbursement method shall not include any charge or expense to the excavator. A landlord that fails to advise or represent that an underground facility is abandoned pursuant to paragraph 1 of this subsection, whose underground facility is verified as abandoned pursuant to this subsection and who has not filed information with a one-call notification center is liable to the one-call notification center and to all affected underground facilities operators and excavators for the cost of verifying abandonment together with any damages, including economic loss, proximately caused by the violation.**
- M. All new and active underground facilities installed in any real property after December 31, 2005 shall be installed with a detectible underground location device unless the facility is capable of being detected from above ground with an electronic locating device or the facility is installed within single family residential property and is beneath a pool, permanent pool decking that is less than forty-eight inches from the pool or a permanent building. A person who violates this subsection is subject to a civil penalty in an amount not to exceed five thousand dollars. The building official shall administer and enforce this subsection for all underground facilities except those that are installed for a public utility or municipal corporation. Any penalties received by the building official shall be deposited in the municipality's or political subdivision's general fund, as applicable. Except as required by a city, town or county building code or other related code, for purposes of locating an underground facility a building official or political subdivision shall not compel the installation of one or more clean-outs on any underground sewer facility that is owned by another person and serves one customer where any portion of the underground sewer facility is in any public street, alley, right-of-way dedicated to public use, private property or easement.**

- N. Nothing in this section shall be construed as prohibiting the use of warning tape, warning markers or any other warning device by the underground facilities operator.**
- O. For every underground facilities operator of a sewer system:**
- 1. For the purposes of this article, an underground facilities operator of a sewer system is responsible for locating and carefully marking the underground sewer facilities owned by another person pursuant to subsection B of this section if those underground facilities are installed after December 31, 2005 and are in any public street, alley, right-of-way dedicated to public use or public utility easement.**
 - 2. In performing the marking required by this subsection, the underground facilities operator of the sewer system shall carefully locate the facility by referring to installation records of the facility and by using one of the methods listed in subsection G of this section.**
 - 3. This subsection does not obligate an underground facilities operator of a sewer system to locate and mark the underground sewer facilities owned by another person if the customer receiving sewer service from the underground sewer facility refuses to grant permission to the underground facilities operator of a sewer system to access the real property for the purpose of ascertaining the location of the underground sewer facility in any public street, alley, right-of-way dedicated to public use or public utility easement.**
 - 4. This subsection does not obligate an underground facilities operator of a sewer system to maintain, clean or unstop underground sewer facilities owned by another person.**
- P. For every landlord:**
- 1. For the purposes of this article, each landlord is responsible for marking the underground facilities operated by the landlord pursuant to subsection B of this section. For the purposes of this paragraph, "underground facilities operated by the landlord" includes every underground facility that is in an apartment community or a mobile home park and that:**
 - (a) Discharges into an underground facility that is operated by the landlord.**
 - (b) Is supplied by an underground facility that is operated by the landlord.**
 - (c) Is not operated by a public utility or municipal corporation.**

- 2. If a landlord is unable to complete the location and marking within the time period provided by subsection B of this section, the landlord shall satisfy its obligations in the manner provided by subsection I of this section. Nothing in this subsection shall be construed to prevent the excavator and the landlord from entering into a mutually agreeable written schedule or written arrangement for satisfying the requirements of this section in the manner provided by subsection K of this section.**
- 3. In performing the marking required by this subsection for an underground facility installed after December 31, 2006, the landlord shall carefully locate the facility by referring to installation records of the facility that are in the possession of the landlord and by using one of the methods listed in subsection G of this section.**
- 4. In performing the marking required by this subsection for an underground facility installed before January 1, 2007, the landlord may refer to installation records or other records relating to the facility to assist in locating the facility and shall locate the facility using one of the methods listed in subsection G of this section.**
- 5. Subject to the availability of monies, landlords may apply for grants from a grant account established for the purpose of meeting the standards prescribed by this article and for the purpose of creating installation records for facilities that are not required to be created or maintained by this article.**
- 6. Notwithstanding any other provision in this article, a landlord is not liable for any costs or expenses, including damage to third parties, resulting from damage to an underground sewer facility owned by the landlord and located within a public right-of-way if the damage was not caused by either:**

 - (a) The landlord's or tenant's actions.**
 - (b) The landlord's or tenant's refusal to grant access to the operator of the sewer system that connects to the landlord's underground sewer facility.**
- 7. This article does not obligate a landlord to locate and mark a facility owned by a tenant if the tenant owns the mobile home, the tenant refuses to grant permission to the landlord to access the mobile home and the facility cannot be located without accessing the mobile home.**

8. **Any rule, regulation, lease or agreement that purports to obligate a tenant to perform the landlord's obligations required by this article is against the public policy of this state and is void.**
 9. **This subsection does not obligate a landlord to maintain, clean or unstop underground facilities owned by another person.**
- Q. All inquiries and notices to a landlord shall be made to the address on file at a one-call notification center. Notwithstanding any other law, if the landlord has not filed information at the one-call notification center, the excavator does not violate this article and fulfills the standard of care of a reasonably prudent excavator if the excavator makes the inquiry or notice to the property owner of record according to the records of the county assessor in the county in which the property is located.**

40-360.23. Making excavation in careful, prudent manner; liability for negligence; notice; obliteration of marks

- A. **Except as otherwise provided in section 40-360.28, subsection E, obtaining information as required by this article does not excuse any person making any excavation from doing so in a careful and prudent manner, nor shall it excuse such persons from liability for any damage or injury resulting from their negligence.**
- B. **Except as otherwise provided in section 40-360.22, subsection D, after markings have been made pursuant to section 40-360.22, an excavator shall notify either the underground facilities operator or an organization designated by the underground facilities operator if the excavator encounters an underground facility that has not been located and marked or has been marked in the wrong location.**
- C. **An excavator or an underground facilities operator shall not move or obliterate markings made pursuant to this article or fabricate markings in an unmarked location for the purpose of concealing or avoiding liability for a violation of or noncompliance with this article.**

40-360.24. Notice of damage to underground facility

- A. In the event of any damage that results in a release from any underground facility that transports natural gas, liquefied petroleum gas, liquefied natural gas, petroleum products or any other hazardous gases or liquids in connection with any excavation, the person responsible for the excavation operations shall immediately notify the underground facilities operator and 911 or the local emergency response agency.**
- B. In the event of any damage to or dislocation of any underground facility or detectible underground location device in connection with any excavation the person responsible for the excavation operations shall immediately notify the underground facilities operator and shall not attempt any repair to the damaged facility or device except the temporary emergency repairs allowed by this section.**
- C. Temporary emergency repairs shall not be made by an excavator to a public utility's or municipal corporation's natural gas, electric, propane, hazardous liquid, communication, cable television system or video service network, sewer system, wastewater or water facilities without the consent of the underground facilities operator.**
- D. The excavation shall be left open until the arrival of representatives of the underground facilities operator. On receipt of notice, the underground facilities operator shall dispatch its representatives promptly, but in no event later than two working days, to examine the underground facility and, if necessary, effect repairs. Unless it would interfere with compliance with commission rules or requirements regarding maintenance or restoration of service and repair of facilities, the underground facilities operator shall immediately respond to a notification for emergencies involving injury or damage.**

40-360.25. Injunction; mandamus

- A. If any person is engaging in excavation in violation of this article and the violation has resulted in or is likely to result in damage to an underground facility or if any person is proposing to use procedures for excavation in violation of this article that are likely to result in damage to an underground facility, any affected underground facilities operator may commence an action in the superior court in the county in which the excavation is occurring or is to occur, or in which the person complained of has its principal place of business or resides, for the purpose of having such act or omission stopped and prevented, either by mandamus or injunction.**
- B. If any landlord in violation of this article fails to file information with a one-call notification center, knowingly fails to update the information, fails to locate or mark an underground facility in a manner required by this article or fails to prepare and maintain installation records required by this article, any affected underground facilities operator, any harmed excavator or a one-call notification center may commence an action in the superior court in the county in which the facility is situated or in which the person complained of has its principal place of business or resides, for the purpose of having such acts or omissions stopped and prevented, either by mandamus or injunction. A landlord is deemed to have knowledge of the filing requirements ten working days after a copy of section 40-360.32, subsection A is sent by certified mail to the property owner of record according to the records of the county assessor in the county in which the property is located.**
- C. Such persons as the court may deem necessary or proper may be joined as parties.**
- D. The final judgment in any such action or proceeding shall either dismiss the action or direct that the writ of mandamus or injunction issue or be made permanent as prayed for in the complaint. If the court finds that the person complained of has repeatedly engaged in negligent or unsafe excavation or has knowingly violated this article without just cause, the court shall issue such order and take such equitable action as shall be reasonable and appropriate to prevent continuance by such person of such act or omission.**

Damage of underground facility; liability to owner; homeowner and tenant exemption

- A. **If any underground facility is damaged by any person in violation of this article as a result of failing to obtain information as to its location, failing to take measures for protection of the facilities or failing to excavate in a careful and prudent manner, the person is liable to the owner of the underground facility for the total cost of the repair of the facility.**
- B. **A homeowner or homeowners' association engaging in excavating in an express or implied private property utility easement across property owned by the homeowner or homeowners' association is not liable to the owner or operator of the underground facility damaged by the homeowner or homeowners' association pursuant to this section if the damaged underground facility is not buried or placed below ground in accordance with the applicable standards, if the underground facility is not located within the easement or if the homeowner or homeowners' association engaged in the excavation has complied with section 40-360.22. This subsection does not apply to any person employed by a homeowner or a homeowners' association including a contractor licensed pursuant to title 32, chapter 10 or a person engaging in contracting without a license as prohibited by section 32-1151.**
- C. **Notwithstanding any other provision in this article, a homeowner is not liable for any costs or expenses, including damage to third parties, resulting from damage to an underground facility owned by the homeowner but located within a public right-of-way if the damage was not caused by the homeowner's actions or by the homeowner's refusal to grant permission to the underground facilities operator of a sewer system to access the real property for the purpose of ascertaining the location of the underground sewer facility. A tenant is not liable for any costs or expenses, including damage to third parties, resulting from damage to an underground facility owned by the tenant but located within a mobile home park if the damage was not caused by the tenant's actions or by the tenant's refusal to grant permission to the landlord to access the mobile home for the purpose of ascertaining the location of the underground facility.**

40-360.27. Liability for attorney fees; administrative costs and expenses

The prevailing party in an action brought to impose liability under any section of this article or to have any act or omission stopped and prevented, either by mandamus or injunction, pursuant to section 40-360.25 is entitled to recover reasonable attorney fees. In addition, if the prevailing party is a one-call notification center, that party is entitled to recover reasonable administrative costs and expenses.

40-360.28. Civil penalty; liability

- A. Except as provided in section 40-360.22, subsection M, a person who violates any provision of this article is subject to a civil penalty in an amount not to exceed five thousand dollars to be imposed by the court in favor of the state. Any penalties received by the state shall be deposited in the state general fund.
- B. If a violation of this article results in damage to an underground facility, the violator is liable to all affected underground facilities operators and excavators for all resulting damages proximately caused by the violations, including economic loss.
- C. If a person violates this article by failing to provide timely notice as required by this article, by failing to respond in the time and manner provided by this article or by failing to locate and mark an underground facility in the manner provided by this article, the person is liable to all affected underground facilities operators and excavators for all damages proximately caused by the violation, including economic loss.
- D. Notwithstanding any other law, a violation of section 40-360.22, subsection D or subsection L, paragraph 3 is a superseding event that breaks the chain of causation for any damages that could result from an underground facilities operator's failure to accurately locate or mark an underground facility.

- E. **If a landlord or an excavator complies with the duties set forth in sections 40-360.22, 40-360.30 and 40-360.32 for all facilities operated by a landlord as provided in section 40-360.22, subsection P, paragraph 1, the person is not liable for any death or injury to persons or property or for any economic loss to any person to the extent the conduct is regulated by this article. This section does not excuse any landlord or excavator from liability for any death or injury to persons or property or for any economic loss to any person to the extent the injury or loss does not arise from the conduct regulated by this article.**
- F. **This section is not applicable to an excavation made:**
1. **During an emergency which involves danger to life, health or property if reasonable precautions are taken to protect underground facilities.**
 2. **In agricultural operations or for the purpose of finding or extracting natural resources.**
 3. **With hand tools on property owned or occupied by the person performing the excavation while gardening or tilling such property.**

40-360.29. Charters and ordinances of governments not affected; preemption

- A. **Except as provided in subsection B, the provisions of this article shall be cumulative and supplemental to other provisions of law or charter and shall not be construed to prohibit cities and towns from enacting ordinances regulating excavations.**
- B. **The legislature finds that notification, location, marking, installation records, enforcement and remedies relating to underground facilities pursuant to sections 40-360.22, 40-360.24, 40-360.25, 40-360.26, 40-360.28 and 40-360.30, are a matter of statewide concern and are hereby preempted by this state.**

40-360.30. Installation records of underground facilities

- A. Except as otherwise provided in this subsection, for all new underground facilities, excluding service drops and service lines, installed after December 31, 1988 in a public street, alley or right-of-way dedicated to the public use or public utility easement, but not including any express or implied private property utility easement, the underground facilities operator shall prepare and maintain installation records of the underground facility and shall refer to such records in marking pursuant to section 40-360.22, subsection B.**
- B. For all new sewer facilities installed after December 31, 2005 in any public street, alley, right-of-way dedicated to the public use or public utility easement, the underground facilities operator of a sewer system shall prepare and maintain installation records of the underground facility and shall refer to such records in marking pursuant to section 40-360.22, subsection B. To assist the underground facilities operator of a sewer system in preparing and maintaining such records, a certified survey plan of the sewer's location in the public street, alley, right-of-way dedicated to public use or public utility easement shall be provided to the underground facilities operator of a sewer system by the customer receiving sewer service as a condition to receiving such sewer service.**
- C. For all new underground facilities that are installed after December 31, 2006 in an apartment community or mobile home park and that are not owned or operated by a public utility or municipal corporation, the landlord at the time the facilities are installed or abandoned shall prepare and maintain installation records of the underground facilities. Successor landlords shall maintain the installation records that come into their possession. The landlord shall keep records in its possession and shall refer to records in marking pursuant to section 40-360.22, subsection B.**

- D. Installation records required by this section shall reflect, if applicable, any field notes or other indications by the installer of the facilities that the installation involved deviations or changes from installation standards, instructions or designs and the correction of any inaccuracies found as a result of locating or marking the underground facilities. Installation records of an underground facility shall indicate if all or a portion of the facility has been abandoned. Installation records required by this section are for the internal use of the underground facilities operator and its successor in locating its underground facilities and are not intended to be relied on by others.**
- E. Information contained in installation records relating to the nature and location of underground facilities, but not the installation records themselves, shall be made available on a confidential basis within ten working days from a written request to persons who are engaged in the design of construction projects involving excavation in a public street, alley, right-of-way dedicated to the public use, or public utility easement, in any express or implied private property utility easement, or in an apartment community or mobile home park. The underground facilities operator shall make the same information available to authorized persons who are complying with a requirement imposed by contract providing for construction projects involving excavation in a public street, alley or right-of-way dedicated to the public use or public utility easement, in any express or implied private property utility easement, in any apartment community or mobile home park or by operation of law. The only lawful use of the information that is obtainable pursuant to this subsection is to minimize delays of construction projects. The underground facilities operator may indicate any portions of the information that are proprietary and require the authorized person to protect proprietary matters. The underground facilities operator may satisfy the requirements of this subsection by allowing an authorized person to inspect or copy the installation records required by this section, without charge, or may provide the information in another manner for a reasonable fee. The underground facilities operator is not liable to any person for damages arising from any person's inspection of or reliance on the installation records that are made available for the purpose of complying with this subsection.**

40-360.31. Routine road maintenance; prior notification

- A. **Prior to performing routine road maintenance grading as defined in section 40-360.21, the state or the political subdivision performing the routine road maintenance grading shall notify every public utility, municipal corporation or other person having the right to bury underground facilities in advance. For the purpose of this section advance notification means written notice delivered to the utility not more than sixty calendar days nor less than two working days prior to the performance of routine maintenance grading. The notification shall include all roads and their location which are planned for routine road maintenance grading within the time period identified. Notification is complete when received by the persons identified in the records of the commission pursuant to section 40-360.22. No marking pursuant to section 40-360.22 is required in response to a notification of routine road maintenance and the notification specified in this section constitutes full compliance with any notice requirements for routine road maintenance grading.**
- B. **If written notice, as required by subsection A of this section, is not practicable, the state or a political subdivision shall comply with the notice provisions required for excavation under section 40-360.22 before performing routine road maintenance grading.**
- C. **Routine road maintenance grading as defined in section 40-360.21, does not include:**
1. **Recovery of material from the bottom of the borrow ditch at a depth beyond the depth established when the borrow ditch was originally constructed or subsequently reconstructed to accommodate a newly installed underground facility.**
 2. **Grading which progressively reduces the elevation of the roadway surface.**
 3. **Grading of the sub-base of the roadway.**
 4. **Any other activity that intrudes on the sub-base of the roadway.**

- D. **If the state or a political subdivision performs any of the activities listed in subsection C of this section, the state or political subdivision shall be required to comply with the notice provisions required for excavation under section 40-360.22.**

40-360.32. One-call notification center membership; termination; designated representatives

- A. **Every landlord, without charge to the landlord, shall file with a one-call notification center the property name, property address, contact name or job title, contact fax number, contact postal mailing address, contact electronic mail address if available, contact telephone number and hours of contact. The landlord shall update any information required by this subsection within seven working days after a change in the information occurs. The contact person or persons shall be readily available during the hours of contact on file. The hours of contact required by this subsection shall be consistent with the landlord's regular business hours, but shall total at least thirty hours per week. Subject to the availability of monies, a one-call notification center may apply for grants from a grant account established for the purpose of maintaining and imparting the information supplied to the center from landlords as prescribed by this subsection.**
- B. **Every underground facilities operator who is obligated to locate and mark underground facilities pursuant to section 40-360.22, subsection B, except a landlord exempted by this section, shall be a member of a one-call notification center, either statewide or serving each county in which such entity or person has underground facilities. This subsection does not apply to a landlord if the only underground facilities that the landlord are obligated to locate and mark are within an apartment community or mobile home park.**

- C. Each one-call notification center shall establish a limited basis participation membership option, which may be made available to all members, but which must be made available for any member serving less than one thousand customers, or any member irrigation or electrical district. An underground facilities operator who elects limited basis participation membership shall provide to the one-call notification center the location of its underground facilities solely by identifying the incorporated cities and towns, or for unincorporated county areas, by identifying the townships, in which it has facilities. The service level provided to limited basis participation members by the one-call notification center is limited to providing excavators with the names and telephone numbers the excavators should contact to obtain facilities location. Each one-call notification center shall establish fair and reasonable fees for limited basis participation members, based on customer count, areas occupied or miles of underground facilities.**
- D. When any person neglects or refuses to pay fees when due and is in arrears for two months, the one-call notification center may terminate the membership of that person without notice and may have a claim for fees and a separate claim for damages for breach of an ancillary agreement. The one-call notification center may refuse to reinstate any person's membership until that person's fee is paid in full.**
- E. Every underground facilities operator, except a landlord exempted by this subsection, shall file with the corporation commission the job title, address and telephone number of the person or persons from whom the necessary information may be obtained. Such person or persons shall be readily available during established business hours. The information on file shall also include the name, address and telephone number of each one-call notification center to which the underground facilities operator belongs. This subsection does not apply to a landlord if the only underground facilities that the landlord are obligated to locate and mark are within an apartment community or mobile home park.**

- F. All underground facilities operators, except landlords, in a county having a population of more than seven hundred one thousand persons shall have designated representatives available and on call for excavators who by public works contract specifications or municipal ordinances are required to work in congested locations involving public streets, alleys or rights-of-way dedicated to the public use during the night or on weekends. Night and weekend telephone numbers to reach the designated representatives shall be furnished to the excavator in writing within forty-eight hours after they are requested for a specific location.**
- G. The form prepared by a one-call notification center as provided in section 40-360.22, subsection A may provide a disclaimer of liability, may instruct the landlord to obtain and review this article and may instruct the landlord to obtain the advice of an attorney to answer any questions about any part of the form or this article. The form may include general guidelines that describe the obligations and rights of landlords as established by this article. This information may include the following rights and obligations:**
- 1. To file and maintain current information with a one-call notification center.**
 - 2. To locate and mark certain underground facilities in response to an excavator's request.**
 - 3. The manner of marking.**
 - 4. The timing of marking.**
 - 5. The notification to an excavator if the landlord believes that the landlord will not be timely in making the markings.**
 - 6. To provide and receive information from an excavator, including contact information and the estimated construction schedule.**
 - 7. To require the excavator to mark the perimeter of the excavation.**
 - 8. To hold a preconstruction conference with an excavator.**
 - 9. To enter an agreement with an excavator to modify the excavation schedule, marking schedule or means of excavation.**
 - 10. To request an excavator to mark the excavation area.**

COLOR CODE

ELECTRIC POWER

GAS-OIL PRODUCT LINES

WATER SYSTEMS / SLURRY PIPELINES

COMMUNICATION CABLE TELEVISION

SANITARY SEWER SYSTEMS

TEMPORARY SURVEY MARKINGS

RECLAIMED WATER

PROPOSED EXCAVATION

**ARIZONA ADMINISTRATIVE CODE
CHAPTER 2
CORPORATION COMMISSION
FIXED UTILITIES
ARTICLE 1. GENERAL PROVISIONS**

R14-2-106. Commission color code to identify location of underground facilities.

