# CITY OF CARENCRO

## GAS DISTRIBUTION SYSTEM

# OPERATION & MAINTENANCE MANUAL

**MAYOR:** **GLENN BRASSEAUX**
**CITY MANAGER:** **DON CHAUVIN**
**OPERATOR ID#** **02092**

***Pipeline Integrity Partners, LLC***
February 2019

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## OPERATION AND MAINTENANCE MANUAL REVIEW FORM

| REVIEWED BY | REVIEW DATE | REVISION NO. | COMMENTS |
|---|---|---|---|
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CITY OF CARENCRO
OPERATION AND MAINTENANCE MANUAL

# SCHEDULE OF REQUIRED ACTIVITIES

| ACTIVITY | JAN | FEB | MAR | APRIL | MAY | JUNE | JULY | AUG | SEPT | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ANNUAL REPORT (191.9) | | | X | | | | | | | | | |
| EIA-176 REPORT TO WASHINGTON DC | | | X | | | | | | | | | |
| PLS-OR-1 FORM (JANUARY 1) | X | | | | | | | | | | | |
| DAMIS REPORT - DRUG AND ALCOHOL TESTING | | | X | | | | | | | | | |
| O&M PLAN REVIEW (192.605) | | | | | | | | | X | | | |
| SIGN AOC REVIEW SHEET IN OQ PROGRAM | X | | | | | | | | | | | |
| PLS-OR-1 FORM (JANUARY 1) | X | | | | | | | | | | | |
| CUSTOMER NOTIFICATION (192.16) | WITHIN 90 DAYS OF CONNECTION | | | | | | | | | | | |
| EMERGENCY PLAN REVIEW (192.615) | | | | | | | | | X | | | |
| QUARTERLY REPORT (192.625) | | | X | | | X | | | X | | | X |
| EXCESS FLOW VALVES (192.381) | INSTALL ON ALL NEW AND REPAIRED SERVICE LINES UNDER 1000 SCFH | | | | | | | | | | | |
| SERVICE LINE SHUTOFF VALVE (192.385) | INSTALL ON ALL NEW AND REPAIRED SERVICE LINES OVER 1000 SCFH | | | | | | | | | | | |
| PIPELINE INSPECTION (192.459) | X EACH TIME THE GAS MAIN OR SERVICE IS EXPOSED | | | | | | | | | | | |
| CORROSION SURVEY (192.465) | | | | | | | | | X | | | |
| RECTIFIER INSPECTION (192.465) | X | | X | | X | | X | | X | | X | |
| CORROSION ATMOSPHERIC (192.481) | X ONCE EVERY THREE YEARS | | | | | | | | | | | |
| CLASS LOCATION STUDY BUSINESS DISTRICT (192.607) | X ONCE EVERY FIVE YEARS | | | | | | | | | | | |
| CONTINUING SURVEILLANCE (192.613) | | | X | | | | | | | | | |
| PUBLIC AWARENESS PROGRAM | SCHEDULE OF ACTIVITIES LISTED BELOW | | | | | | | | | | | |
| PUBLIC EDUCATION MESSAGE (192.616) | MAIL NOTICE ON PAGE 19 OF PAP TO GAS CUSTOMER TWICE A YEAR | | | | | | | | | | | |
| PUBLISH IN NEWSPAPER | NOTICE ON PAGE 19 OF PAP TO NON-CUSTOMERS ONCE A YEAR | | | | | | | | | | | |
| DELIVER TO EXCAVATORS | DELIVER TO EXCAVATORS NOTICE ON PAGE 20 23 AND 24 (YEARLY) | | | | | | | | | | | |
| ANNUAL AUDIT OF PAP | COMPLETE ANNUAL AUDIT SHEET ON PAGE 14 OF PAP ONCE A YEAR | | | | | | | | | | | |
| EMERGENCY OFFICALS | LETTER ON PAGE 21 AND 22 OF PAP (YEARLY) | | | | | | | | | | | |
| PUBLIC OFFICALS | LETTER ON PAGE 21 AND 22 OF PAP (ONCE EVERY THREE YEARS) | | | | | | | | | | | |
| ANNUAL AUDIT OF PAP | X | | | | | | | | | | | |
| EFFECTIVENESS ASSESSMENT PAP | X ONCE EVERY FOUR YEARS DUE JUNE 2018 | | | | | | | | | | | |
| ODORIZATION SNIFF TEST (192.625) | | X | | | X | | | X | | | X | |
| PATROLLING 192.721) | | | | X | | | | X | | | | |
| GAS LEAKAGE SURVEYS (192.723) | | | | | | | | | | | X | |
| PRESS. LIMITING DEVICES (192.739) | | | | | | | X | | | | | |
| REGULATOR STATIONS (192.741) | | | | | | | X | | | | | |
| RELIEF DEVICES (192.743) | | | | | | | X | | | | | |
| VALVE MAINTENANCE KEY VALVES (192.747) | | | | | | | X | | | | | |
| OQ PROGRAM REVIEW (192.801) | X | | | | | | | | | | | |
| I M. PLAN REVIEW (192.1007) | X ANNUALLY | | | | | | | | | | | |