- A.** If the location of an underground facility is marked with stakes, paint or in some customary manner pursuant to A.R.S. § 40-360.21.13, the facility owner will use the following color code:

<u>Facility Type</u>	<u>Specific Color</u>
Electric Power Distribution and Transmission.	Safety Red
Gas Distribution and Transmission; Oil Products Distribution and Transmission; Dangerous Materials, Product Lines.	High Visibility Safety Yellow
Telephone and Telegraph System; Cable Television.	Safety Alert Orange
Fiber Optic Communication Lines. Orange	The Letter "F" in Safety Alert
Water Systems; Slurry Pipelines.	Safety Precaution Blue
Reclaimed Water Systems.	Purple
Sanitary Sewer Systems.	Safety Green

UNACCEPTABLE FACILITY LOCATION COLORS:

Fluorescent Pink – This shall be considered a land surveyor marking.

White – This shall be reserved for excavator markings.

- B.** Excavators and Underground Facility Owners shall consider use of the color fluorescent pink to be indicative of land survey markings and not location markings for any underground facility. Surveyors may place aerial photogrammetric markings (targets) using the color white, such markings shall have a fluorescent pink dot not less than two inches in diameter placed within one foot of any edge of the aerial marking. Fluorescent pink shall not be used by excavators or underground facility owners.
- C.** Excavators making markings pursuant to Arizona Revised Statute Ann. § 40-360.22.C are required to use the color white.
- D.** Colors similar to those listed in R14-2-106.A through R14-2-106.C shall not be used for other than their listed purpose.

**ARIZONA
ADMINISTRATIVE
CODE**

**R14-5-201 THRU
R14-5-207**

SECTION/TAB # 9

ARTICLE 2. PIPELINE SAFETY

R14-5-201. Definitions

As used in this Article:

1. "Arizona Office of Pipeline Safety" means the Commission personnel assigned to perform the Commission's day-to-day activities under A.R.S. Title 40, Chapter 2, Article 10, who are headquartered at 1300 W. Washington Street, Suite 220 Phoenix, AZ 85007 and whose contact information is available at <http://www.azcc.gov/Divisions/Safety>.
2. "AZOPS" means "Arizona Office of Pipeline Safety," as defined herein.
3. "Building" means any structure intended for supporting or sheltering any occupancy.
4. "Commission" means the Arizona Corporation Commission.
5. "Discontinuation of service" means an interruption in service expected to exceed four hours, occurring after an operator tests a service line or meter set assembly and determines that additional actions are necessary to restore service because of a leak or hazardous operating condition.
6. "DOT" means the U.S. Department of Transportation.
7. "Evacuation" means denying entry into or the organized clearing of a building or buildings, involving:
 - a. One hundred or more individuals from any number of buildings;
 - b. All of the individuals present from five or more buildings;
 - c. All of the individuals present from five or more businesses within a single building such as a strip mall; or
 - d. A nonresidential building known or discovered to be occupied by individuals who are confined, are of impaired mobility, or would be difficult to evacuate because of their age or physical or mental condition or capabilities, such as a hospital, prison, school, daycare facility, retirement facility, or assisted living facility.
8. "Gas" means natural gas, flammable gas, or toxic or corrosive gas and includes LPG and LNG that is vaporized.
9. "Hazardous liquid" means:
 - a. Petroleum,
 - b. A petroleum product, or
 - c. Anhydrous ammonia.
10. "Independent laboratory" means a laboratory that is not owned or operated by the operator and that has no affiliation with the operator through ownership, familial relationship, or contractual or other relationship that results in the laboratory being controlled by or under common control with the operator.
11. "Intrastate pipeline" means all pipeline facilities included in the definition of "pipeline system" that are used by a provider to transport gas, LNG, or a hazardous liquid within Arizona and that are not used to transport gas, LNG, or a hazardous liquid in interstate or foreign commerce. This includes, without limitation, any equipment, facility, building, or other property used or intended for use in transporting gas, LNG, or a hazardous liquid.
12. "Liquefied natural gas" means natural gas or synthetic gas having as its major constituent methane (CH₄) that has been changed to a liquid.
13. "LNG" means liquefied natural gas.
14. "LNG facility" means those portions of a pipeline system that are used for transporting or storing LNG or for LNG conversion.
15. "LPG" means liquefied petroleum gas.
16. "MAOP" means maximum allowable operating pressure, the maximum pressure at which a gas or LPG pipeline or segment of pipeline may be operated.
17. "Master meter system" means physical facilities for distributing gas within a definable area where the operator purchases metered gas from a provider to provide gas service to two or more buildings other than at a single-family residence.
18. "Operator" means a person that owns or operates a pipeline system or master meter system.
19. "Outage" means an unplanned and unscheduled discontinuation of service:
 - a. Concurrently to 250 or more residential customer accounts or to 10 or more commercial customer accounts; or
 - b. To a nonresidential building known or discovered to be occupied by individuals who are confined, are of impaired mobility, or would be difficult to evacuate or relocate because of age or physical or mental condition or capabilities, such as a hospital, prison, school, daycare facility, retirement facility, or assisted living facility.
20. "Person" means any individual, firm, joint venture, partnership, corporation, association, cooperative association, joint stock association, trustee, receiver, assignee, or personal representative, or the state or any political subdivision of the state.
21. "PHMSA" means the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration.
22. "Pipeline system" means all parts of the physical facilities of a public service corporation or provider through which gas, LPG, LNG, or a hazardous liquid moves in transportation, including but not limited to pipes, compressor units, metering stations, regulator stations, delivery stations, holders, fabricated assemblies, and other equipment, buildings, and property so used.
23. "Provider" means any intrastate gas pipeline operator, public service corporation, or municipality that provides natural gas or LPG service to a master meter customer.
24. "PSIG" means pounds per square inch gauge.
25. "Public service corporation" has the same meaning as in Article 15, § 2 of the Arizona Constitution.
26. "Sandy type soil" means sand no larger than "coarse" as defined by the American Society for Testing and Materials, ASTM D-2487-83, Standard Practice for Classification of Soils for Engineering Purposes (1983), including no future editions or amendments, which is incorporated by reference; on file with the Office of Pipeline Safety; and published by and available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428-2959.
27. "Sour gas" means natural gas that contains the corrosive sulfur-bearing compound hydrogen sulfide (H₂S) in a concentration that exceeds a minimum threshold of 0.25 grain of hydrogen sulfide per 100 cubic feet (5.8

milligrams/m³) under standard operating conditions (4 parts per million).

28. "Sour oil" means crude oil containing the impurity sulfur in a concentration greater than 0.5 percent.
29. "State" means the state of Arizona and all lands within its boundaries.
30. "Structure" means something that is built or constructed, or any piece of work artificially composed of parts joined together in some definite manner.
31. "Transport" or "transportation" of gas, LNG, or a hazardous liquid means the gathering, transmission, distribution, or storage of gas, LNG, or a hazardous liquid using a pipeline system within the state.
32. "Unknown failure" means an occurrence in which a portion of a pipeline system fails, and:
 - a. The cause cannot be attributed to any observable corrosion, third-party damage, natural or other outside force, construction or material defect, equipment malfunction, or incorrect operations; or
 - b. The operator and the Office of Pipeline Safety disagree as to the cause.

Historical Note

Adopted effective October 23, 1987 (Supp. 87-4). Amended Paragraph (5) effective February 3, 1989 (Supp. 89-1). Amended effective July 25, 1994, under a court-ordered exemption as determined by the Arizona Corporation Commission (Supp. 94-3). Amended by exempt rulemaking at 5 A.A.R. 3693, effective September 17, 1999 (Supp. 99-3). Amended by final rulemaking at 8 A.A.R. 2382, effective May 10, 2002 (Supp. 02-2). Amended by final rulemaking at 20 A.A.R. 75, effective December 16, 2013 (Supp. 13-4). Amended by final rulemaking at 25 A.A.R. 151, effective January 9, 2019 (Supp. 19-1). Amended by final rulemaking at 28 A.A.R. 1404 (June 17, 2002), effective July 24, 2022 (Supp. 22-2).

R14-5-202. Construction and Safety Standards for Gas, LNG, and Hazardous Liquid Pipeline Systems

- A. Applicability: This Section applies to the construction, reconstruction, repair, operation, and maintenance of each intrastate gas, LNG, or hazardous liquid pipeline system, pursuant to A.R.S. § 40-441.
- B. Subject to the definitional changes in R14-5-201 and the modifications noted in this Section, the Commission adopts, incorporates, and approves as its own 49 CFR 40; 191; 192, except (I)(A)(2) and (3) of Appendix D to Part 192; 193; 195, except 195.1(b)(2), (3), and (4); and 199 (October 1, 2022), including no future editions or amendments, which are incorporated by reference; on file with the Arizona Office of Pipeline Safety (AZOPS); and published by and available from the Government Bookstore at <https://bookstore.gpo.gov> and online at ecfr.gov. For purposes of 49 CFR 192, "Business District" means an area where the public congregate for economic, industrial, religious, educational, health, or recreational purposes and two or more buildings used for these purposes are located within 100 yards of each other.
- C. The above mentioned incorporated Parts of 49 CFR, except 49 CFR 191; 49 CFR 192.727(g)(1), 192.913(b)(1)(vii), 192.943(a), 192.949(a)-(b), and 192.951; 49 CFR 193 Subpart A; and 49 CFR 195 Subparts A and B, are revised as follows:
 1. Substitute "Commission" where "Administrator," "Pipeline and Hazardous Materials Administration," "Office of Pipeline Safety," or "OPS" appears; and
 2. Substitute "Arizona Office of Pipeline Safety, Arizona Corporation Commission, at its office in Phoenix, Arizona" where the address for the "Information Resources Manager,

Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation" appears.

- D. An operator of an intrastate pipeline shall file with the AZOPS an Operation and Maintenance Plan, including an emergency plan, at least 30 days before placing a pipeline system into operation. Any changes in an existing Operation and Maintenance Plan shall be filed within 30 days after the effective date of the change.
- E. An operator of an intrastate pipeline transporting sour gas or sour oil shall comply with the following industry standards addressing facilities handling hydrogen sulfide (H₂S), which are incorporated by reference, including no future editions or amendments:
 1. NACE Standard MR0175-99, Standard Materials Requirements-Sulfide Stress Cracking Resistant Metallic Material for Oilfield Equipment (1999 Revision), on file with the AZOPS and published by and available from the NACE International, 1440 S. Creek Dr., Houston, TX 77084-4906 and website: <http://store.ampp.org/>; and
 2. API RP55: Recommended Practice for Conducting Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide (2nd Edition 1995), on file with the AZOPS and published by and available from the American Petroleum Institute, 200 Massachusetts Ave. NW, Suite 1100, Washington, DC 20001 and website: <https://www.api.org/>.
- F. An operator of an intrastate pipeline transporting LNG, hazardous liquid, or gas shall not construct any part of a hazardous liquid, LNG, or gas pipeline system under a building. If a building encroaches over a pipeline system, the operator may require the property owner to remove the building from over the pipeline or to reimburse the operator the cost associated with relocating the pipeline system. The operator shall determine, within 90 days after discovering the encroachment, whether the encroachment can be resolved within 180 days. If the operator determines that the encroachment cannot be resolved within 180 days, the operator shall, within 90 days of discovery, submit to the AZOPS a written plan to resolve the encroachment within a period longer than 180 days. The AZOPS may then extend the 180-day requirement to allow the property owner and the operator to implement the written plan to resolve the encroachment. If the operator does not submit a written plan, and the encroachment is not resolved within 180 days of discovery, the operator shall discontinue service to the pipeline system. This modifies 49 CFR 192.361 and 195.210.
- G. An operator of an intrastate distribution pipeline transporting gas shall not construct any part of a pipeline system less than 8 inches away from any other underground structure. If the 8-inch clearance cannot be maintained, a sleeve, casing, or shielding shall be used. This modifies 49 CFR 192.361.
- H. An operator of an intrastate pipeline transporting gas that has regulators, meters, or regulation meter sets that have been out of service for 36 months shall disconnect the pipeline from all sources and supplies of gas or hazardous liquids, purge the gas or hazardous liquids from the pipeline being disconnected, and cap all ends within six months after the 36 months have passed. This modifies 49 CFR 192.727.
- I. An operator of an intrastate pipeline shall not install or operate a gas regulator that might release gas within 3 feet of a source of ignition, an opening into a building, an air intake into a building, or any electrical source that is not intrinsically safe. The 3-foot clearance from a source of ignition shall be measured from the vent or source of release (discharge port), not from the physical location of the meter set assembly. This subsection does not apply to building permits issued and subdivisions platted before

October 1, 2000. If an encroachment into the required 3-foot clearance is caused by an action of the property owner, an occupant, or a provider after the effective date of this rule, the operator may require the property owner to resolve the encroachment or to reimburse the operator the cost associated with relocating the pipeline system. The operator shall determine, within 90 days after discovering the encroachment, whether the encroachment can be resolved within 180 days. If the operator determines that the encroachment cannot be resolved within 180 days, the operator shall, within 90 days of discovery, submit to the AZOPS a written plan to resolve the encroachment within a period longer than 180 days. The AZOPS may then extend the 180-day requirement to allow the property owner and the operator to implement the written plan to resolve the encroachment. If the operator does not submit a written plan, and the encroachment is not resolved within 180 days of discovery, the operator shall discontinue service to the affected pipeline system. This modifies 49 CFR 192.357 and 192.361.

- J.** An operator of an intrastate pipeline transporting LNG, gas, or a hazardous liquid shall use a cathodic protection system designed to protect the metallic pipeline in its entirety, in accordance with 49 CFR 192, Subpart I, as incorporated by reference in subsection (B). Sections (I)(A)(2) and (3) of Appendix D to Part 192 shall not be utilized. This modifies 49 CFR 192.463(a), 193.2629, and 195.571.
- K.** An operator of an intrastate pipeline transporting hazardous liquid or gas shall not install Acrylonitrile-Butadiene-Styrene (ABS) or aluminum pipe in a pipeline system. This modifies 49 CFR 192.53 and 192.59.
- L.** An operator of an intrastate pipeline transporting hazardous liquid or gas shall not install plastic pipe aboveground unless the plastic pipeline is protected by a metal casing, or equivalent, and the installation is approved by the AZOPS. An operator may use a temporary aboveground plastic pipeline bypass for up to 60 days, provided that the plastic pipeline is under the direct supervision of the operator and protected at all times. This modifies 49 CFR 192.321 and 195.254.
- M.** An operator of an intrastate pipeline transporting hazardous liquid or gas that constructs a pipeline system or any portion thereof using plastic pipe shall install, at a minimum, a 14-gauge coated or corrosion resistant, electrically conductive wire as a means of locating the pipe while it is underground. Tracer wire shall not be wrapped around the plastic pipe. Tracer wire may be taped, or attached to the pipe in another manner, provided that the adhesive or attachment is not detrimental to the integrity of the pipe wall. This modifies 49 CFR 192.321 and 195.246.
- N.** An operator of an intrastate pipeline transporting gas or hazardous liquid that constructs an underground pipeline system using plastic pipe shall bury the installed pipe with at least 6 inches of sandy type soil, free of any rock or debris, surrounding the pipe for bedding and shading, unless the pipe is otherwise protected as approved by the AZOPS. Steel pipe shall be installed with at least 6 inches of sandy type soil, free of any debris or materials injurious to the pipe coating, surrounding the pipe for bedding and shading, unless the pipe is otherwise protected as approved by the AZOPS. This modifies 49 CFR 192.329, 192.361, and 195.246.
- O.** An operator of an intrastate pipeline transporting gas that constructs an underground pipeline system using plastic pipe shall install the pipe with sufficient slack to allow for thermal expansion and contraction. In addition, all plastic pipe and fittings for use in an area with service temperatures above 100° F shall be tested and marked CD, CE, CF, or CG as required by ASTM D2513 (2018-a), including no future editions or amendments, which is incorporated by reference, on file with the AZOPS, and published by and available from ASTM International, 100 Barr

Harbor Dr., P.O. Box C700, W. Conshohocken, PA 19428-2959 and through <http://www.astm.org>. This modifies 49 CFR 192.63.

- P.** An operator of an intrastate pipeline system transporting hazardous liquid or gas shall qualify welding procedures and shall ensure that welding of steel pipelines is performed in accordance with API Standard 1104, as incorporated by reference in 49 CFR 192.7, by welders qualified pursuant to API Standard 1104, except that welders qualified as delineated in 49 CFR 192, Appendix C may be used for low stress level pipe. This modifies 49 CFR 192.225, 192.227, 195.214, and 195.222.
- Q.** An operator of an intrastate pipeline transporting gas shall survey and grade all detected leakage according to the standards provided below, which modify 49 CFR 192.706 and 192.723:
 - 1. In the case of all gas except LPG, leakage surveys and grading shall be performed pursuant to the standards set by American Gas Association, Guide for Gas Transmission and Distribution Piping Systems. Gas Piping Technology Committee Guide Material. Appendix G-192-11: 2022 Edition, including Addendum 1 (2022), including no future editions or amendments, which is incorporated by reference; on file with the AZOPS; published by and available from American Gas Association, 400 North Capitol Street, NW, Suite 450, Washington, D.C. 20001 and online at Techstreet.com; and modified by omitting 4.4(c) and by replacing “should” with “shall” each time it appears.
 - 2. In the case of LPG, leakage surveys and grading shall be performed pursuant to the standards set by American Gas Association, Guide for Gas Transmission and Distribution Piping Systems, Gas Piping Technology Committee Guide Material, Appendix G-192-11A: 2022 Edition, including Addendum 1 (2022), including no future editions or amendments, which is incorporated by reference; on file with the AZOPS; published by and available from American Gas Association, 400 North Capitol Street, NW, Suite 450, Washington, D.C. 20001 and online at Techstreet.com; and modified by replacing “should” with “shall” each time it appears.
 - 3. Leakage survey records shall identify in some manner each pipeline surveyed and shall be maintained to demonstrate that each required leakage survey has been conducted. This modifies 49 CFR 192.706 and 192.723.
- R.** An operator of an intrastate transmission pipeline transporting gas shall conduct a leakage survey at least twice each calendar year, at an interval not exceeding 7 1/2 months, independent of class location, and shall repair each underground leak classified as grade two or three either upon discovery or within one year after discovery. This modifies 49 CFR 192.706 and 192.711.
- S.** An operator of an intrastate transmission pipeline transporting gas and operating at or above 20 percent of Specified Minimum Yield Strength shall ensure that nondestructive testing is completed for each weld performed on newly installed, replaced, or repaired pipeline or an appurtenance. The nondestructive testing shall be completed before the newly welded area of the pipeline or appurtenance is used for service. This modifies 49 CFR 192.241.
- T.** An operator of an LNG facility shall ensure that nondestructive testing is completed for each weld performed on newly installed, replaced, or repaired pipeline or an appurtenance. This modifies 49 CFR 193.2303.
- U.** In the event of an unknown failure of a gas, LNG, or hazardous liquid pipeline, resulting in the operator’s being required to provide a telephonic or written report under R14-5-203(B) or (C) and in the operator’s removing a portion of the failed pipeline, the following shall occur:
 - 1. The operator shall retain the portion of failed pipeline that was removed;

2. The operator shall telephonically notify the AZOPS of the removal within two hours after the removal is completed, providing the following information.
 - a. Identity of the failed pipeline,
 - b. Description and location of the failure,
 - c. Date and time of the removal,
 - d. Length or quantity of the removed portion,
 - e. Storage location of the removed portion, and
 - f. Any additional information about the failure or the removal of the portion of the failed pipeline that is requested by the AZOPS;
 3. Within 48 hours after receiving telephonic notification pursuant to subsection (U)(2), the AZOPS shall:
 - a. Determine, based on the information provided by the operator and the availability, adequacy, and reliability of any pipeline testing laboratory operated by the operator, whether it is necessary to have the removed portion of pipeline tested at an independent laboratory; and
 - b. Telephonically notify the operator either:
 - i. That the operator must have the removed portion of pipeline tested, in accordance with AZOPS directions, by an independent laboratory selected by the AZOPS as provided in subsection (U)(5), to determine the cause or causes of the failure; or
 - ii. That the operator is not required to have the removed portion of pipeline tested by an independent laboratory and instead must conduct testing in its own pipeline testing laboratory, after which the operator may discard the removed portion of pipeline;
 4. After providing telephonic notice as provided in subsection (U)(3)(b), the AZOPS shall confirm its notification in writing;
 5. If the AZOPS directs testing by an independent laboratory:
 - a. The AZOPS shall:
 - i. Determine, as provided in subsection (U)(6), the independent laboratory that will do the testing and the period of time within which the testing is to be completed;
 - ii. Determine, based on the available information concerning the failure, the number and types of tests to be performed on the removed pipeline; and
 - iii. Notify the operator of its determinations; and
 - b. The operator shall:
 - i. Contact the selected independent laboratory to arrange the scheduling of the required tests;
 - ii. Notify the AZOPS, at least 20 days before the date of the tests, of the date and time scheduled for the laboratory tests;
 - iii. At the request of the AZOPS, ensure that a representative of the Arizona Office of Pipeline Safety is permitted to observe any or all of the tests;
 - iv. Ensure that the original test results are provided to the AZOPS by the independent laboratory within 30 days after the tests are completed; and
 - v. Pay for the independent laboratory testing; and
 6. In determining an independent laboratory to perform testing required under subsection (U), the AZOPS shall:
 - a. Submit to at least three different independent laboratories written requests for bids to conduct the testing;
 - b. Consider each responding independent laboratory's qualifications to perform the testing, as demonstrated by:
 - i. Prior experience in performing the required test or tests according to ASTM International standards, and
 - ii. Any recognition that a laboratory may have received from a national or international laboratory accreditation body, such as through a certification or accreditation process;
 - c. Wait to select an independent laboratory until one of the following occurs:
 - i. The AZOPS has received written bids from at least three different independent laboratories, or
 - ii. Thirty days have passed since the date of the request for bids; and
 - d. Select the independent laboratory that offers the optimum balance between cost and demonstrated ability to perform the required test or tests. This modifies 49 CFR 192.617, 193.2515, and 195.402.
- V. An operator shall ensure that all repair work performed on an existing intrastate pipeline transporting LNG, hazardous liquid, or gas complies with this Article.
- W. The Commission may waive compliance with any of the requirements of this Section upon a finding that such a waiver is in the interest of public and pipeline safety.
- X. To ensure compliance with the provisions of this Article, the Commission or an authorized representative thereof may enter the premises of an operator of an intrastate pipeline to inspect and investigate the property, books, papers, electronic files, business methods, and affairs that pertain to the pipeline system operation.

Historical Note

Adopted effective October 23, 1987 (Supp. 87-4).
 Amended subsections (B), (I) and (J) effective February 3, 1989 (Supp. 89-1). Amended effective December 18, 1991 (Supp. 91-4). Amended effective July 25, 1994, under a court-ordered exemption as determined by the Arizona Corporation Commission (Supp. 94-3). Amended effective August 30, 1996, under a court-ordered exemption as determined by the Arizona Corporation Commission (Supp. 96-3). Amended effective September 26, 1997, under a court-ordered exemption as determined by the Arizona Corporation Commission (Supp. 97-3). Amended by exempt rulemaking at 5 A.A.R. 3693, effective September 17, 1999 (Supp. 99-3). Amended by final rulemaking at 8 A.A.R. 2382, effective May 10, 2002 (Supp. 02-2). Amended by final rulemaking at 9 A.A.R. 3496, effective September 15, 2003 (Supp. 03-3). Amended by final rulemaking at 11 A.A.R. 1253, effective March 3, 2005 (Supp. 05-1). Amended by final rulemaking at 13 A.A.R. 4533, effective January 25, 2008 (Supp. 07-4). Amended by final rulemaking at 18 A.A.R. 126, effective December 28, 2011 (Supp. 11-4). Amended by final rulemaking at 20 A.A.R. 75, effective December 16, 2013 (Supp. 13-4). Section R14-5-202 amended by emergency rulemaking at 22 A.A.R. 5, effective December 15, 2015 for 180 days (Supp. 15-4). Emergency renewed at 22 A.A.R. 1637, effective June 7, 2016 for 180 days (Supp. 16-2). Section amended by final rulemaking at 22 A.A.R. 2869, effective September 14, 2016 (Supp. 16-4). Amended by final rulemaking at 25 A.A.R. 151, effective January 9, 2019 (Supp. 19-1). Amended by final rulemaking at 26 A.A.R. 1024, effective July 4, 2020 (Supp. 20-2). Amended by

final rulemaking at 28 A.A.R. 1404 (June 17, 2002),
effective July 24, 2022 (Supp. 22-2).

R14-5-203. Pipeline Incident Reports

A. Applicability. This Section applies to all intrastate pipeline systems.

B. Required incident reports by telephone:

1. An operator of an intrastate pipeline transporting LNG or gas shall immediately notify by telephone the AZOPS, at 602-262-5601 during normal working hours or at 602-252-4449 at all other times, upon discovering the occurrence of any of the following related to the operator's intrastate pipeline system:

- a. Release of gas or LNG from a pipeline or LNG facility, when any of the following results:
 - i. Death or personal injury requiring hospitalization;
 - ii. Injury to any individual resulting in loss of consciousness;
 - iii. An explosion or fire not intentionally set by the operator;
 - iv. Property damage estimated in excess of \$5,000, including the value of the gas lost; or
 - v. Unintentional release of gas from a transmission pipeline;
- b. Emergency transmission pipeline shutdown;
- c. News media inquiry;
- d. Overpressure of a pipeline system where a pipeline operating at less than 12 PSIG exceeds MAOP by 50%, where a pipeline operating between 12 PSIG and 60 PSIG exceeds MAOP by 6 PSIG, or where a pipeline operating over 60 PSIG exceeds MAOP plus 10%;
- e. Permanent or temporary discontinuance of service to a master meter system or when assisting with the isolation of any portion of a master meter system, when either is required due to a leak or failure of a leak test;
- f. Emergency shutdown of any LNG facility;
- g. An evacuation; or
- h. An outage.

2. An operator of an intrastate pipeline transporting hazardous liquid shall immediately notify by telephone the AZOPS, at 602-262-5601 during normal working hours or at 602-252-4449 at all other times, upon discovering a failure in a pipeline system resulting in the occurrence of any of the following:

- a. Injury to an individual that results in one or more of the following:
 - i. Death or personal injury requiring medical treatment,
 - ii. Loss of consciousness, or
 - iii. Inability of the individual to leave the scene of the incident unassisted;
- b. An explosion or fire not intentionally set by the operator;
- c. Property damage estimated in excess of \$5,000;
- d. Pollution of any land or stream, river, lake, reservoir, or other body of water that violates applicable environmental quality or water quality standards, causes a discoloration of the water surface or adjoining shoreline, or deposits sludge or emulsion beneath the water surface or upon the adjoining shoreline;
- e. News media inquiry;
- f. Release of 5 gallons (19 liters) or more of hazardous liquid or carbon dioxide, except that no report is required for a release of less than 5 barrels (0.8 cubic

meters) resulting from a pipeline maintenance activity if the release is:

- i. Not otherwise reportable under this Section;
 - ii. Not one described in 49 CFR 195.52(a)(4), as incorporated by reference in R14-5-202 and available from the AZOPS;
 - iii. Confined to the operator's property or the pipeline right-of-way; and
 - iv. Cleaned up promptly; or
- g. Any release of hazardous liquid or carbon dioxide that was significant in the judgment of the operator even though it did not meet any of the criteria in subsections (B)(2)(a) through (f).

3. A telephonic incident report shall include the following information:

- a. Name of the pipeline system operator,
- b. Name of the reporting party,
- c. Job title of the reporting party,
- d. Telephone number of the reporting party,
- e. Location of the incident,
- f. Time of the incident, and
- g. Description of any fatalities and injuries.

C. Required written incident reports:

1. An operator of an intrastate pipeline transporting LNG or gas shall file a written incident report when an incident involving a pipeline occurs resulting in any of the following:

- a. Release of gas or LNG from a pipeline or LNG facility, when any of the following results:
 - i. Death or personal injury requiring hospitalization;
 - ii. Loss of consciousness;
 - iii. An explosion or fire not intentionally set by the operator;
 - iv. Property damage estimated in excess of \$25,000, including the value of all released gas; or
 - v. Unintentional release of gas from a transmission pipeline;
- b. An incident involving an evacuation, outage, or property damage and resulting in expenses including the value of any released gas and of restoring service or evacuation estimated in excess of \$25,000;
- c. Emergency transmission pipeline shutdown;
- d. Overpressure of a pipeline system where a pipeline operating at less than 12 PSIG exceeds MAOP by 50%, where a pipeline operating between 12 PSIG and 60 PSIG exceeds MAOP by 6 PSIG, or where a pipeline operating over 60 PSIG exceeds MAOP plus 10%; or
- e. Emergency shutdown of any LNG facility.

2. A written incident report concerning a gas pipeline system shall be completed using the following, as applicable, which are incorporated by reference; on file with the AZOPS; and published by and available from PHMSA at East Building, Second Floor, 1200 New Jersey Ave., SE, Washington, DC 20590, and at <http://www.phmsa.dot.gov/forms/operator-reports-submitted-phmsa-forms-and-instructions>:

- a. Form PHMSA F 7100.1: Incident Report – Gas Distribution System (May 2021), including no future editions or amendments;
- b. Form PHMSA F 7100.2: Incident Report – Natural and Other Gas Transmission and Gathering Pipeline Systems (March 2022), including no future editions or amendments; or
- c. Form PHMSA F 7100.3: Incident Report – Liquefied Natural Gas (LNG) Facilities (April 2019), including no future editions or amendments.

3. An operator of an intrastate pipeline transporting hazardous liquid shall file a written incident report completed using Form PHMSA F 7000-1: Accident Report – Hazardous Liquid Pipeline Systems (March 2021), including no future editions or amendments, which is incorporated by reference, on file with the AZOPS, and published by and available from PHMSA as set forth in subsection (C)(2), any time the operator would have been required to make a notification as required under R14-5-203(B)(2).
4. A written incident report required by this Section shall be filed with the AZOPS within the time specified below:
 - a. For an LNG or gas - incident, within 20 days after detection; and
 - b. For a hazardous liquid incident, within 15 days after detection.
5. An operator shall either file a copy of each DOT required written incident report electronically with PHMSA at <https://portal.phmsa.dot.gov/pipeline> or submit a written request for an alternative reporting method to the Information Resource Manager, Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, PHP-20, 1200 New Jersey Avenue, SE, Washington, DC 20590, under 49 CFR 191.7 and 195.58, as incorporated by reference in R14-5-202.
6. After an incident involving shutdown or partial shutdown of a master meter system, an operator of a gas pipeline system shall request and obtain a clearance from the AZOPS before turning on or reinstating service to the master meter system or portion of the master meter system that was shut down.

Historical Note

Adopted effective October 23, 1987 (Supp. 87-4).
 Amended effective December 18, 1991 (Supp. 91-4).
 Amended effective September 26, 1997, under a court-ordered exemption as determined by the Arizona Corporation Commission (Supp. 97-3). Amended by exempt rulemaking at 5 A.A.R. 3693, effective September 17, 1999 (Supp. 99-3). Amended by final rulemaking at 8 A.A.R. 2382, effective May 10, 2002 (Supp. 02-2). Amended by final rulemaking at 9 A.A.R. 3496, effective September 15, 2003 (Supp. 03-3). Amended by final rulemaking at 11 A.A.R. 1253, effective March 3, 2005 (Supp. 05-1). Amended by final rulemaking at 13 A.A.R. 4533, effective January 25, 2008 (Supp. 07-4). Amended by final rulemaking at 18 A.A.R. 126, effective December 28, 2011 (Supp. 11-4). Amended by final rulemaking at 20 A.A.R. 75, effective December 16, 2013 (Supp. 13-4). Amended by final rulemaking at 20 A.A.R. 75, effective December 16, 2013 (Supp. 13-4). Section R14-5-203 amended by emergency rulemaking at 22 A.A.R. 5, effective December 15, 2015 for 180 days (Supp. 15-4). Emergency renewed at 22 A.A.R. 1637, effective June 7, 2016 for 180 days (Supp. 16-2). Section amended by final rulemaking at 22 A.A.R. 2869, effective September 14, 2016 (Supp. 16-4). Amended by final rulemaking at 28 A.A.R. 1404 (June 17, 2002), effective July 24, 2022 (Supp. 22-2).

R14-5-204. Annual Reports

- A. An operator of an intrastate pipeline shall file with the Arizona Office of Pipeline Safety, not later than March 15, for the preceding calendar year, an annual report completed using one of the following, as applicable, which are incorporated by reference; on file with the AZOPS; and published by and available from PHMSA as provided in R14-5-203(C)(2):

1. Form PHMSA F 7000-1.1: Annual Report for Calendar Year 20__ Hazardous Liquid Pipeline Systems (January 2020), including no future editions or amendments, which shall be completed in accordance with the PHMSA instructions for the form;
2. Form PHMSA F 7100.1-1: Annual Report for Calendar Year 20__ Gas Distribution System (May 2021), including no future editions or amendments, which shall be completed in accordance with the PHMSA instructions for the form;
3. Form PHMSA F 7100.2-1: Annual Report for Calendar Year 20__ Natural and Other Gas Transmission and Gathering Pipeline Systems (March 2022), including no future editions or amendments, which shall be completed in accordance with the PHMSA instructions for the form; or
4. Form PHMSA F 7100.3-1: Annual Report for Calendar Year 20__ Liquefied Natural Gas (LNG) Facilities (March 2022), including no future editions or amendments, which shall be completed in accordance with the PHMSA instructions for the form.

- B. An operator of an intrastate pipeline shall submit a copy of each required annual report by March 15, for the previous calendar year, to PHMSA at <https://portal.phmsa.dot.gov/pipeline>.

Historical Note

Adopted effective October 23, 1987 (Supp. 87-4).
 Amended effective December 18, 1991 (Supp. 91-4).
 Amended by exempt rulemaking at 5 A.A.R. 3693, effective September 17, 1999 (Supp. 99-3). Amended by final rulemaking at 8 A.A.R. 2382, effective May 10, 2002 (Supp. 02-2). Amended by final rulemaking at 9 A.A.R. 3496, effective September 15, 2003 (Supp. 03-3). Amended by final rulemaking at 11 A.A.R. 1253, effective March 3, 2005 (Supp. 05-1). Amended by final rulemaking at 13 A.A.R. 4533, effective January 25, 2008 (Supp. 07-4). Amended by final rulemaking 18 A.A.R. 126, effective December 28, 2011 (Supp. 11-4). Amended by final rulemaking at 20 A.A.R. 75, effective December 16, 2013 (Supp. 13-4). Section R14-5-204 amended by emergency rulemaking at 22 A.A.R. 5, effective December 15, 2015 for 180 days (Supp. 15-4). Emergency renewed at 22 A.A.R. 1637, effective June 7, 2016 for 180 days (Supp. 16-2). Section amended by final rulemaking at 22 A.A.R. 2869, effective September 14, 2016 (Supp. 16-4). Amended by final rulemaking at 25 A.A.R. 151, effective January 9, 2019 (Supp. 19-1). Amended by final rulemaking at 26 A.A.R. 1024, effective July 4, 2020 (Supp. 20-2). Amended by final rulemaking at 28 A.A.R. 1404 (June 17, 2002), effective July 24, 2022 (Supp. 22-2).

R14-5-205. Commission Investigations

- A. The AZOPS shall investigate the cause of each reportable incident, accident, or event resulting in a death or an injury requiring hospitalization and may investigate other incidents, accidents, or events.
- B. While investigating an incident, accident, or event, the Commission or an authorized agent of the Commission may:
 1. Inspect all plant and facilities of a pipeline system and all other property of a pipeline system operator;
 2. Inspect the books, papers, business methods, and affairs of a pipeline system operator;
 3. Make inquiries regarding and interview persons having knowledge of facts surrounding an incident or accident;
 4. Attend, as an observer, all hearings and formal investigations concerning a pipeline system operator;

5. Schedule and conduct a public hearing into the incident or accident; and
6. Issue subpoenas to compel the production of records and the taking of testimony.

Historical Note

Adopted effective October 23, 1987 (Supp. 87-4). Amended subsections (B) and (G) effective February 3, 1989 (Supp. 89-1). Amended effective December 18, 1991 (Supp. 91-4). Amended effective July 25, 1994, under a court-ordered exemption as determined by the Arizona Corporation Commission (Supp. 94-3). Amended effective August 30, 1996, under a court-ordered exemption as determined by the Arizona Corporation Commission (Supp. 96-3). Amended effective September 26, 1997, under a court-ordered exemption as determined by the Arizona Corporation Commission (Supp. 97-3). Amended by exempt rulemaking at 5 A.A.R. 3693, effective September 17, 1999 (Supp. 99-3). Amended by final rulemaking at 8 A.A.R. 2382, effective May 10, 2002 (Supp. 02-2). Amended by final rulemaking at 9 A.A.R. 3496, effective September 15, 2003 (Supp. 03-3). Amended by final rulemaking at 11 A.A.R. 1253, effective March 3, 2005 (Supp. 05-1). Amended by final rulemaking at 13 A.A.R. 4533, effective January 25, 2008 (Supp. 07-4). Amended by final rulemaking at 18 A.A.R. 126, effective December 28, 2011 (Supp. 11-4). Section R14-5-205 renumbered to R14-5-207; new Section R14-5-205 made by final rulemaking at 20 A.A.R. 75, effective December 16, 2013 (Supp. 13-4). Section R14-5-205 amended by emergency rulemaking at 22 A.A.R. 5, effective December 15, 2015 for 180 days (Supp. 15-4). Emergency renewed at 22 A.A.R. 1637, effective June 7, 2016 for 180 days (Supp. 16-2). Section amended by final rulemaking at 22 A.A.R. 2869, effective September 14, 2016 (Supp. 16-4). Amended by final rulemaking at 28 A.A.R. 1404 (June 17, 2002), effective July 24, 2022 (Supp. 22-2).

R14-5-206. Employee Drug and Alcohol Testing Requirements

An operator of an intrastate pipeline facility transporting gas or a hazardous liquid or of an intrastate LNG facility shall ensure that drug and alcohol testing of its workers is performed in compliance with 49 CFR 199, as incorporated by reference in R14-5-202.

Historical Note

Section R14-5-206 made by final rulemaking at 20 A.A.R. 75, effective December 16, 2013 (Supp. 13-4).