## SECTION 1 - GENERAL

### 1.0 GENERAL INFORMATION

This Operation and Maintenance Manual requires that items listed to be conducted are scheduled so that their completion is accomplished in the time period specified. Each item requiring action shall be documented so that Pipeline Safety and other governing agencies can determine results of the inspections and corrective maintenance. Annually but not to exceed 15 months, these documents will be reviewed to determine if areas of high hazard exist or are developing. If any portion of the system becomes suspect, immediate corrective action shall be taken to eliminate all danger to the public and/or company property. Additionally, in accordance with 192.13 ( c), each operator will maintain, modify as appropriate, and follow the plans, procedures and programs that it is required to established under Part 192.

### LOUISIANA STATE POLICE REPORTING REQUIREMENTS:

Any release of natural gas from a pipeline or other facilities of 100 pounds or more is reportable to Louisiana State Police. The weight of natural gas is 100 pounds of Natural Gas equals 21,000 standard cubic feet. All compressed or refrigerated flammable gases and all flammable liquids (as defined in 49 CFR 173.120) will have a 100 pound Reporting Quantity.

**All releases and incidents as defined above must be reported immediately to:**

1) Local Emergency Planning Committee (with jurisdiction over a facility); and then to
2) Emergency Response Commission via the Office of State Police, Transportation and Environmental Safety Section, using the Hazardous Materials Hotline phone number **225/925-6595 or toll free 1-877/925-6595.**

Facilities must also make follow-up written reports for all legally reportable releases and incidents within five business days after the release or incident occurs. This report must be made to the Local Emergency Planning Committee with jurisdiction over a facility and to the Emergency Response Commission via the Department of Public Safety and Corrections, Office of State Police, Transportation and Environmental Safety Section, Right-to-Know Unit, P.O. Box 66168, Baton Rouge, LA 70896-6168. The format for this report should be as outlined in Subsection G of Section 10111 of the Right-to-Know rules and in Title III of the Superfund Amendments and Reauthorization Act (SARA). Any additional information not given in the initial telephone notification should also be included.
Any emergency or release notification made to the Hazardous Materials Hotline must be received no later than one hour after the occurrence, depending on the exigency of the circumstances. See copy of letter increasing minimum loss from 100 to 1000 pounds.

### CALCULATING LOSS OF GAS

Use the following formula when calculating loss of natural gas through line breakage:
$(\text{Pipe Diameter})^2$ **X** (gas pressure + Atmospheric Pressure 14.73) = MCF/Hour
Documentation is considered part of the plan.

# STATE OF LOUISIANA

DEPARTMENT OF PUBLIC SAFETY AND CORRECTIONS

PUBLIC SAFETY SERVICES

EDWIN W. EDWARDS
GOVERNOR

PAUL W. FONTENOT
SUPERINTENDENT

March 10, 1992

HQ-40-296

Mr. Michael Lyons
MID-CONTINENT OIL AND GAS ASSOCIATION
801 North Boulevard
Suite 201
Baton Rouge, LA 70802-5727

Dear Mr. Lyons:

Based upon several meetings the Department of Public Safety and Corrections has had with representatives of the natural gas industry with regard to possibly raising the Reportable Quantity (RQ) for natural gas from 100 pounds, and based upon the authority granted by the Legislature to the Deputy Secretary to grant an alternate means of compliance in this area, the Department will, at a point in the future, promulgate a rule change to establish a 1,000 pound RQ for natural gas.

The proposed rule change would apply to Title 33 LAC Part V, Subpart 2, Chapter 101, Subpart 10107(3)(e). The wording would be changed to read as follows:

(e) All releases, including those from natural gas distribution lines and crude oil and natural gas gathering lines, must be reported immediately to the Local Emergency Planning Committee and the Emergency Response Commission. However, the reportable quantity (RQ) for a release of natural gas is hereby established at 1,000 pounds.

Until such time as this rule change is made, the Department will only consider releases of natural gas at the proposed 1,000 pound RQ for possible enforcement action.

Sincerely,

Kendall J. Fellon, Lieutenant
LOUISIANA STATE POLICE
Transportation & Environmental Safety

KJF:wc

c-Bob Hayes

COURTESY · LOYALTY · SERVICE

## 1.1 PURPOSE

The purpose of this Operating and Maintenance Plan is to provide instruction to the City of Carencro Gas Maintenance Personnel for the conduct of operations, maintenance activities and emergency response associated with the Gas Distribution System. Instructions delineated in this manual are to be followed by all maintenance and supervisory personnel. The instructions contained in this manual meet or exceed the requirements set forth in LAC 43:XIII.2705 [Part 192.605]. This manual must be reviewed and updated by the operator at intervals not exceeding fifteen (15) months but at least once each calendar year. The operator should record this review by signature and date on the annual review form on page 5 of this manual. Appropriate parts of this manual must be kept at locations where operations and maintenance activities are conducted.

## 1.2 HISTORY

The system is presently owned and operated by the City of Carencro under the governing authority of the City of Carencro Mayor and Board of Aldermen. The gas distribution system is under the direct management and supervision of the Gas Superintendent who is employed by the City of Carencro.

The City of Carencro gas distribution system was installed in the early 1950's. The gas system has undergone numerous changes and extensions and has expanded to include gas customers in and around the City of Carencro and south to the purchase point located on University Drive (La. 182) south of the City of Carencro.

There are two (2) purchase points supplying gas to the City of Carencro. Gulf South Gas Company supplies natural gas to the purchase point located on University Drive (La. 182) and Florida Gas Company supplies gas to the purchase point located on Prejean Road. As of 2013 the Gas Distribution System consisted of approximately 7.7 miles of two (2") to six (6") inch steel mains, twelve (12) miles of 2" cast iron main and two (2) miles of 2" polyethylene main lines.. In addition, there are approximately 781 gas service lines in the gas distribution system. Six hundred twenty-two (622) are steel, one hundred fifty-four (154) are cast iron and five (5) are polyethylene. These service lines are tapped off of steel, cast. iron main and polyethylene mains.

Cathodic Protection is provided for the steel portions of the gas distribution, which remains in electrical continuity by means one (1) 36 volt, 36 amp impressed current rectifier and associated ground beds. In addition, prepackaged magnesium anodes are installed along the steel gas mains in specific areas to supplement the cathodic protection system and to help maintain minimum cathodic protection of –0.85 volt DC. The cathodic protection system and procedure is addressed in Section 5.0 of this manual.

The entire gas distribution system is odorized using King Tool 2B Odorizers at both purchase points. Presently T.B. Captan is used to odorize the gas system. This is further addressed in Section 7.8 of this manual. Key valves are located at each purchase point and district regulator station, which allows isolation or shutdown of all or parts of the distribution system. The key valves are addressed further in Section 8.9 of this manual

The gas distribution system for the City of Carencro is detailed on gas distribution maps identifying gas mains and services, their size, depth, and location. Additional information pertaining to the gas distribution system including cathodic protection test stations and magnesium anode locations are also incorporated on these maps. These gas distribution maps are located in the Carencro City Hall on East St. Peter Street in Carencro, La.

## 1.3 SYSTEM DESCRIPTION

The City of Carencro Gas Distribution System was originally installed in the early 1950's. The gas distribution system has under gone numerous changes and additions and now consists of a combination of Steel and Cast-Iron piping. There are two (2) separate purchase points in the City of Carencro gas distribution system and one (1) District Regulator Station located on La. 182 within the city limits of the City of Carencro. At each purchase point, gas is odorized using King Tool 2B odorizers with T.B. Captan Odorant.