R14-5-207. Master Meter System Operators

- A. Applicability: This Section applies to the construction, reconstruction, repair, emergency procedures, operation, and maintenance of all master meter systems.
- B. An operator of a master meter system shall comply with this Section as a condition of receiving service from a provider. Noncompliance with this Section by an operator of a master meter system constitutes grounds for termination of service by the provider when informed in writing by the AZOPS. In case of an emergency, the AZOPS may give the provider oral instructions to terminate service, with written confirmation to be furnished within 24 hours.
- C. Each operator of a master meter system shall comply with all applicable requirements of 49 CFR 192, as incorporated by reference in R14-5-202.
- D. An operator of a master meter system shall:
 1. Establish an Operation and Maintenance Plan, including an emergency plan; and

2. At all times, maintain a copy of the Operation and Maintenance Plan at the master meter system location.
- E. An operator of a master meter system shall:
 1. Ensure that no part of a gas pipeline system is constructed under a building and that no building is placed over any portion of a gas pipeline system; and
 2. Upon discovering that a building is located over a portion of a gas pipeline system, complete one of the following within 180 days:
 - a. Remove the building from over the pipeline,
 - b. Relocate the pipeline, or
 - c. Discontinue service to the portion of the pipeline system located under the building.
 - F. An operator of a master meter system shall not install Acrylonitrile-Butadiene-Styrene (ABS) or aluminum pipe in the master meter system.
 - G. An operator of a master meter system that constructs a pipeline or any portion thereof using plastic pipe shall install, at a minimum, a 14-gauge coated or corrosion resistant, electrically conductive wire as a means of locating the pipe while it is underground. Tracer wire shall not be wrapped around the plastic pipe. Tracer wire may be taped or attached to the pipe in another manner, provided that the adhesive or attachment is not detrimental to the integrity of the pipe wall.
 - H. An operator of a master meter system that constructs an underground pipeline using plastic pipe shall bury the installed pipe with at least 6 inches of sandy type soil, free of any rock or debris, surrounding the pipe for bedding and shading, unless the pipe is otherwise protected as approved by the AZOPS. Steel pipe shall be installed with at least 6 inches of sandy type soil, free of any debris or materials injurious to the pipe coating, surrounding the pipe for bedding and shading, unless the pipe is otherwise protected as approved by the AZOPS.
 - I. An operator of a master meter system that constructs an underground pipeline using plastic pipe shall install the pipe with sufficient slack to allow for thermal expansion and contraction. In addition, all plastic pipe and fittings for use in an area with service temperatures above 100° F shall be marked CD, CE, CF, or CG as required by ASTM D2513 (1995), incorporated by reference in R14-5-202 and available from the Arizona Office of Pipeline Safety.
 - J. An operator of a master meter system shall qualify welding procedures and shall ensure that welding of steel pipelines is performed in accordance with API Standard 1104, as incorporated by reference in 49 CFR 192.7 and R14-5-202, by welders qualified pursuant to API Standard 1104.
 - K. An operator of a master meter system shall ensure that all repair work performed on an existing master meter system complies with this Article.
 - L. An operator of a master meter system shall:
 1. Ensure that each underground steel pipeline is protected against external corrosion with an external protective coating meeting the requirements of 49 CFR 192.461;
 2. When installing a new underground steel pipeline system, before placing the new pipeline system into service, provide a cathodic protection system designed to protect the new pipeline system in its entirety;
 3. When repairing, partially replacing, or relocating an existing underground steel pipeline system, within 45 days after completing the repair, replacement, or relocation, provide a cathodic protection system designed to protect the pipeline system; and
 4. Ensure that each cathodic protection system has a voltage of at least negative 0.85 volts direct current (-0.85Vdc) as measured using a saturated copper-copper sulfate half cell.

- M.** An operator of a master meter system shall ensure that no portion of an underground gas system is installed less than 8 inches away from any other underground structure.
- N.** At least 30 days before commencing construction of any pipeline, an operator of a master meter system shall file with the AZOPS a Notice of Construction that includes at least the following information:
 1. The dates projected for commencing and completing construction,
 2. The size and type of pipe to be used,
 3. The location of construction, and
 4. The MAOP for the new pipeline.
- O.** An operator of a master meter system shall:
 1. Perform leakage surveys at intervals not exceeding 15 months, but at least once each calendar year, using leak detection procedures approved by the AZOPS;
 2. Except for LPG, perform each leakage survey in accordance with ASME Guide for Gas Transmission and Distribution Pipeline System, Guide Material, Appendix G-11-1983, other than 4.4(c), as incorporated by reference in R14-5-202(Q);
 3. For LPG, perform each leakage survey in accordance with ASME Guide for Gas Transmission and Distribution Pipeline System, Guide Material, Appendix G-11A-1983, as incorporated by reference in R14-5-202(Q); and
 4. Repair each grade 1 leak immediately upon discovery, each grade 2 leak within 30 days of discovery, and each grade 3 leak within one year of discovery.
- P.** In the event of an unknown failure of a gas pipeline resulting in a master meter system operator's being required to provide a report under subsection (Q) and in the operator's removing a portion of the failed pipeline, the following shall occur:
 1. The operator shall retain the portion of failed pipeline that was removed;
 2. The operator shall telephonically notify the Arizona Office of Pipeline Safety of the removal within two hours after the removal is completed, providing the following information:
 - a. Identity of the failed pipeline,
 - b. Description and location of the failure,
 - c. Date and time of the removal,
 - d. Length or quantity of the removed portion,
 - e. Storage location of the removed portion, and
 - f. Any additional information about the failure or the removal of the portion of the failed pipeline that is requested by the AZOPS;
 3. Within 48 hours after receiving telephonic notification pursuant to subsection (Q)(2), the AZOPS shall:
 - a. Determine, based on the information provided by the operator and the availability, adequacy, and reliability of any pipeline testing laboratory operated by the operator, whether it is necessary to have the removed portion of pipeline tested at an independent laboratory; and
 - b. Telephonically notify the operator either:
 - i. That the operator must have the removed portion of pipeline tested, in accordance with AZOPS directions, by an independent laboratory selected by the AZOPS as provided in subsection (P)(6), to determine the cause or causes of the failure; or
 - ii. That the operator is not required to have the removed portion of pipeline tested by an independent laboratory and instead must conduct testing in its own pipeline testing laboratory, after which the operator may discard the removed portion of pipeline;
- 4. After providing telephonic notice as provided in subsection (P)(3)(b), the AZOPS shall confirm its notification in writing;
- 5. If the AZOPS directs testing by an independent laboratory:
 - a. The AZOPS shall:
 - i. Determine, as provided in subsection (P)(6), the independent laboratory that will do the testing and the period of time within which the testing is to be completed;
 - ii. Determine, based on the available information concerning the failure, the number and types of tests to be performed on the removed pipeline; and
 - iii. Notify the operator of its determinations;
 - b. The operator shall:
 - i. Contact the selected independent laboratory to arrange the scheduling of the required tests;
 - ii. Notify the AZOPS, at least 20 days before the date of the tests, of the date and time scheduled for the laboratory tests;
 - iii. At the request of the AZOPS, ensure that a representative of the AZOPS is permitted to observe any or all of the tests;
 - iv. Ensure that the original test results are provided to the AZOPS by the independent laboratory within 30 days after the tests are completed; and
 - v. Pay for the independent laboratory testing; and
- 6. In determining an independent laboratory to perform testing required under subsection (P), the AZOPS shall:
 - a. Submit to at least three different independent laboratories written requests for bids to conduct the testing;
 - b. Consider each responding laboratory's qualifications to perform the testing, as demonstrated by:
 - i. Past experience in performing the required test or tests according to ASTM International standards; and
 - ii. Any recognition that a laboratory may have received from a national or international laboratory accreditation body, such as through a certification or accreditation process;
 - c. Wait to select an independent laboratory until:
 - i. The AZOPS has received written bids from at least three different independent laboratories; or
 - ii. Thirty days have passed since the date of the request for bids, whichever comes sooner; and
 - d. Select the independent laboratory that offers the optimum balance between cost and demonstrated ability to perform the required test or tests.
- Q.** An operator of a master meter system shall:
 1. Telephonically notify the AZOPS, at 602-262-5601 during normal working hours or at 602-252-4449 at all other times, at the earliest practicable moment following discovery of any of the following related to the operator's master meter system:
 - a. An event involving a release of gas from a pipeline, along with any of the following:
 - i. A death or personal injury requiring hospitalization;
 - ii. Injury to any individual resulting in the individual's loss of consciousness;
 - iii. Estimated property damage, including the value of all released gas, in excess of \$5,000;
 - iv. Unintentional estimated gas loss of 3 million cubic feet or more;

- v. An explosion or fire not intentionally set by the operator;
 - vi. A news media inquiry;
 - vii. An evacuation; or
 - viii. An outage;
- b. An event involving overpressure of a pipeline system where a pipeline operating at less than 12 PSIG exceeds MAOP by 50%, where a pipeline operating between 12 PSIG and 60 PSIG exceeds MAOP by 6 PSIG, or where a pipeline operating over 60 PSIG exceeds MAOP plus 10%;
 - c. An event involving permanent or temporary discontinuance of service to a master meter system or any portion of a master meter system due to a failure of a leak test or for any purpose other than to perform routine maintenance; or
 - d. An event that is significant, in the judgment of the operator, even though it does not meet any of the criteria listed in subsections (Q)(1)(a) through (c);
- 2. Include the following information in a telephonic report under subsection (Q)(1):
 - a. The names of the operator and the person making the report;
 - b. The job title of the person making the report;
 - c. The telephone numbers of the operator and the person making the report;
 - d. A description of the type and location of the event;
 - e. The time of the event;
 - f. The number of fatalities and personal injuries, if any; and
- g. All other significant facts that are known by the operator and are relevant to the cause of the event or the extent of the damages; and
- 3. Not later than April 15 of each year, submit to the AZOPS an annual report for the prior calendar year, completed on Commission Form MM-04: "Annual Report for Calendar Year 20___, Small Operators of Gas Distribution System," which is included herein as Exhibit A.
- R. The Commission may waive compliance with any of the requirements of this Section upon a finding that such a waiver is in the interest of public and pipeline safety.
 - S. To ensure compliance with all applicable provisions of this Article, the Commission or an authorized representative thereof may enter the premises of an operator of a master meter system to inspect and investigate the property, books, papers, electronic files, business methods, and affairs that pertain to the operation of the master meter system.

Historical Note

New Section R14-5-207 renumbered from Section R14-5-205 and amended by final rulemaking at 20 A.A.R. 75, effective December 16, 2013 (Supp. 13-4). Section R14-5-207 amended by emergency rulemaking at 22 A.A.R. 5, effective December 15, 2015 for 180 days (Supp. 15-4). Emergency renewed at 22 A.A.R. 1637, effective June 7, 2016 for 180 days (Supp. 16-2). Section amended by final rulemaking at 22 A.A.R. 2869, effective September 14, 2016 (Supp. 16-4). Amended by final rulemaking at 28 A.A.R. 1404 (June 17, 2002), effective July 24, 2022 (Supp. 22-2).

CATHODIC PROTECTION

SECTION/TAB # 10

TROUBLESHOOTING A CP SYSTEM

GALVANIC SYSTEM

A. IF PREVIOUSLY OPERATED SATISFACTORILY

1. TEST ALL INSULATORS
2. INVESTIGATE FOR FOREIGN CONTACTS
 - A. UNDERGROUND WATER LINES
 - B. UNDERGROUND CABLES
 - C. GROUND CONNECTIONS TO
POWER/TELEPHONE/TV CABLES
3. DISCONNECTED OR DEPLETED ANODES
 - A. CHECK ABOVE GROUND
CONNECTIONS
4. POSSIBILITY OF ABNORMAL DRY SOIL
CONDITIONS

B. IF NEVER OPERATED SATISFACTORILY

1. VERIFY ALL REQUIRED INSULATORS WERE
INSTALLED

2. VERIFY ALL POSSIBLE UNDERGROUND
CONTACTS HAVE BEEN REMOVED

3. REVIEW COATING QUALITY
 - A. IS COATING OF POOR QUALITY?
 - B. IF POOR QUALITY COATING,
ADDITIONAL ANODES MAY BE REQUIRED
 - C. POOR QUALITY COATING MAY MAKE IT
IMPRACTICAL TO USE GALVANIC ANODES

4. REVIEW ANODE INSTALLATION
 - A. ANODES PROPERLY SIZED, INSTALLED
AND CONNECTED?

 - B. SUFFICIENT ANODES INSTALLED?

GUIDELINE FOR MAGNESIUM ANODE INSTALLATIONS

The following information is a guideline only. There may be situations whereby magnesium anodes are not an effective means for the application of cathodic protection. Such situations would include soils with a high electrical resistance, piping that is not coated, or installed in a common trench and contacting other metallic facilities. When soil characteristics, coating condition or possible presence of numerous metallic contacts with other facilities are not known it may be desirable to engage persons that are qualified to make the necessary investigation.

Magnesium anodes can provide economical protection from corrosion on buried steel piping. They are most effective when the pipeline is relatively well coated and not in contact with other metallic facilities. Except for relative short sections of pipe (50' or less) it may not be effective or economical to protect bare (uncoated) piping using magnesium anodes. The presence or condition of the coating (if any) can be estimated by excavating the piping at several places. Suggested excavation locations might be piping "T's" and valve locations.

GENERAL INSTALLATION GUIDELINES

1. Above ground piping and all buried metallic piping must be electrically isolated from the piping planned for cathodic protection. This may be accomplished by installing dielectric unions or other fittings that have the capability to electrically isolate piping. All underground contacts with other metallic facilities must be eliminated for cathodic protection to be effective. Protective current intended for your facility will be received by the facility in contact with your line. This will result in unnecessary costs to protect your line. Underground contacts can be "cleared" by placing thick rubber gasket material, sections of a rubber tire or thick plastic materials between the two facilities to eliminate metal to metal contact.
2. Magnesium anodes are commonly packaged in a prepared backfill material and have 10' of # 12 insulated lead wire.
3. Long lengths of pipe (approximately 300' or more) will require multiple anodes. When possible it is desirable to install the anodes away from the ends of piping and equally spaced from each other when more than one is required.
4. Anodes may be positioned either vertically or horizontally however they should always be at least 1' from the piping and at or below the bottom of the piping. Prompt operation may be assisted by flooding the anodes with water prior to backfilling.
5. Thermite (cadweld) connections are strongly recommended to attach

the anode lead wire to the piping. The use of underground pipe clamps to attach anode leads may result in ineffective connections.

All anode lead connections and other damaged coating should be repaired prior to backfilling. A common method to coat anode lead connections and repair the pipe coating is use a plastic pipe wrapping tape. The procedure is to clean the pipe surface thoroughly, prime it with the recommended primer for that particular pipe wrap and then to securely wrap the pipe avoiding wrinkles and voids as much as possible.

The anode lead wire must have sufficient slack to protect it from soil settlement stress and other damage during backfilling.

6. Suggested anode spacing and sizes for coated pipe is:

0 to 5' lengths of 3/4" thru 4" pipe 1-1 lb.
(Such as steel risers in plastic pipe systems) anode

0 to 300' lengths of 3/4" thru 4" pipe 1-17 lb.
(position anode as near to pipe segment anode
mid-point as is possible)

Lengths greater than 300' should have an anode for each 300' of piping and spaced approximately 300' apart.

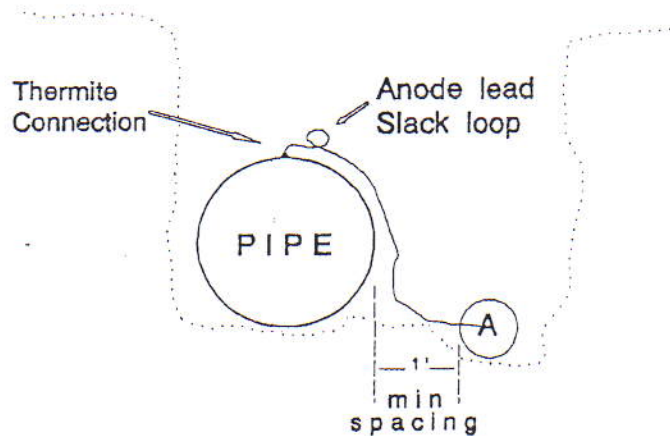
Note: Other sizes of anodes may be used however their life expectancy will be increased or decreased depending upon their size. A larger anode will last longer than a smaller one. The average life will vary however a 10 to 20 year life can be expected for a correctly sized anode.

P/S potential measurements should be made at locations as far distant as possible from the anode. Otherwise the readings may indicate adequate protection when the pipe distant from the anode is not protected.

TYPICAL MAGNESIUM ANODE INSTALLATION

1. Anode may be installed either vertical or horizontal, however it should be as deep as the bottom of the pipe. Always remove anode from paper sack. Avoid handling by the lead wire as they are easily damaged.
2. It is recommended that the underground anode lead wire to pipe connection be made using the thermite process (Cadweld).
3. Coat the anode lead connection and repair any coating damage present in the excavation. Use an approved pipe coating material such as plastic pipe wrap and the primer supplied with it.
4. Care should be taken to prevent the anode lead wire from being stressed or broken during backfilling operations.
5. The anode may be flooded with water prior to backfilling to help it begin operating.
6. Backfill anode with native soil, not sand or rocks.

Typical Anode Installation



CHAPTER III: CORROSION CONTROL

FEDERAL REQUIREMENTS

This chapter contains a simplified description of the corrosion control requirements contained in the pipeline safety regulations. The complete text of the corrosion control requirements can be found in 49 CFR Part 192.

NOTE: This chapter begins with a review of federal requirements. Readers with little or no experience in corrosion or cathodic protection may find it helpful to read the “Fundamentals of Corrosion” and “Principles and Practices of Cathodic Protection” sections of this Chapter before reading this section on federal requirements. In addition, an internet search for keyword “corrosion” will find several websites that discuss the basics of corrosion and corrosion control.

PROCEDURES AND QUALIFICATIONS

Operators must establish procedures to implement and maintain a corrosion control program for their piping system. These procedures should include design, installation, operation and maintenance of a cathodic protection system. A person qualified in pipeline corrosion control methods must carry out these procedures.

TECHNIQUES FOR COMPLIANCE

If the operator chooses to use a corrosion consultant, it is important to utilize one who is experienced with natural gas piping and the requirements of 49 CFR Part 192. The following is a list of sources where operators of small natural gas systems can find qualified personnel to develop and carry out a corrosion control program:

- There are many consultants and experts who specialize in cathodic protection. Many advertise in gas trade journals. A keyword search using an internet search engine may also provide references.
- Another source, especially for master meter operators, is an experienced corrosion engineer or technician working for a local gas utility company. Such experts may be able to implement cathodic protection for small operators, or refer them to local qualified corrosion control personnel.
- Operators of small municipal systems can contact the transmission company that supplies their gas. A municipal corrosion engineer or technician may be able to supply information as to where to find local qualified corrosion control personnel.
- Operators of small natural gas systems may encourage their respective trade associations (such as state and local mobile home associations or municipal associations) to gather and maintain records of available corrosion consultants or contractors who are qualified in their specific region.

- The local chapter of “NACE International” (National Association of Corrosion Engineers) may be able to provide useful information.
- Operators who are unsure of a consultant’s qualification in corrosion control should request references from the consultant and contact gas pipeline operators who have hired the consultant in the past. Ask if the consultant is NACE-certified or equivalent.

CORROSION CONTROL REQUIREMENTS FOR PIPELINES INSTALLED AFTER JULY 31, 1971

All buried metallic pipe installed after July 31, 1971, must be properly coated and have a cathodic protection system designed to protect the pipe in its entirety.

Newly constructed metallic pipelines must be coated before installation and must have a cathodic protection system. While the regulations require that cathodic protection system be installed and placed in operation in its entirety within one year after construction of the pipeline, it is recommended that it be installed and operating as soon as possible. However, if the operator can demonstrate by tests, investigation, or experience in the area of application, including, as a minimum, soil resistivity measurements and tests for corrosion accelerating bacteria, that a corrosive environment does not exist, a very rare situation, no cathodic protection is required. OPS recommends that all operators of small natural gas systems coat and cathodically protect all new metallic pipe. It is extremely difficult and costly to prove that a noncorrosive environment exists.

Cathodic protection requirements do not apply to electrically isolated, metal alloy fittings in plastic pipelines if the metal alloy used for the fitting provides corrosion control and if corrosion pitting will not cause leakage.

CORROSION CONTROL REQUIREMENTS FOR PIPELINES INSTALLED BEFORE AUGUST 1, 1971

Metallic pipelines installed before August 1, 1971, (bare pipe or coated pipe), must be cathodically protected in areas that are determined to be experiencing active corrosion. All underground natural gas distribution systems, including underground piping related to regulating and measuring stations, must be cathodically protected in areas of active corrosion.

The operator must determine areas of active corrosion by (a) electrical survey, (b) where electrical survey is impractical, by the study of corrosion and leak history records, or (c) by leak detection surveys. Active corrosion means continuing corrosion, which, unless controlled, could result in a condition that is detrimental to public safety.

As a guideline for operators when determining corrosion to be detrimental to public safety (active corrosion), OPS recommends the following:

- For master meter operators and small municipal gas systems, all continuing corrosion occurring on metallic pipes (other than cast iron or ductile iron pipes) should be considered active and pipes should be cathodically protected, repaired, or replaced.

- OPS recommends that operators of small gas systems and their consultants use the following guidelines in determining where it is impractical to do electrical surveys to find areas of active corrosion where:
 1. The pipeline is covered by concrete or paving and is more than 2 feet from the edge of a paved street or within wall to wall pavement areas.
 2. The pipelines in a common trench with other metallic structures.
 3. Stray earth gradient currents exist (due to telluric currents, iron ore deposits, a.c. induction, and other sources).
 4. There is lack of electrical continuity of the gas facility.
 5. Pavement and congestion prevents ready access to the soil around the pipe.
 6. Facilities are not electrically isolated, are often in direct contact with other metallic structures or in indirect contact.
 7. Current may be shielded by nearby objects close to the pipeline.
 8. Current can be picked up by nearby conducting elements such as casings, parallel or crossing lines, scrap metal, or other foreign objects.
 9. Insufficient history and details of facilities exist.
 10. There is extremely dry soil.
 11. There are adjacent underground facilities.