## UNIVERSITY STREET (LA 182) PURCHASE POINT STATION

The University Street Purchase Point Station is located on La. 182 between Carencro and Lafayette, La. This station is referred to as the Koch Station. Natural gas is supplied to the La. 182 purchase point station by Gulf South Gas Company. The Station is operated and maintained jointly by Gulf South Gas Company and the City of Carencro. Gas is odorized at this station using a King Tool 2B odorizer. Rockwell 461 regulator reduces gas pressure to approximately 37 psig for delivery to the City Gate Regulator Station on University Drive where the pressure is further reduced to 28 psig. Over pressurization at the La. Koch Purchase Point is controlled by an American Axial Relief Valve set to relieve at 60 psig. The MAOP for piping downstream of this purchase point is 60 psig. There are numerous key valves located at the Koch Station Purchase Point Station. Below is a picture this Purchase Point Station.

**KOCH (LA. 182) PURCHASE POINT STATION**

## PREJEAN ROAD PURCHASE POINT STATION

The Prejean Road Purchase Point Station is located on Prejean Road west of La. 182. Florida Gas Company supplies natural gas to the Prejean Road Purchase Point Station. The Station is operated and maintained jointly by Florida Gas Company and the City of Carencro. Gas is odorized at this station using a King Tool 2B odorizer. Two (2) Rockwell 441 regulator serves as monitor regulators and reduce gas pressure to approximately 37 psig for delivery to the City Gate Station on University Drive where the gas pressure is further reduced to 25 psig. The MAOP for piping downstream of this purchase point is 60 psig. There are numerous key valves located throughout the City of Carencro Gas Distribution System. Below is a picture of the Prejean Road Purchase Point Station.

**PREJEAN ROAD PURCHASE POINT STATION**

## CITY GATE REGULATOR STATION

The City of Carencro, in addition to the two purchase point stations, one on La. 182 and one on Prejean Road has one district regulator station. This station is commonly referred to as the City Gate Station and is equipped with a Fisher EZR regulator that reduces gas pressure from 37 psig to approximately 25 psig. A Fisher EZR Relief Valve set to relieve pressure at 30 psig provides overpressure protection. The MAOP for piping downstream of the City Gate Station is 25 psi. The City Gate Station is located in the 4200 block of University Drive within the city limits of the City of Carencro. Below is a pictorial of the City of Carencro Border Station including the regulator and relief valve.

**CITY OF CARENCRO CITY GATE REGULATOR STATION**

## 1.4 INSTRUCTIONS TO EMPLOYEES

All maintenance and emergency procedures covered in this maintenance and operating manual must be complied with by each employee during normal operations and the performance of regular duties. Employees, while performing their assigned duties will note any unusual situations or conditions noticed and report these in writing to the Operator. Unusual conditions of heavy leakage, accident, damage to facilities, or fire should be handled in accordance with emergency procedures and reported immediately.

### ABNORMAL OPERATING CONDITIONS

Pipeline Safety Regulation 192.803 defines an Abnormal Operating Condition (AOC) as a condition identified by the operator that may indicate a malfunction of a component or deviation from normal operations that may:

(a) Indicate a condition exceeding design limits, or
(b) Result in a hazard(s) to persons, property, or the environment

An abnormal operating condition may lead to and emergency situation but not all abnormal operating conditions are emergencies. Basically, any condition that is **"UNEXPECTED"** is considered an AOC. Because AOC's could potentially lead to an emergency situation it is vital that all gas operation and maintenance personnel be trained to recognize and react to any and all AOCs. A OC are discussed and detailed in the City of Carencro Operator Qualification Program. All operation and maintenance personnel have been trained and qualified to recognize and react to AOC's.

Below is a generic list of potential AOC's that one may reasonably expect to occur in any given situation. There may be additional AOC's that are not included in this list however; these are the more common ones that one might expect.