In areas where electrical surveys cannot be used to determine corrosion, the operator should perform leakage surveys on a more frequent basis. Although the regulations require the survey at least every 3 years, OPS recommends that these surveys be run at least once a year.

Electrical surveys to find active corrosion must be performed by a person qualified in pipeline corrosion control methods.

COATING REQUIREMENTS

All metallic pipe installed below ground, as a new or replacement pipeline system, should be coated in its entirety (APPENDIX B, FORM 1). Types of coatings and handling practices are discussed later in this chapter. For aboveground metallic pipe, see “Atmospheric Corrosion” below.

EXAMINATION OF EXPOSED PIPE

Whenever buried pipe is exposed or dug up, the operator is required to examine the exposed portion of the pipe for evidence of corrosion on bare pipe or for deterioration of the coating on coated pipe. A record of this examination must be maintained. If the coating has deteriorated or the bare pipe has evidence of corrosion, remedial action must be taken. The excavation must be widened to expose more pipe to determine if that pipe also requires remedial action. The operator must continue to expose pipe until pipe not requiring remedial action is uncovered. (APPENDIX B, FORM 1).

CRITERIA FOR CATHODIC PROTECTION

Operators must meet one of five criteria listed in Appendix D of 49 CFR Part 192, to comply with the pipeline safety regulations for cathodic protection. This is discussed later in this chapter.

MONITORING

A piping system that is under cathodic protection must be monitored. Tests for effectiveness of cathodic protection must be performed at least once every year, not to exceed 15 months between tests. Records of this monitoring must be maintained (APPENDIX B, FORM 14).

Short, separately protected service lines or short, protected mains (not over 100 feet in length) may be surveyed on a sampling basis. At least 10 percent of these short sections and services must be checked each year so that all short sections in the system are tested in a 10-year period. Examples of short, separately protected pipe in a small natural gas system would be:

- Steel service lines connected to, but electrically isolated from, cast iron mains.
- Steel service risers that have cathodic protection provided by an anode attached to a riser that is installed on plastic service lines.

OPS recommends, if a small number of isolated protection sections of pipeline exist in the system, that the operator include all sections in the annual survey. If there are a considerable number, they can be sampled at a rate of 10% per year, but this 10% sample must be distributed all over the system.

When using rectifiers to provide cathodic protection, each rectifier must be inspected six times every year to ensure that the rectifier(s) is properly operating. The interval between inspections must not exceed 2½ months. Records of these inspections must be maintained (APPENDIX B, FORM 15).

Operators must take prompt action to correct any deficiencies indicated by the monitoring.

ELECTRICAL ISOLATION

Pipelines must be electrically isolated from other underground metallic structures (unless electrically interconnected and cathodically protected as a single unit). For illustrations of where meter sets are commonly electrically insulated, see FIGURES 8, 13 and 14 in this chapter.

TEST POINTS

Each pipeline under cathodic protection must have sufficient test points for electrical measurement to determine the adequacy of cathodic protection. Test points should be shown on a cathodic protection system map. Some typical test point locations include the following.

- (a) Meter risers,
- (b) Pipe casing installations,
- (c) Foreign metallic structure crossings,

- (d) Insulating joints,
- (e) Road crossings.

INTERNAL CORROSION INSPECTION

Whenever a section of pipe is removed from the system, the internal surface must be inspected for evidence of corrosion. Remedial steps must be taken if internal corrosion is found. Adjacent pipe must be inspected to determine the extent of internal corrosion. Records of these inspections must be maintained (APPENDIX B, FORM 1).

ATMOSPHERIC CORROSION

Newly installed aboveground pipelines must be cleaned and coated or jacketed with a material suitable to prevent atmospheric corrosion. Aboveground pipe, including meters, regulators and measuring stations, must be inspected for atmospheric corrosion at least once every three years, not to exceed 39 months between inspections. Remedial action must be taken if atmospheric corrosion is found. Records of these inspections must be maintained (APPENDIX B, FORM 13).

REMEDIAL MEASURES

All steel pipe used to replace an existing pipe must be coated and cathodically protected. Each segment of pipe that is repaired because of corrosion leaks must be cathodically protected. The new segment should be insulated from any of the existing pipe that will not also be cathodically-protected.

GRAPHITIZATION OF CAST IRON

Cast iron is an alloy of iron and carbon (graphite). Graphitization is the process by which the iron in cast iron pipe corrodes, leaving a brittle sponge-like structure of graphite flakes. There may be no appearance of damage, but the affected area of the pipe becomes brittle. For example, a completely graphitized buried cast iron pipe may hold gas under pressure but will fracture under a minor impact, such as being hit by a workman's shovel.

Each segment of cast iron or ductile iron pipe with graphitization (to a degree where a fracture or any leakage might result) must be replaced with steel or plastic and may not be replaced with cast, wrought, or ductile iron. Among other factors, pipeline age and material are significant risk indicators. Pipelines constructed of cast and wrought iron, as well as bare steel, are among those pipelines that pose the highest-risk to safety and should be considered for replacement.

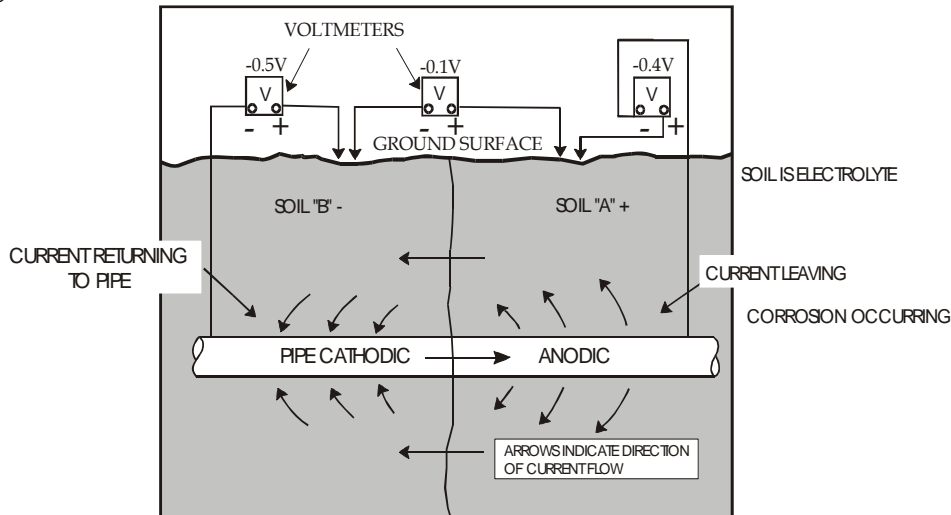
RECORDS

Operators must maintain records or maps of their cathodic protection system. Records of all tests, surveys, or inspections required by the pipeline safety code must be maintained. See APPENDIX B for samples of records/forms.

FUNDAMENTALS OF CORROSION

Corrosion is the deterioration of metal pipe caused by a reaction between the metallic pipe and its surroundings. As a result, the pipe deteriorates and may eventually leak. In order for corrosion to occur there must be four parts: An electrolyte, anode, cathode, and a metallic return path. A metal will corrode at the point where current leaves the anode (see FIGURE III-1). NOTE: Some soils may create an environment that enhances corrosion.

Figure III-1: Corrosion Cell



A corrosion cell may be described as follows:

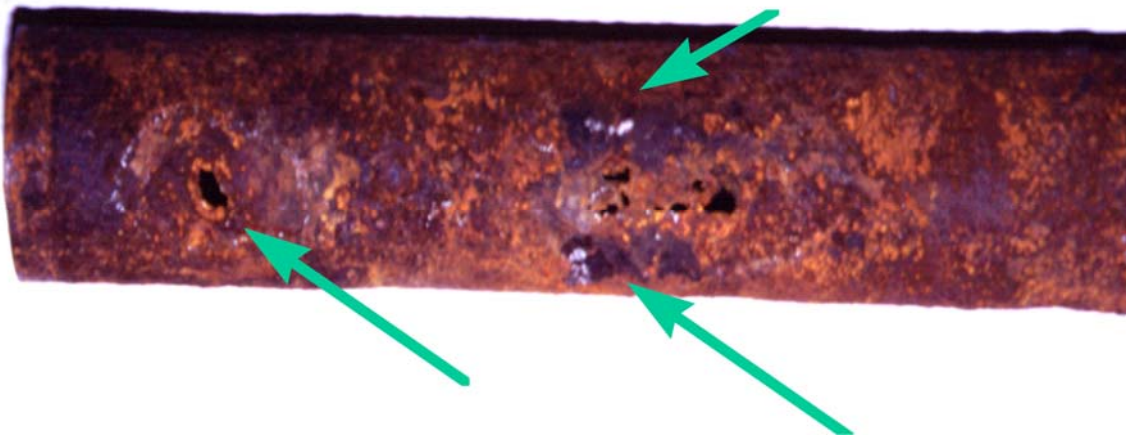
- Electrical current flows through the soil (electrolyte) from the anode to the cathode. It returns to the anode through the return circuit (the pipe).
- Corrosion occurs wherever current leaves the metal (pipe, fitting, etc.) and enters the soil. The area where current leaves the pipe is said to be anodic. Corrosion, therefore, occurs in the anodic area.
- Current returns to the pipe at the cathode. No corrosion occurs here. The cathode is protected against corrosion.
- The flow of current is caused by a potential (voltage) difference between the anode and the cathode.

PRINCIPLES AND PRACTICES OF CATHODIC PROTECTION

This section gives operators with little or no experience in cathodic protection a review of the general principles and practices of cathodic protection. Common causes of corrosion, types of pipe coatings, and criteria for cathodic protection are among the topics. A checklist of steps which an operator of a small natural gas system may use to determine the need for cathodic protection is included. Basic definitions and illustrations are used to clarify the subject. This section does not go into great depth. Therefore, reading this section alone will not qualify an operator to design and implement cathodic protection systems or programs.

Although corrosion cannot be totally eliminated, it can be substantially reduced with cathodic protection (see FIGURE III-2).

Figure III-2 Bare Pipe - not under cathodic protection

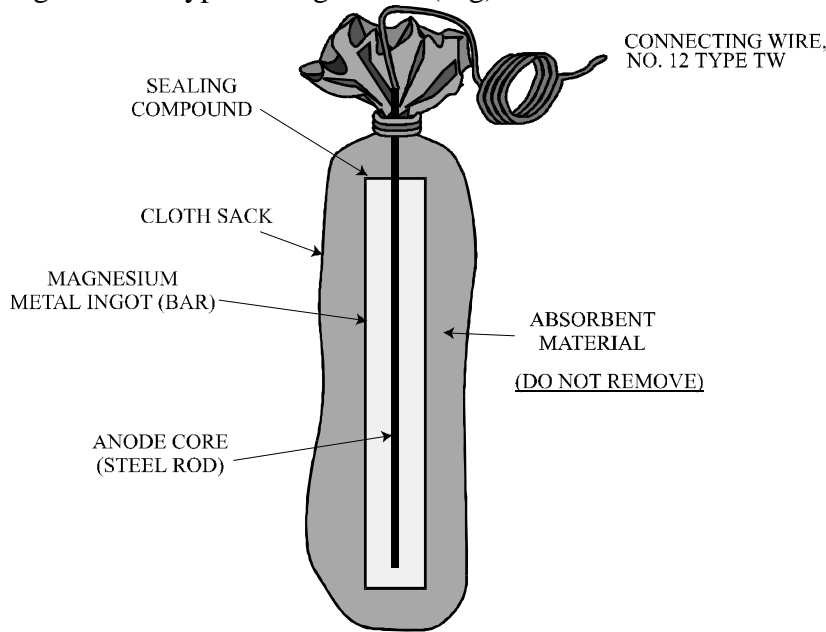


An example of bare steel pipe installed for gas service. Note that deep corrosion pits have formed. Operators should never install bare steel pipe underground. For both new and replacement pipe operators should use either polyethylene pipe manufactured according to ASTM standard D2513 or steel pipe that is coated and cathodically protected.

Cathodic protection is a process that protects an underground metallic pipe against corrosion. An electrical current is impressed onto the pipe by means of a sacrificial anode or a rectifier. Corrosion will be reduced where sufficient current flows onto the pipe.

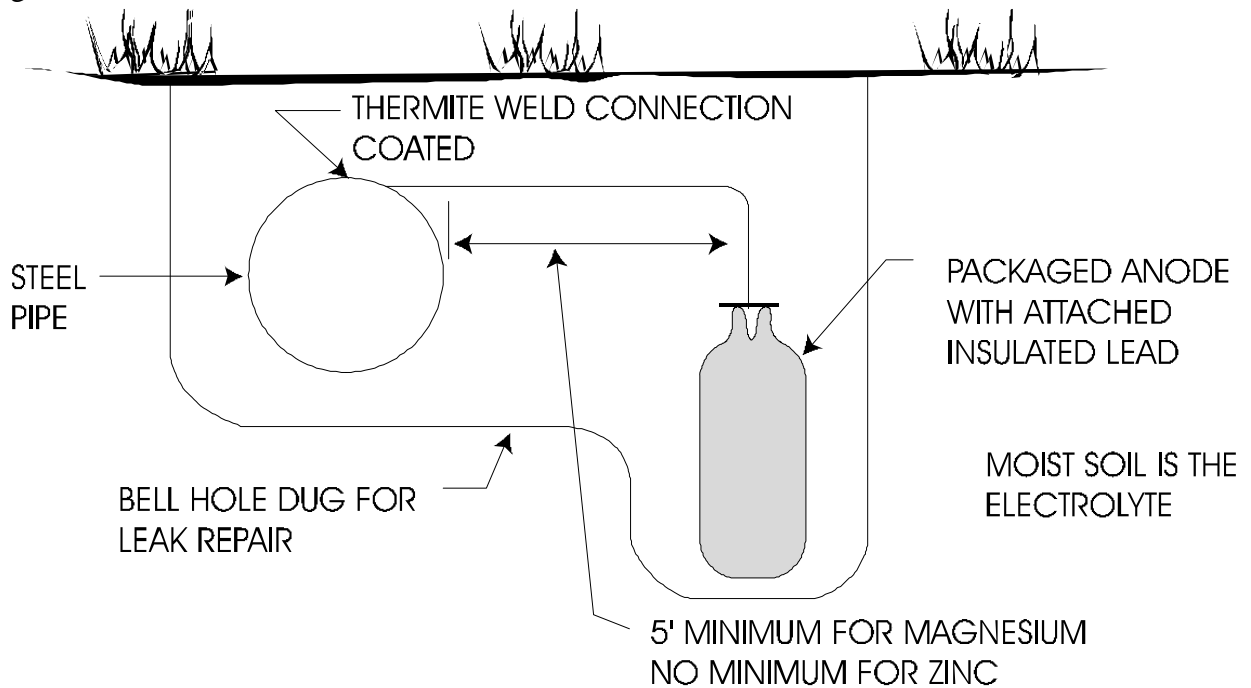
Anode (sacrificial) is an assembly consisting of a bag usually containing a magnesium or zinc ingot and other chemicals, which is connected by wire to an underground metal piping system. It functions as a battery that impresses a direct current on the piping system to retard corrosion (see FIGURE III-3).

Figure III-3 Typical Magnesium (Mg) Anode



Sacrificial protection means the reduction 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 III-4). The magnesium or zinc will sacrifice itself (corrode) to retard corrosion in steel the pipe.

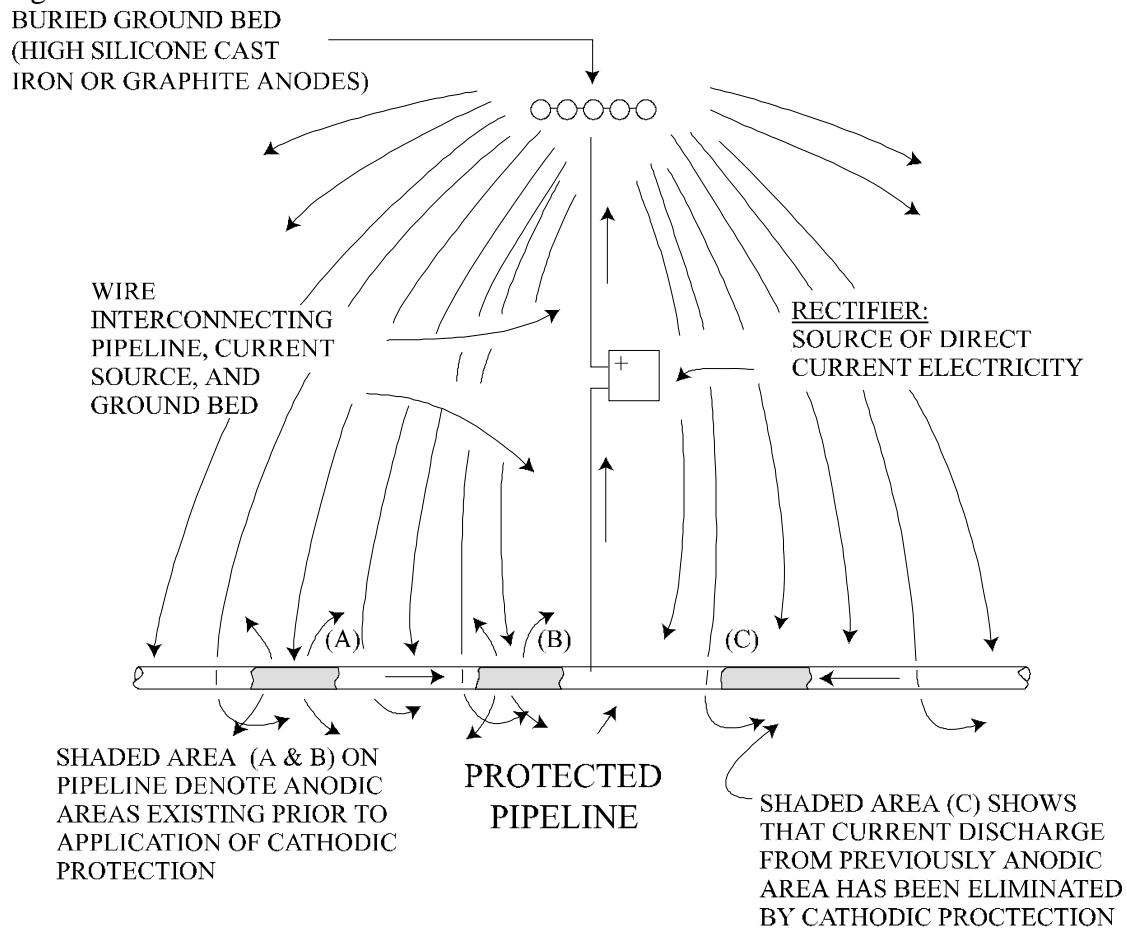
Figure III-4



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

Rectifier is an electrical device that 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 III-5).

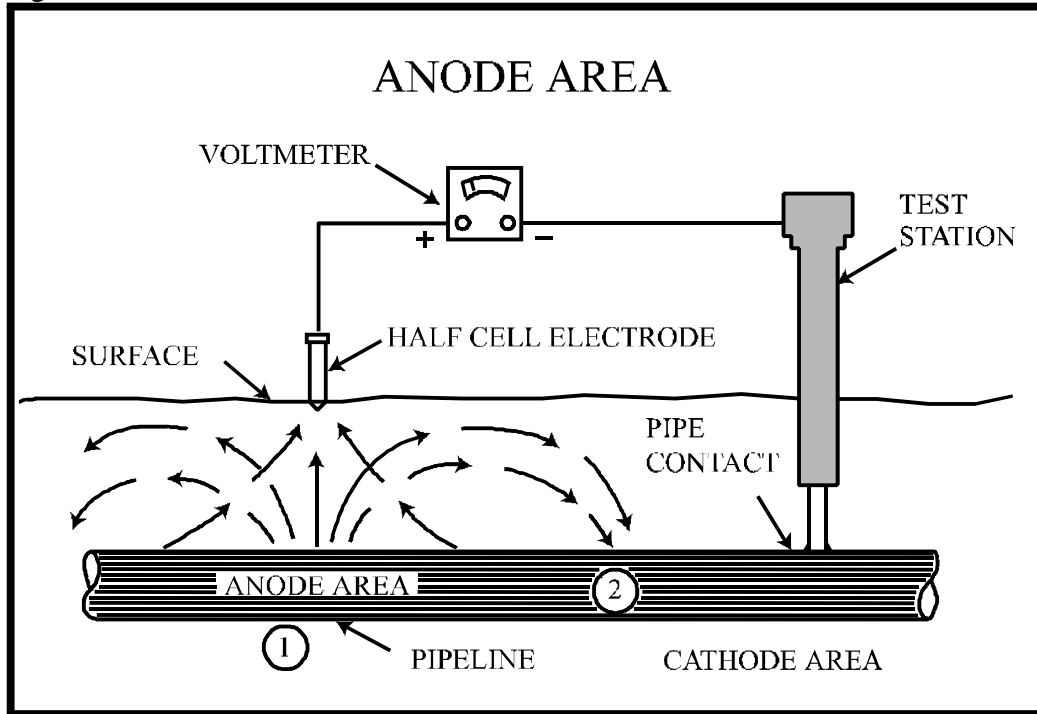
Figure III-5



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 the reverse occurs (positive terminal to pipe), the pipe will corrode much faster.

Potential means the difference in voltage between two points of measurement (see FIGURE III-6).

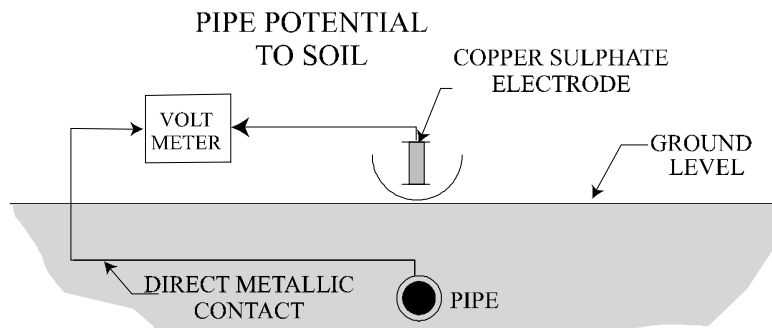
Figure III-6



The voltage potential in this example 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 an electrode made up of copper immersed in copper-copper sulfate (Cu-CuSO_4).

Pipe-to-soil potential is the potential difference (voltage reading) between a buried metallic structure (piping system) and the soil surface. The difference is measured with a half-cell reference electrode (see definition of reference electrode that follows) in contact with the soil (see FIGURE III-7).

Figure III-7

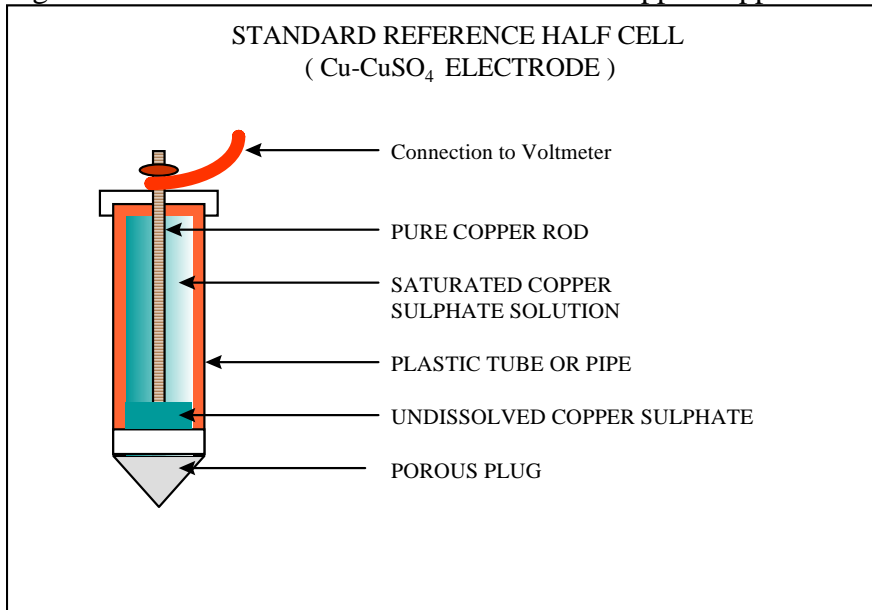


1. INVESTIGATE CORROSIVE CONDITIONS.
2. EVALUATE THE EXTENT OF CATHODIC PROTECTION

If the voltmeter reads at least -0.85 volt, the operator can usually consider that the steel pipe has cathodic protection. **NOTE:** Be sure to take into consideration the voltage (IR).

Reference electrode (commonly called a half-cell) is a device which usually has copper immersed in a copper sulfate solution. The open circuit potential is constant under similar conditions of measurement (see FIGURE III-8).

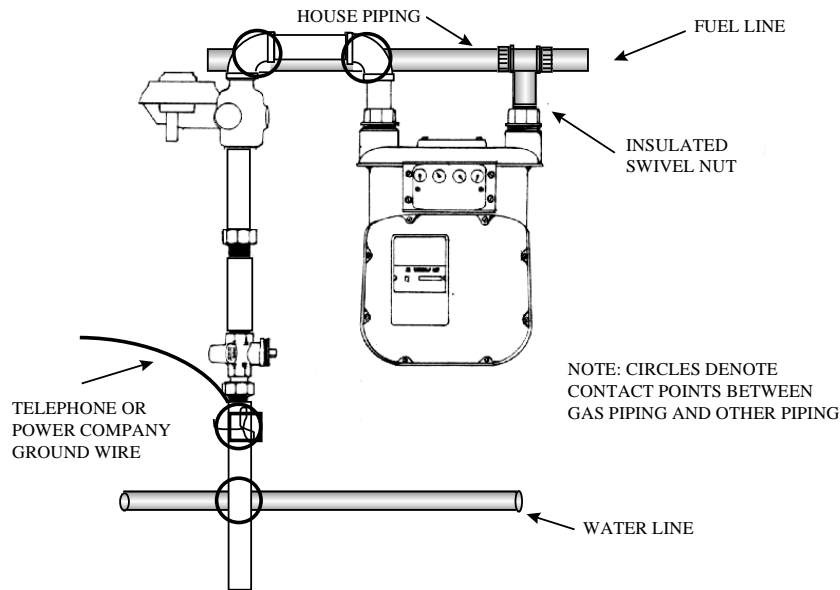
Figure III-8 Reference Electrode – A saturated copper-copper sulfate half-cell.



(Caution Copper-Copper Sulfate is Poisonous)

Short or corrosion fault means an unintended contact between a cathodically protected section of a piping system and other metallic structures (water pipes, buried tanks, or unprotected section of a gas piping system) (see FIGURE III-9). Shorts can divert cathodic protection current off of the gas piping and onto these other metallic structures, which can result in inadequate cathodic protection on the gas pipe and premature wearing out of sacrificial anodes.

Figure III-9 Typical Meter Installation Accidental Contacts
(Meter Insulator Shorted Out by House Piping, etc.)



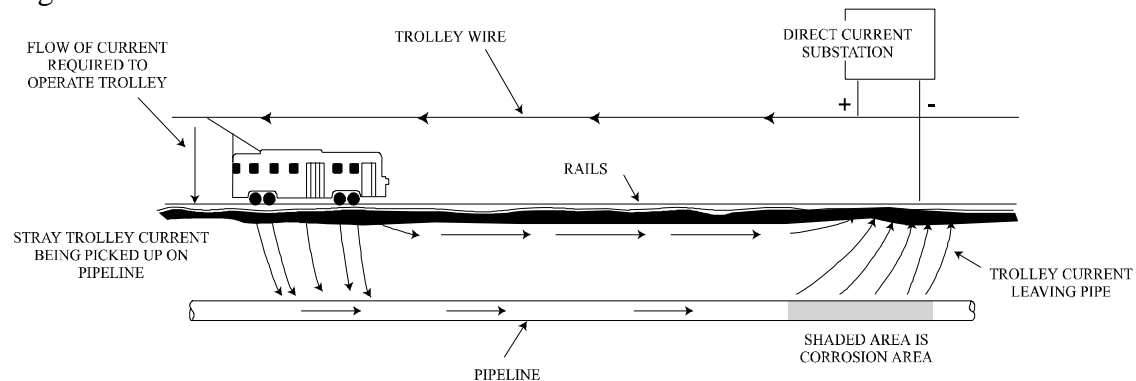
Unshaded piping shows operator's piping from service entry to meter insulator at location shown on sketch above. Shaded areas show house piping, electrical cables, etc.

The circled locations are typical points where the Operators piping (unshaded) can come in contact with house piping. This causes shorting out or "bypassing" of 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 the aboveground piping cannot be moved, 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 III-10). If your pipe-to-soil readings fluctuate, stray current may be present.

Figure III-10




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. affecting the pipeline.

Galvanic series is a list of metals and alloys arranged according to their relative potentials in a given environment (see Table 1).

Galvanic corrosion occurs when any two of the metals in TABLE 1 (next page) are connected in an electrolyte (soil). Galvanic corrosion is caused by the different potentials of the two metals.

Table 1: Galvanic Series

METAL	POTENTIAL (VOLTS)		
Commercially pure magnesium	-1.75	<div style="display: flex; align-items: center; justify-content: center;"> Anodic  </div>	
Magnesium alloy (6% Al, 3% Zn, 0.15% Mn)	-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 (rusty)	-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 in natural soils and water, measured with respect to a copper-copper sulfate reference electrode.

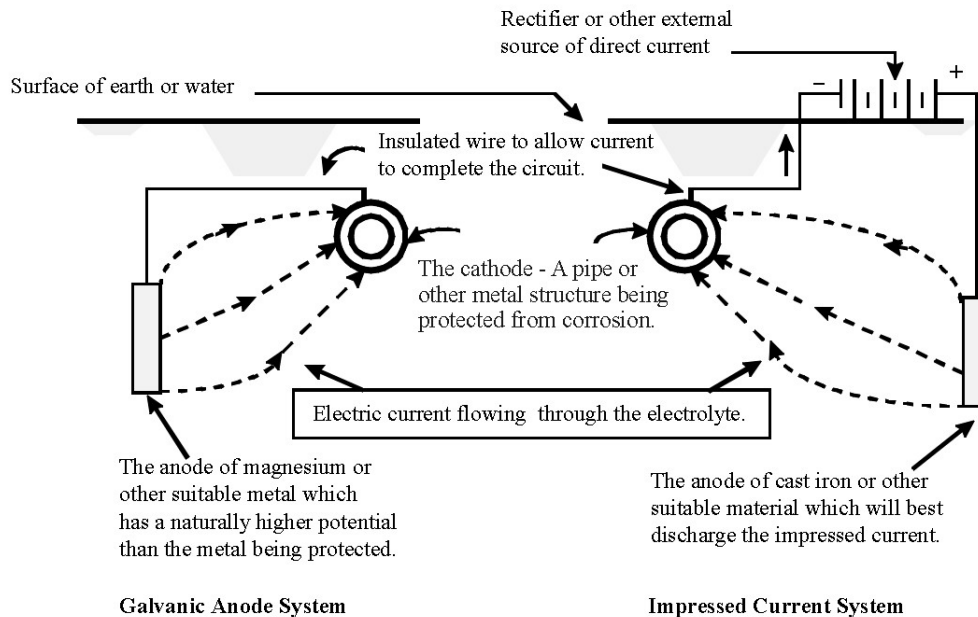
When electrically connected in an electrolyte, any metal in the table will be anodic (corrode relative to) to any metal below it. That is, the more anodic metal sacrifices itself to protect the metal (pipe) lower in the table.)

TYPES OF CATHODIC PROTECTION

There are two basic methods of cathodic protection: the galvanic (sacrificial) anode system and the impressed current (rectifier) system.

The preferred method of cathodic protection, when its application is reasonable, is an impressed current system. In other cases, galvanic anodes are used to provide cathodic protection on gas distribution systems. (see FIGURE III-11).

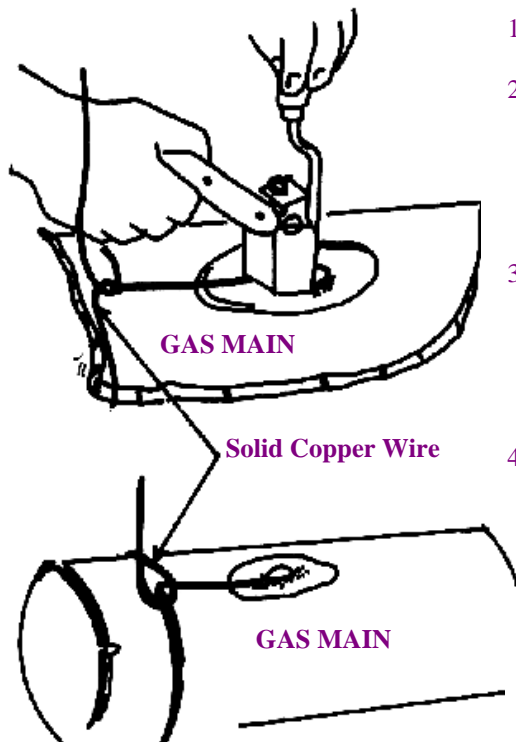
Figure III-11



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

Galvanic Anode System. Anodes are "sized" to meet current requirements of the resistivity of the environment (soil). The surface area of the buried steel and estimated anode life determines the size and number of anodes required. Anodes are made of materials such as magnesium (Mg), zinc (Zn), or aluminum (Al). They are usually installed near the pipe and connected to the pipe with an insulated wire. They are sacrificed (corroded) instead of the pipe (see FIGURES III-4, III-11, AND III-12).

Figure III-12 Typical Procedure For Installing A Magnesium Anode By The Thermo-Weld Process



1. Loop wire as shown to avoid strain on bond.
2. Insert conductor in mold-do not push end of conductor past center of tap hole. Drop metal disc over tap hole. Remove all starting power from cartridge by tapping the inverted cartridge on lip of mold.
3. Close cover, hold mold steady. Ignite starting power with flint gun as shown. When powder fires, remove gun immediately. Hold mold steady for 10 seconds. Remove slag from weld.
4. See the manufacturer's recommendation before proceeding.

After welding, all exposed pipe should be well coated and wrapped.

Impressed Current Systems. Anodes are connected to a direct current source, such as a rectifier or generator. The principle is the same except that the anodes are made of materials such as graphite, high silicon cast iron, lead-silver alloy, platinum, or scrap steel and the cathodic protection voltage and current is provided by the rectifier or generator rather than the difference in potential between the pipe and the anode.

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. Determine the date the gas system was installed (steel pipe installed after July 1, 1971, must be cathodically protected in its entirety).
Who installed pipe? By contacting the contractor and other operators who had pipe installed by same contractor, operators may be able to obtain valuable information, such as:
 - 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. Even if drawings are available, a metallic pipe locator should be used.
4. Before the corrosion consultant 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 III-13).

5. Contact a corrosion consultant or consulting firm that is experienced in gas pipelines and the requirements of 49 CFR Part 192. Try to complete steps 1 through 4 before contracting a consultant.
6. Use of Consultant -- A sample method, which may be used by a consultant to determine cathodic protection needs, is provided below:
 - 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 (see below for a discussion of testing insulation).
 - 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 will vary for each gas system.Remember to retain copies of all tests run by the corrosion consultant.
7. Cathodic Protection Design -- The experienced corrosion consultant, will design a cathodic protection system based on the results of testing, that best suits the gas piping system.

Figure III-13: Places where a meter installation may be electrically isolated.

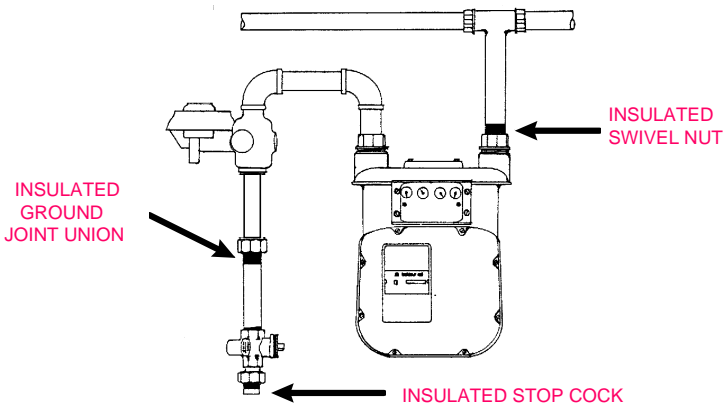


Figure III-14

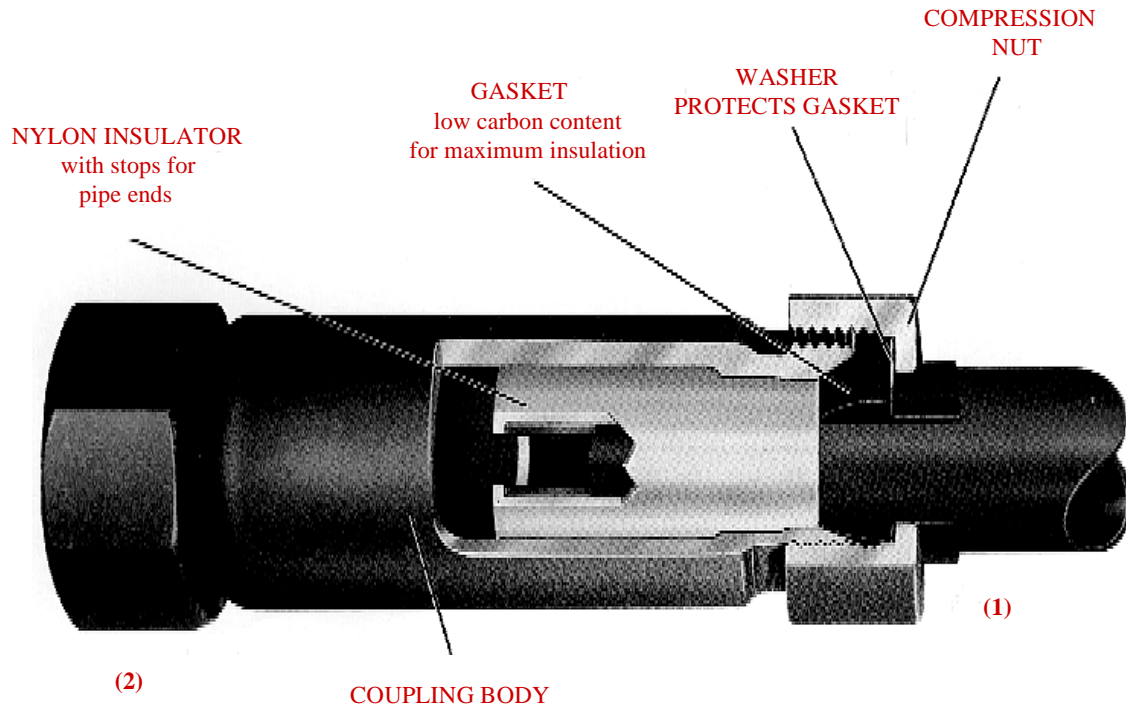
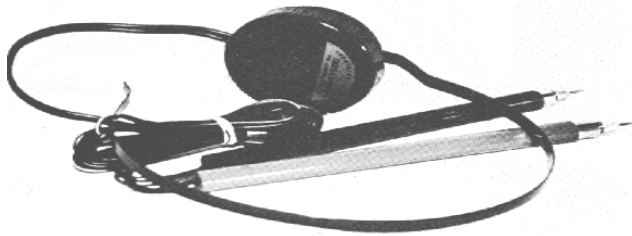


Illustration of an insulated compression coupling used on meter sets to protect against corrosion. Pipe connection by this union will be electrically insulated between the piping located on side one (1) and the piping located on side two (2).

Figure III-15: Insulation Tester



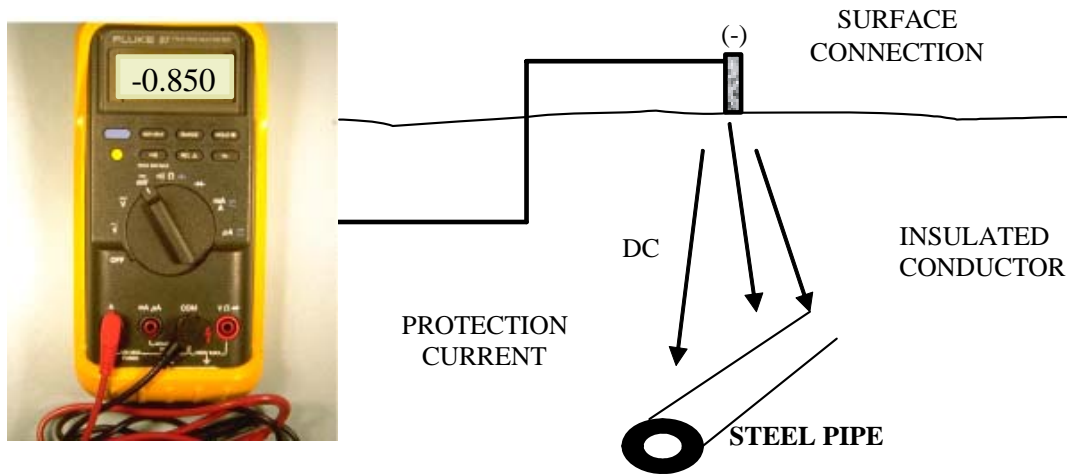
This insulation tester consists of a magnetic transducer mounted in a single earphone headset with connecting needlepoint contact probes. It is a "go" or "no go" type tester which operates from low voltage current present on all underground piping systems, thus eliminating the necessity of outside power sources or costly instrumentation and complex connections. By placing the test probes on the metallic surface on either side of the insulator a distinct audible tone will be heard if the insulator is performing properly. The absence of an audible tone indicates a faulty insulator. Insulator effectiveness can be determined quickly using this simple, easy-to-operate tester.