1. Accidental Release of Gas
2. Line Breaks
3. Fires and Ignitions
4. Damage to or Malfunction of Gas Equipment or Facilities
   - Defective Pressure Regulator(s)
   - Defective Pressure Relief Valve(s)
   - Defective Control Valves
5. Abnormal Operating Pressure
   - Unexpected High Pressure or Exceeding the MAOP
   - Unexpected Low Pressure
6. Loss of Service
7. Inadequate Odorization or Reports of Gas Odor
   - Too much odorant in the gas system
   - Not enough odorant in the gas system
8. Inadequate Cathodic Protection
9. Loss of Safe Atmosphere in Confined Space

## RECOGNIZING AOC'S AND SAFETY RELATED CONDITIONS

Most AOC can be recognized before the AOC develops into a hazardous situation. Generally, AOC's are recognized by the four (4) senses:

- Sight – Observing unusual or out of the ordinary situations or activities in and around gas distribution facilities
- Smell – Observation by smelling gas odors in and around gas distribution facilities
- Sound – Observation by listening to strange sounds in and around gas distribution facilities. Sounds such as hissing or blowing sounds.
- Feel - Observation in and around gas distribution facilities by feeling a leak on metering or regulating equipment of its associated piping.

Gas personnel are trained to be observant of gas facilities, particularly those that are subject to damage from foreign object and/or outside forces such as motor vehicles, vandalism and third-party damage. The important point of recognizing AOC is to identify actual AOC's or a situation that could potentially develop into and AOC before the AOC escalates into an emergency.

In addition to recognizing actual AOC's there are approximately seven (7) common conditions or clues that are likely to lead to emergency situations or AOC's. G as operations and maintenance personnel have been trained and qualified to recognize these "clues" and take corrective action to prevent the occurrence of an actual AOC. These clues may include the following:

- **Corrosion –** Steel underground piping is required to have and normally has cathodic protection on it that can be verified by a pipe-to-soil potential reading. If it is determined that there is inadequate cathodic protection the underground piping is subject to the effects of corrosion that could lead to leakage and potential failure.

- **Damage –** Physical damage to pipeline facilities, usually by Third Party or contractors presents a clear danger to both buried and above ground pipeline facilities.

- **Line Obstructions –** Line obstructions cause low pressure in the gas distribution system and are usually the result of both steel and polyethylene tap shaving left in the gas main after tapping a main to run new service or stopping the gas flow in the main with a blocking unit. D ebris collecting in bends or 90° turns in piping or in gas regulating equipment and valves reducing the pressure downstream.

- **Line stress –** Line stress is the result of erosion or improper installation of piping in a crooked trench. Line stress can result in gas leakage at joints and mechanical fittings leading to an AOC.

- **Construction Defects –** Construction defects include improper installation of fittings, installation of non-approved fittings, i.e. installing water fittings on gas mains and services, improper backfill and improper clearance between gas and other facilities. All of these may lead to gas leakage and potential line failure.

- **Confined Space –** Confined space is limited to vault entry and atmosphere inside vaults, which could lead to fire and explosion or a toxic atmosphere for persons entering.

- **No Electrical Power –** No electrical power may lead to pipeline failure or disruption of service as a result of no power to operate pneumatic valves or loss of cathodic protection supplied by rectifiers.

- **Mechanical Failure –** Mechanical failure of control valves, pressure regulators and pressure relief valves are examples of mechanical failure that could potentially lead to over pressurization of the gas distribution system resulting in catastrophic consequences and potential fire, explosion, damage to personal property, injury to the public and possibly death.

- **Human Error –** Human error is the most common cause of AOC's. Failure to follow procedures and instructions during the performance of a covered task may lead to numerous undesired consequences include all of the ones identified above.

  The training provided to the City of Carencro gas operations and maintenance personnel provided instructions on how to distinguish AOC's from clues to potential AOC's and how to react to each identified AOC. Recognizing the "clues" to an AOC and properly reacting to them is important in preventing the actual AOC from occurring.

## REACTING TO AOC's

Each gas utility company may react differently to AOC's. The City of Carencro Gas Department provides training to its employees detailing how to react to each AOC. When reacting to AOC's the most important step is to first protect life and property including the employees' life and safety. Never attempt to react immediately to an AOC if the reaction to that AOC would be considered unsafe or endanger the employees' life or safety or the life or safety of others.

When reacting to an AOC everyone's first priority is to protect the lives of persons, both employees and individual customers or persons in the immediate area of the AOC. The second priority is to protect company and customer property and third is to make the area safe. These are the **first three actions that must be taken** by gas operation and maintenance personnel when encountering any AOC.