CRITERIA FOR CATHODIC PROTECTION

There are five criteria listed in Appendix D of Part 192, to qualify a pipeline as being cathodically protected. Operators can meet the requirements of any one of the five to be in compliance with the pipeline safety regulations. Most systems will be designed to Criterion 1.

Criterion 1: With the protective current applied, a voltage of at least -0.85 volt measured between the pipeline and a saturated copper-copper sulfate half-cell. This measurement is called the pipe-to-soil potential reading (see FIGURE III-16). IR drop must be considered.

Figure III-16 Pipe-to-Soil Potential Reading.



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 -0.85 volt or more negatively, the operator knows that the 850 mv criteria is met at that location. If not, remedial action must be taken promptly. **NOTE:** Be sure to take into consideration the IR drop.

IR drop is a phenomenon that occurs when trying to check or conduct test to determine if the pipeline is being cathodically protected. When a reading is taken, the readings may appear to show that the pipeline is cathodically protected, but in actuality, the pipeline might not be protected. Each operator must take IR drop into account to ensure that the pipeline is really being protected.

To consider IR drop:

- For pipeline systems protected by a rectifier, the current is turned off while taking a reading and the “off” reading is considered to be the correct reading.
- For pipeline systems protected by magnesium anodes your corrosion consultant can determine how best to consider IR drop.

COATINGS

Coatings are used to electrically insulate the pipe from the electrolyte (soil), preventing the electrical flow that causes corrosion. Prior to July 1, 1971, metallic pipe could be installed without a coating. Any steel pipe installed since then must be coated. There are many different types of coating on the market. The better the coating application, the less 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 select the best coating for a natural gas system. A local natural gas utility may be able to give master meter operators the name and location of nearby suppliers of mill coated gas pipe. When purchasing steel pipe, remember 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

Special tape materials designed for pipe coating are available. 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.

Some tapes in use today are:

- Polyethylene (PE) and Polyvinyl chloride (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 a pipe supplier before purchasing tapes. Tapes must be compatible with the mill coating on the pipe. Household tape, masking tape, duct tape and other general purpose tapes are not suitable for pipe coating repairs.

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 be followed precisely. Corrosion may occur 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),
- Properly apply the 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 with material that is free of objects such as rocks or debris capable of damaging the coating. Severe coating damage can be caused by careless backfilling when rocks and debris strike and break the coating.

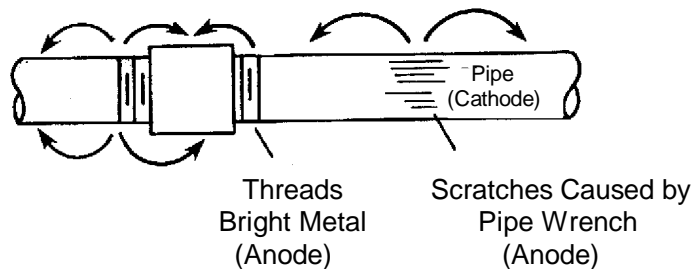
COMMON CAUSES OF CORROSION IN GAS PIPING SYSTEMS

Figure III-17 Shorted Meter Set.



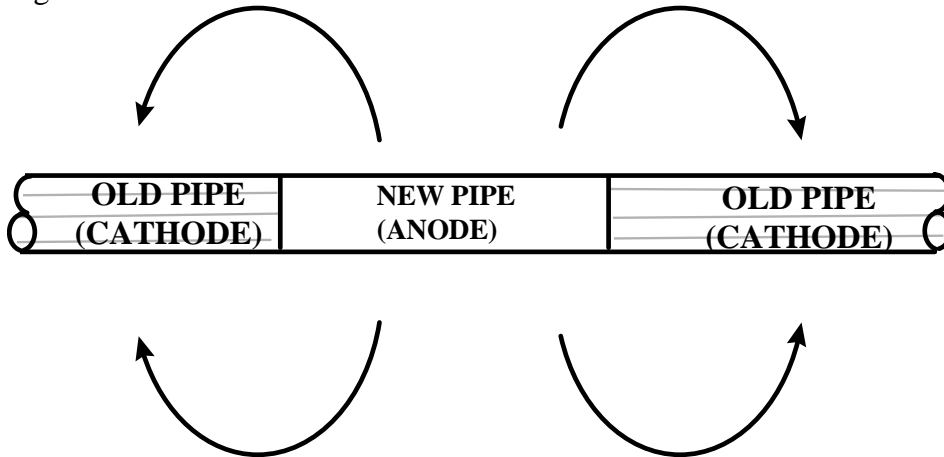
An example of a galvanic corrosion cell. The tenants of this building have "shorted" out this meter by storing metallic objects on the meter set. Never allow customers or tenants to store material on or near a meter installation. Also, do not allow clotheslines, fences, tools or other items to hang on meter installations as they may cause damage to the pipeline.

Figure III-18 Corrosion Caused by Dissimilar Surface Conditions.



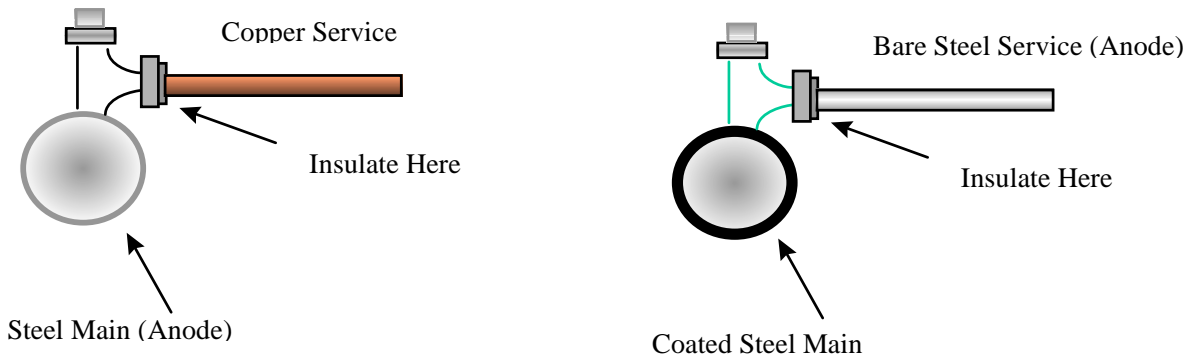
This pipe will corrode at the threads or where it is scratched. Remember to repair all cuts or scratches in the coating before burying the pipe. Always coat and/or wrap pipe at all threaded or weld connections before burying pipe.

Figure III-19 Galvanic Corrosion



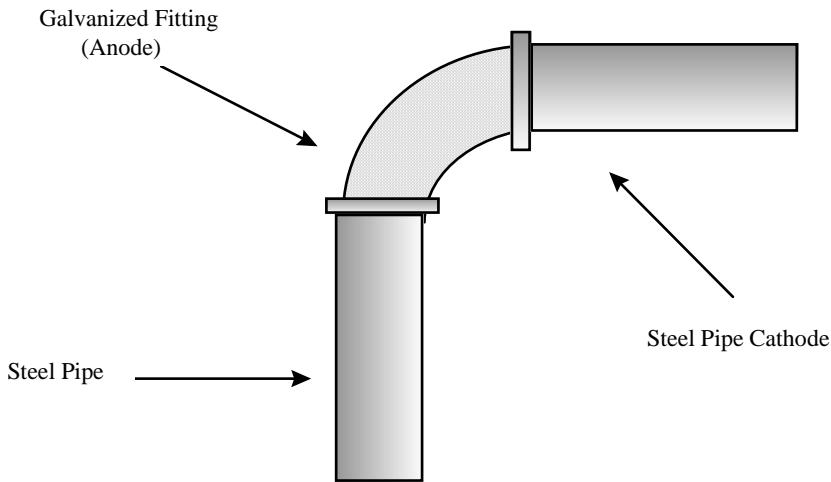
Remember, all new steel pipe must be coated and cathodically protected. The new pipe can either be electrically isolated from old pipe, or both the new and old pipe must be cathodically protected as a unit.

Figure III-20 Galvanic Corrosion Caused by Dissimilar Metals.



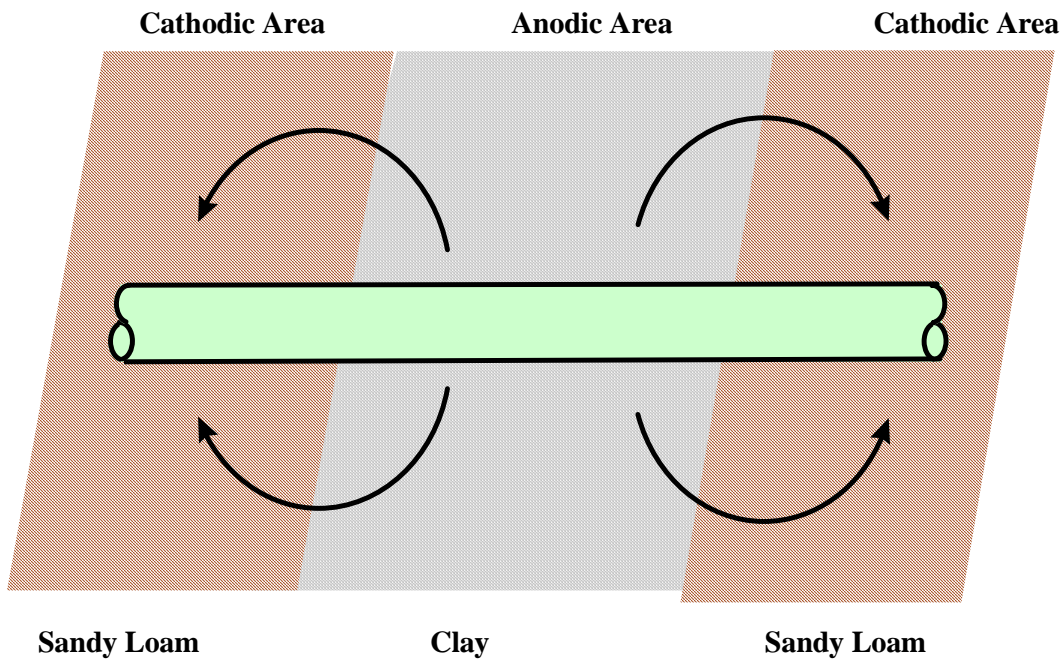
Steel is above copper in the galvanic series in TABLE 1 of this chapter. Therefore, steel will be anodic to the copper service. That means the steel pipe will corrode. The copper service should be electrically isolated from the steel main. Remember, steel and cast iron or ductile iron should be electrically isolated rather than tied in directly. Also, coated steel pipe should be electrically isolated from bare steel pipe.

Figure III-21 Galvanic Corrosion



The galvanized elbow will act as an anode to steel and will corrode. Do not install galvanized pipe or fittings in system, if possible.

Figure III-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 III-23 Poor Construction Practice



Figure III-23 shows an example of a main which was buried without a coating or wrapping at the service connection. This corrosion problem could have been avoided by properly coating and cathodically protecting the pipe.

Figure III-24 Atmospheric Corrosion



Atmospheric corrosion at a meter riser, as shown above, can be prevented by either jacketing the exposed pipe or by keeping it properly painted. Corrosion is usually more severe at the point where the pipe comes out of the ground. Similar corrosion can occur anywhere pipe comes aboveground, such as regulator or metering stations.

PHYSICAL PROPERTIES

SECTION/TAB # 11

PHYSICAL PROPERTIES OF SELECTED EXPLOSIVE LIQUIDS AND GASSES

MATERIAL	CHEMICAL FORMULA	SPECIFIC GRAVITY AIR = 1	IGNITION TEMP °F IN AIR	FLAMABILITY LIMITS IN AIR	
				LOWER	UPPER
Methane	CH ₄	.55	1193°	5	15.0
Natural Gas	Blend	.65	1163°	4.5	14.5
Ethane	C ₂ H ₆	1.04	993 - 1101°	3.0	12.5
Propane	C ₃ H ₈	1.56	957 - 1090°	2.2	9.5
Butane	C ₄ H ₁₀	2.01	912 - 1056°	1.9	8.5
Toluene	C ₇ H ₈	3.14	1026 - 1031°	1.3	6.7
Gasoline	Blend	3.40	632°	1.4	7.6
Acetone	C ₃ HO	2.0	1042°	2.6	12.8
Benzene	C ₆ H ₆	2.77	968°	1.4	6.7
Carbon Monoxide	CO	.97	1191 - 1216°	12.5	74.0
Hydrogen	H ₂	.07	1076 - 1094°	4.0	75.0
Hydrogen Sulfide	H ₂ S	1.18	655 - 714°	4.3	45.0

**INTRODUCTION
TO NATURAL
GAS PIPELINE
SAFETY ACT**

SECTION/TAB # 12

INTRODUCTION

The Natural Gas Pipeline 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 became effective in 1970 and the Materials Transportation Bureau of DOT is charged with their enforcement. They are published in Title 49, Code of Federal Regulations, Parts 190, 191, and 192.

This pipeline safety code applies to:

- gas utilities (private, public, and municipal),
- operators of housing developments and mobile home parks served by natural gas master meters,
- liquefied petroleum gas (LP-Gas) systems that supply **ten or more** customers from a single source, and
- any portion of a LP-Gas system located in a public place.

This pipeline safety code says that operators of all gas systems must:

- deliver gas safely and reliably to customers,
- provide training and written instruction for employees,
- establish written procedures to minimize the hazards resulting from gas pipeline emergencies, and
- keep records of inspection and testing.

It is very important that you meet your responsibilities under the code because operators who do not comply may be subject to civil penalties, compliance orders, or both. If the hazards warrant it, a "Hazardous Facility Order" may be issued that could shut down your system.

In some cases state agencies have assumed the responsibility for enforcing pipeline safety standards for operators within their state. The state agency is allowed to adopt additional or more stringent safety standards for intrastate pipeline transportation as long as such standards are compatible with the federal minimum standards. If a state agency has not taken safety jurisdiction over an intrastate operator, the federal government retains jurisdiction.

To understand this manual, you will need to know the meaning of some commonly used terms in the natural gas and LP-Gas industry. Look over this list and read carefully any definition of a word when you may not be sure of its meaning.

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

NATURAL GAS is a non-toxic, colorless fuel, about one third lighter than air, Gas burns only when mixed with air in the right proportion and ignited by a spark or flame. Gas, in its natural state, may not have an odor.

LIQUEFIED PETROLEUM GAS (LP-GAS or LPG) is gas in a liquid state in the supply tank, but it is vaporized at the tank's outlet then distributed in a gaseous state. There are two properties of LP-Gas that you should know: it expands when the temperature rises, and it is heavier than air.

SERVICE LINE is a gas distribution line that transports gas from a common source of supply to a customer's meter, or to the connection to a customer's piping if the piping is farther downstream, or if there is no meter.

MAIN is a distribution line that serves as a common source of supply for more than one service line.

PIPELINE means all parts of those physical facilities through which gas moves in transportation. This includes pipe, valves, and other items attached to pipe, meter station, regulator stations, delivery stations, holders, or fabricated assemblies.

CUSTOMER METER is a device that measures the volume of gas transferred from an operator to the consumer.

SERVICE REGULATOR is a device designed to reduce and limit the gas pressure to the consumer.

SERVICE RISER is 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.

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

OVERPRESSURE PROTECTION equipment is installed to prevent pressure in a system from exceeding the maximum allowed limit for operating the system safely.

PRESSURE REGULATING/RELIEF STATION automatically reduces and controls the gas pressure downstream from a high pressure source of gas in to a system operating at a lower pressure. In it includes any enclosures, relief devices, and ventilating equipment, and any piping and auxiliary equipment (such as valves, regulators, control instruments, or control lines.)

PSIG is an abbreviation for pounds per square inch gage pressure.

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

CORROSION is the rusting of a metal pipe. This is caused by a electro-chemical reaction that takes place between metallic pipe and its surroundings. As a result, the pipe deteriorates and will eventually leak. This underground corrosion can be retarded with cathodic protection.

CATHODIC PROTECTION is a procedure by which underground metallic pipe is protected against corrosion. It is a method for controlling the corrosion or deterioration of steel pipe and connected metallic equipment through the use of electrolysis.

OPERATING AND MAINTENANCE PLAN (O & M PLAN) - is a plan that the federal government requires you the operator to write outlining the procedures you follow to operate and maintain a safe system.

49 CFR refers to the Code of Federal Regulations, Title 49, the document that contains the actual regulations you must follow. The title number refers to a particular volume. Part 191 or Part 192 refers to particular parts in the volume.

**AMERICAN
STANDARD PIPE
THREAD** (PAGES 1 – 3)

SECTION/TAB # 13

AMERICAN STANDARD PIPE THREAD

INTRODUCTION

The threaded pipe joint has been in use for more than one hundred years. During this period it has proved to be an excellent leakproof connection for steel and wrought-iron pipe and fittings. However, its use has not been limited to steel and wrought iron. It is used today with materials such as brass, copper, plastic, etc.

The threaded joint is still considered to be an excellent method of connecting pipe to fittings and is used for many piping installations.

STANDARDIZATION

The threaded joint for steel and wrought-iron pipe was standardized as early as 1913 and is called the *American Standard Pipe Thread*.

ADVANTAGES OF STANDARDIZATION

a) Pipe can be manufactured and threaded in one country and the fittings for the same pipe produced in another country.

b) Threading tools (dies and taps) can be standardized, again permitting manufacture of tools in various countries.

Valves, flanges, machines, pumps and many other types of equipment requiring threaded pipe attachments can be produced to a standard in many countries.

TECHNICAL TERMS

An understanding of the various technical terms used with threads is necessary. These terms are outlined below.

- a) A.S.P.T. – American Standard Pipe Thread
- b) N.P.S. – Nominal Pipe Size
- c) A.P.S. – Actual Pipe size
- d) O.D. – Outside Diameter
- e) I.D. – Inside Diameter
- f) Male Thread – Exterior thread on pipe or fitting
- g) Female Thread – Internal thread on fittings or valves
- h) Thread Taper – Necessary for pipe to tighten into fitting
- i) Thread Pitch – Referred to as the number of threads per inch
- j) Thread Angle – The angle at which the threads are cut (60°)
- Running Thread – This is a long thread that does not have any taper. Usually made leak-proof with a locknut.

- l) Right-Hand Thread – Normal direction for thread on pipe and fittings
- m) Left-Hand Thread – This thread is cut in the opposite direction and is used on left and right nipples and couplings. A left-hand nipple and coupling may be used in place of a union coupling. The nipples are identified with a color on the left-hand thread and the couplings usually have four straight bars on the side.

NOTE: Special dies and taps are required to cut left-hand male and female threads. It is not a general practice to cut left-hand threads on the job as the nipples and couplings are available from the manufacturer.

Figure 1

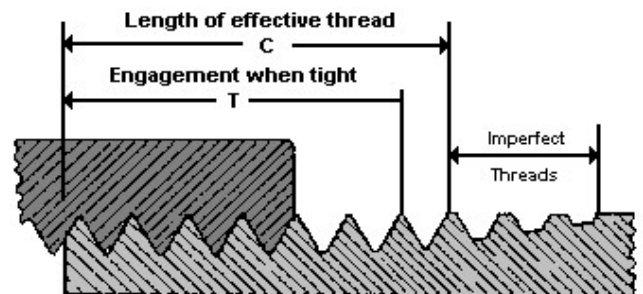


TABLE A

NOMINAL DIAMETER INCHES	THREADS PER INCH	LENGTH OF TIGHTENING (C) INCHES	ENGAGEMENT WHEN TIGHT (T) INCHES
1/8	27	0.25	1/4
1/4	18	0.40	3/8
3/8	18	0.41	3/8
1/2	14	0.53	1/2
3/4	14	0.55	9/16
1	11 1/2	0.68	11/16
1 1/4	11 1/2	0.71	11/16
1 1/2	11 1/2	0.72	11/16
2	11 1/2	0.76	3/4
2 1/2	8	1.14	15/16

NOTE: Nominal pipe sizes larger than 2 1/2 inch use the same pitch, namely 8 threads per inch.

THREAD ENGAGEMENT

Thread engagement is the amount of pipe thread necessary to make a tight connection between pipe and fitting. Refer to T on Figure 1.

For the length of thread engagement for the various nominal diameters of pipes, refer to T on Table A.

NOTE: When cutting threads on various diameters of pipe, it is usual practice to add approximately two additional threads to the length of thread shown in (T) of Table A.

Example: A 1/2-inch diameter pipe.

Engagement when tight in inches (T) equals 1/2 inch. Thread length will equal 1/2 inch plus approximately two additional imperfect threads.

THREADS PER INCH

It is possible to cut threads on pipes of different diameters with the same die chasers. The following examples show the nominal pipe diameters that have the same number of threads per inch.

EXAMPLE 1

1/4-inch and 3/8-inch nominal pipe size have 18 threads per inch.

EXAMPLE 2

1/2-inch and 3/4-inch nominal pipe size have 14 threads per inch.

EXAMPLE 3

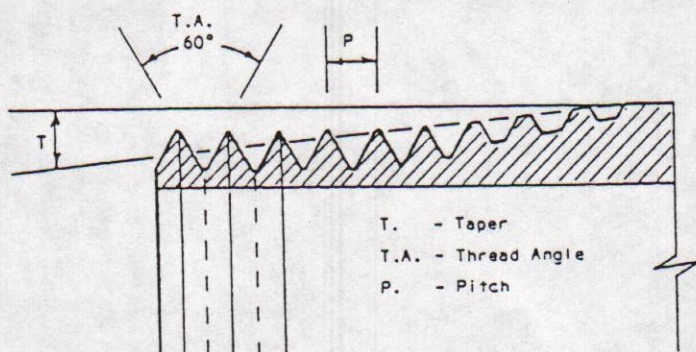
1-inch, 1 1/4-inch, 1 1/2-inch and 2-inch nominal pipe size have 11 1/2 threads per inch.

EXAMPLE 4

2 1/2-inch nominal pipe size and larger have 8 threads per inch.

NOTE: The above examples of threads per inch are shown in Table A.

Figure 2 PIPE THREAD

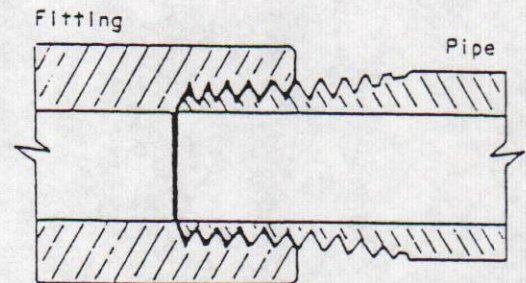


Length of Thread

It is of the utmost importance when threading pipe to cut the correct length of thread for a given pipe diameter.

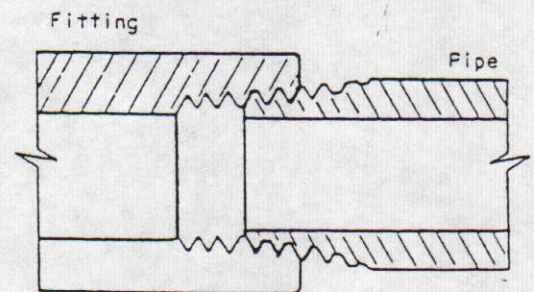
Too long a pipe thread allows the pipe to travel too far into the fitting. The pipe is prevented from turning any further when it reaches the end of the thread inside the fitting. Correct thread engagement of the taper is not made since most of the tapered threads remain outside the fitting. This can cause damage to the fitting and possible leakage.

Figure 3 Too long a pipe thread



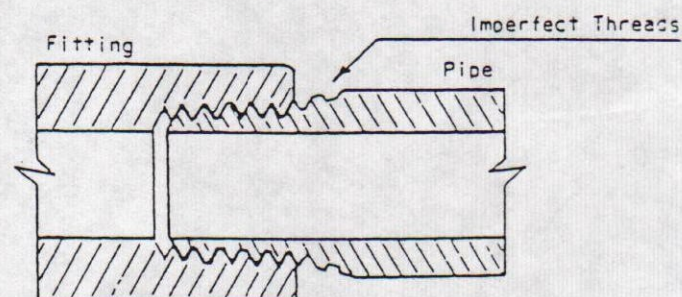
Too short a pipe thread does not allow enough thread to enter the fitting. This prevents the proper use of all the threads in the fitting and can result in a weakened connection and possible leakage.

Figure 4 Too short a pipe thread



Correct length of pipe thread allows the pipe to enter the fitting with the proper number of threads. The thread taper is able to make a tight connection.

Figure 5 Correct pipe thread



NOTE: With the *Correct* thread engagement, approximately two imperfect threads should remain outside the fitting.

PIPE FITTINGS AND THREAD ALLOWANCES

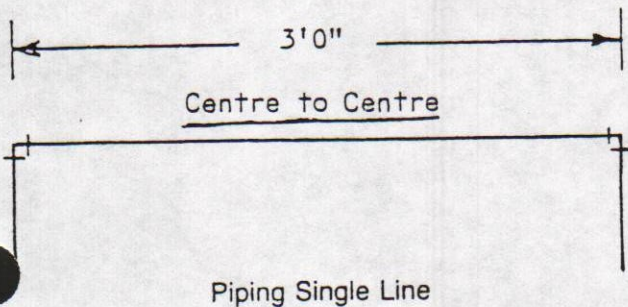
INTRODUCTION

This package has been developed to show how steel pipe and fittings are measured to a given length from diagrams for on-the-job installation. Pipes must be cut to various lengths and threaded for many different installations.

DIAGRAMS

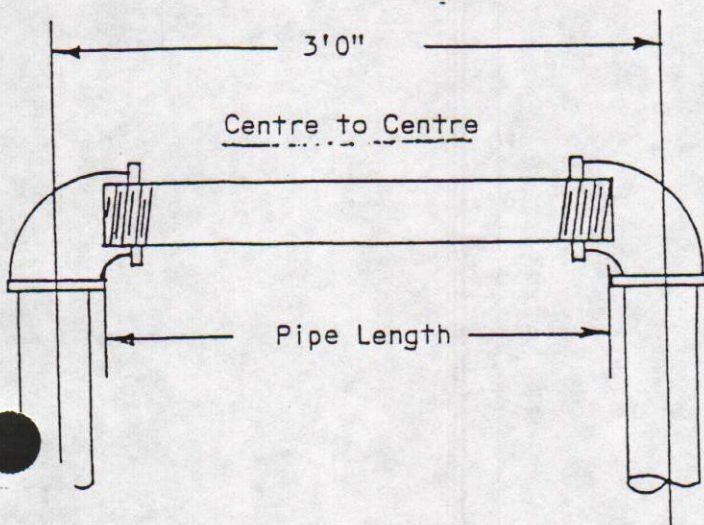
In general, piping diagrams as supplied by engineers show measurements as centre to centre. Refer to Figure 1.

Figure 1



To convert the centre to centre measurements to actual length of pipe, it is necessary to measure the fittings being used because the pipe does not travel into the centre of the fitting. Refer to Figure 2.

Figure 2



METHODS OF MEASURING

As mentioned, piping diagrams usually give measurements as centre to centre of fittings. However, all piping measurements are *not* taken from centre to centre because many have to be taken on the job site when the pipes are fitted.

It is important that the learner be familiar with the various terms used when measuring pipes and fittings. Figure 3 below shows many of these.

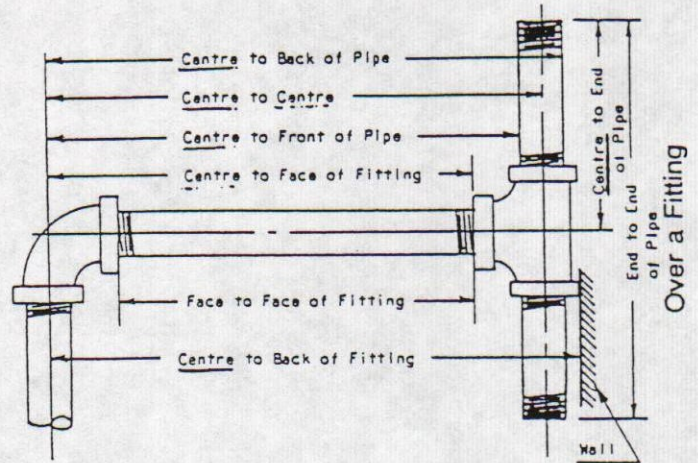


Figure 3

Abbreviations of Terms used when measuring pipes and fittings.

Centre to Back of Pipe	- C. to B. of P.
Centre to Centre	- C. to C.
Centre to Front of Pipe	- C. to F. of P.
Centre to Face of Fitting	- C. to F. of F.
Face to Face of Fitting	- F. to F. of F.
Centre to Back of Fitting	- C. to B. of F.
Centre to End of Pipe	- C. to E. of P.
End to End of Pipe	- E. to E. of P.

THREAD ENGAGEMENT AND FITTING ALLOWANCE

Before pipes can be cut and fitted to a given measurement, the "fitting allowance", "thread engagement" and "pipe diameter" must be known.

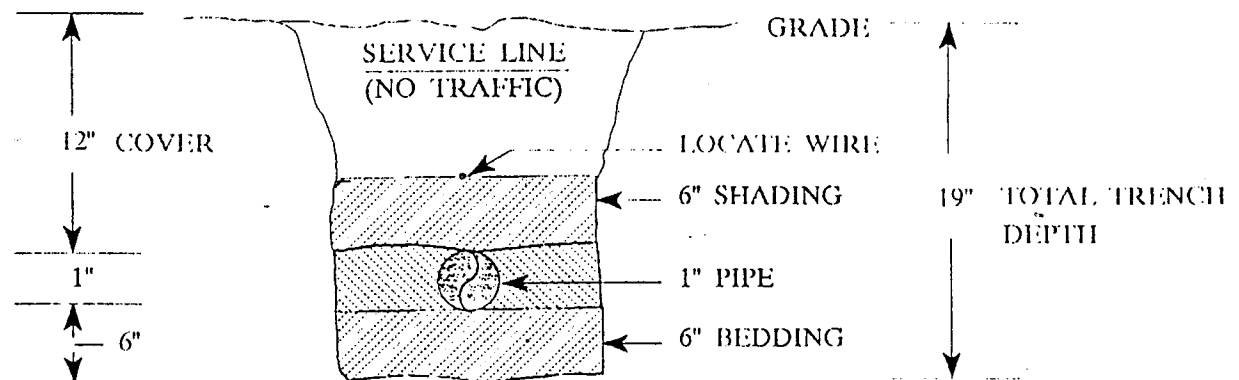
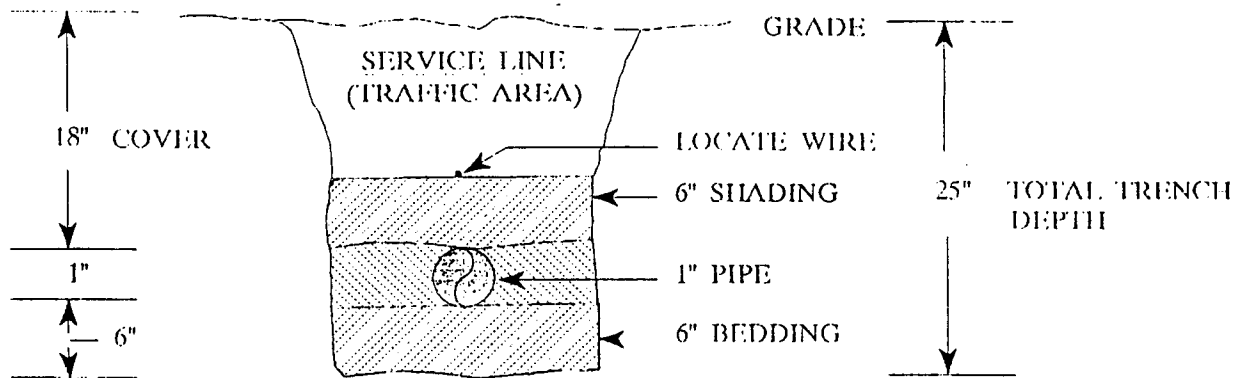
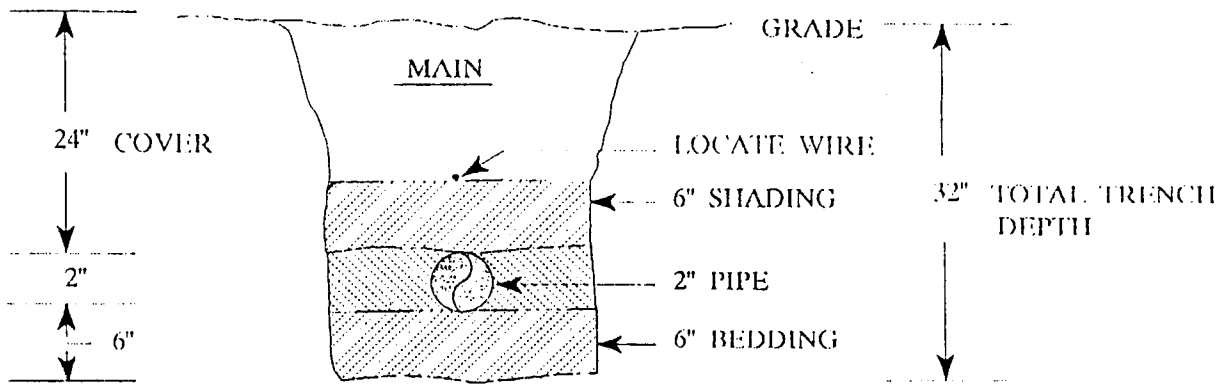
TABLES

American Standard Pipe Thread tables are available giving the fitting allowance and thread engagement for various pipe and fitting diameters.

**TYPICAL GAS
PIPING
INSTALLATION**

SECTION/TAB # 14

TYPICAL GAS PIPING INSTALLATION



SHADING MATERIAL: "SANDY TYPE SOIL" - NO LARGER THAN COARSE

#4 SIEVE (LESS THAN 1/4" DIAMETER)

LOCATE WIRE: MINIMUM 14 GAUGE, COATED, COPPER WIRE

**PREVENTION OF
ACCIDENTAL IGNITION
PROCEDURE
AND
PURGING GUIDELINES**

SECTION/TAB # 15

SAMPLE:

PREVENTION OF ACCIDENTAL IGNITION PROCEDURE: NATURAL GAS

The following procedures are to be observed to minimize the likelihood of accidental ignition.

- To ensure combustible vapors are not present in any area or structure, test the atmosphere using a combustible gas indicator (CGI). The entire area must be tested including false ceiling areas and any other area that may be hidden or closed to normal access.
- Post warning signs as appropriate, provide fire extinguishers and remove all potential sources of ignition from the area when the presence of vapors may create a hazard of fire or explosion.
- Do not turn on electrical circuits, including flashlights not approved for a gaseous atmosphere in an area where vapors are present. All non approved electronic and electrical equipment including but not limited to cell phones, pagers, AC and DC operated electric drills, saws, other tools, cords, and generators, are all potential sources of ignition.
- Do not cut by any method, pipe containing Natural Gas. All pipe used in Natural Gas service should be purged and free of a combustible mixture before cutting.
- The pipeline shall be grounded as a precaution against possible ignition from static electricity when a combustible atmosphere exists or the possibility of a combustible atmosphere exists. When conducting venting, purging, tapping, cutting, repairing and replacing pipeline etc., on steel lines use grounding or bonding cables, on plastic lines soak cotton rags or burlap sacks in a soapy solution, wrapping one end onto the pipe and making contact with the ground at the other end of the rag will ensure proper grounding. The rags or burlap and the ground they make contact with must remain wet during the entire operation.
- Smoking is permitted only at a safe distance away from a combustible atmosphere. Do not carry matches, cigarette lighters, welding torch lighters, or other mechanical sources of ignition at any time while working in a combustible atmosphere.

SAMPLE:

PREVENTION OF ACCIDENTAL IGNITION PROCEDURE: PROPANE (LPG)

The following procedures are to be observed to minimize the likelihood of accidental ignition.

- To ensure flammable vapors are not present in any area or structure, test the atmosphere using a combustible gas indicator (CGI). Due to the fact that Propane is 1 1/2 times heavier than air extra precautions must be taken to assure that a hazardous atmosphere does not exist in the area of a possible release of Propane gas. Atmospheric testing must include all low points, including but not limited to, trenches and bell holes as well as the entire area including structures where there is a potential for Propane to migrate and accumulate. Each CGI used to check for the presence of propane must be calibrated to detect Propane.
- Post warning signs as appropriate, provide fire extinguishers and remove all potential sources of ignition from the area when the presence of vapors may create a hazard of fire or explosion.
- Do not turn on electrical circuits, including flashlights not approved for a gaseous atmosphere in an area where vapors are present. All non approved electronic and electrical equipment including but not limited to cell phones, pagers, AC and DC operated electric drills, saws, other tools, cords, and generators are all potential sources of ignition.
- Do not cut by any method pipe containing Propane. All pipe used in Propane service should be purged and free of a combustible mixture before cutting.
- The pipeline shall be grounded as a precaution against possible ignition from static electricity when a combustible atmosphere exists or the possibility of a combustible atmosphere exists. When conducting venting, purging, tapping, cutting, repairing and replacing pipeline etc., on steel lines use grounding or bonding cables, on plastic lines soak cotton rags or burlap sacks in a soapy solution, wrapping one end onto the pipe and making contact with the ground at the other end of the rag will ensure proper grounding. The rags or burlap and the ground they make contact with must remain wet during the entire operation.
- Smoking is permitted only at a safe distance away from a combustible atmosphere. Do not carry matches, cigarette lighters, welding torch lighters, or other mechanical sources of ignition at any time while working in a combustible atmosphere.

PURGING GUIDELINES

GUIDELINES FOR PURGING ABANDONED GAS LINES.

The purpose of this guideline is to provide minimum requirements and information on purging operations.

Purging is the process of expelling gas from the pipe and replacing it with air. This is accomplished by introducing air and allowing the air/gas mixture to escape to the outside atmosphere until 0 percent gas is obtained.

In order to eliminate initial stratification of air and gas, it is important that the introduction of the air be done quickly. It is desirable to establish the turbulent slug as soon as possible.

All purges shall be checked with a combustible gas indicator (CGI) to ensure that the purge has been completed. Monitoring with the CGI at the vent stack or riser shall continue until 0 percent gas is obtained.

Proper safety precautions to protect people first then property from potential hazards shall be implemented and maintained until all purging operations have been completed.

For riser purging operation, the riser shall be grounded to the soil with an electrically conductive wire or cable and connected to a grounding plate or rod. Attach ground wire to stopcock valve or just below the valve to ensure proper grounding. The escaping gas/air mixture shall be expelled in a manner as to prevent the mixture from collecting in a confined area or enveloping the operating personnel.

PURGE STACKS SHALL BE:

- Made of steel.
- Properly grounded using ground clamps and ground rod.
- A minimum of 6 feet above grade when purging from excavations.
- Shall not be directed towards persons, animals or openings to buildings.

PURGING GUIDELINES

GUIDELINES FOR PURGING NEW OR REINSTATED GAS LINES:

The purpose of this guideline is to provide minimum requirements and information on purging operations.

Purging is the process of expelling air from the pipe and replacing it with gas. This is accomplished by introducing gas from the normal feed source and allowing the air/gas mixture to escape to the outside atmosphere until 100 percent gas is obtained.

In order to eliminate initial stratification of air and gas, it is important that the introduction of the gas or air be done quickly. It is desirable to establish the turbulent slug as soon as possible.

All purges shall be checked with a combustible gas indicator (CGI) to ensure that the purge has been completed. Monitoring with the CGI at the vent stack or riser shall continue until 100 percent gas is obtained.

Proper safety precautions to protect people first then property from potential hazards shall be implemented and maintained until all purging operations have been completed.

For riser purging operation, the riser shall be grounded to the soil with an electrically conductive wire or cable and connected to a grounding plate or rod. Attach ground wire to stopcock valve or just below the valve to ensure proper grounding. The escaping gas/air mixture shall be expelled in a manner as to prevent the mixture from collecting in a confined area or enveloping the operating personnel.

PURGE STACKS SHALL BE:

- Made of steel.
- Properly grounded using ground clamps and ground rod.
- A minimum of 6 feet above grade when purging from excavations.
- Shall not be directed towards persons, animals or openings to buildings.