## ACCIDENTAL RELEASE OF GAS

Should the AOC involve the accidental release of gas, after the first three actions have been taken, notify the Gas Superintendent and eliminate all potential ignition sources. Next, the employee should attempt to isolate the area of the gas distribution where the release is taking place. Closing valves on either side of the release point accomplish this if the release is on a two way feed or closing a single valve upstream of the release point if the release is on a one way feed. Remember, **never** turn or operate a valve unless you are sure of what you will be isolating when turning that valve off. If the release is on polyethylene piping, the release point may be isolated by squeezing the pipe on either side of the release point if on a two way feed or squeezing the polyethylene piping upstream of the release point if the release is on a one way feed. After the release has been isolated and the area made safe you may begin to repair or replace the defective component.

## LINE BREAKS

Line breaks and accidental release of gas are closely related, and the same identical actions would be appropriate. Remember the first three actions when reacting to any AOC is to protect lives protect property and make the area safe for all. Making the area safe may include contacting or having your supervisor contact local law enforcement officials to have the area cordoned off and have traffic re-routed.

## FIRES AND IGNITION

When a ruptured gas main or service line erupts in ignition and fire serious consequences could result. After first protecting lives by potentially evacuating the immediate area contact your supervisor and have him contact the fire department and the local law enforcement officials. Consider enacting the Emergency Plan. Make an assessment based on your judgment as to whether or not let the fire continue to burn or if to attempt to extinguish it. Remember when the fire department arrives on the scene, they are responsible for the actions and you should provide them with advice and information concerning the gas facilities. The fire may be brought under control by two methods. One method would be by extinguishing the fire with foam or chemicals and the second would be by isolating the gas from the fire by valve manipulation or by squeezing polyethylene pipe to stop gas flow. Remember, if the gas is not isolated and the fire is extinguished the escaping gas could collect in a confined space and may lead to an explosion. You never want to replace a known consequence with an unknown consequence that may be worse.

## DAMAGE TO OR MALFUNCTION OF EQUIPMENT OR FACILITIES

This AOC could be caused by outside forces or defective equipment. For example, an automobile may have run over or hit a gas meter or other above ground gas facilities resulting in release of gas and possible ignition and fire. This is typically referred to as "third party" damage. Malfunction of equipment may have been caused by failure of pressure regulators, control valves or pressure relief valves. In either event damage to or malfunction of equipment or facilities poses potential serious consequences and could lead to ignition and fire or explosion. Depending on each situation the reaction would be different. After taking care of the first three actions, protecting lives, protecting property and making the area safe, i.e. eliminating ignition sources, the next action would be to contact the supervisor and notify him/her of the situation. He/she should in turn contact local law enforcement officials and fire department personnel depending on the information you have provided. Should the AOC be caused by outside forces such as an automobile running over a gas meter or other above ground facility you should first attempt to isolate the leaking or blowing gas by either turning off valve(s) or squeezing off polyethylene piping. Once the gas leak or blowing gas has been isolated and stopped, continue to make the necessary repairs or replace the damaged or malfunctioning equipment. Finally check area with a CGI to verify leak is repaired.

Should a malfunctioning pressure regulator cause the AOC you should take the same actions above regarding protection of lives, property, making the area safe and making the identified notification. If the pressure regulator is malfunctioning by allowing over pressurization of the gas distribution system down stream of the pressure regulator, the relief valve should be opened just enough to allow excess pressure to escape into the atmosphere while maintaining the correct pressure downstream. If the station is equipped with a bypass, open the bypass and isolate the malfunctioning pressure regulator. Repair or replace and return equipment to service taking care to leave all valves at the regulator station in their correct and initial positions.

If you are not sure if the **malfunction is in the relief valve** or the pressure regulator, close the relief valve while closely observing the downstream pressure gauges. If the pressure gauges begin to rise, the problem is in the pressure regulator. If the pressure gauges remain the same, the problem is with the relief valve. Make necessary repairs or replace all malfunctioning equipment and leave all valves as found and in the correct position. On quarter turn valves the valve position of the wing when parallel to the piping indicate that the valve is open. It the wing is perpendicular to the piping the valve is closed.

## ABNORMAL OPERATING PRESSURE

Abnormal operating pressure can be either pressure that is higher than expected based on the regulator setting or lower than expected based on the regulator setting. Remember, for there to be abnormal operating pressure, the pressure does not need to exceed the Maximum Allowable Operating Pressure (MAOP). Any pressure different than the set regulator outlet pressure taking into consideration load is considered abnormal. In other words, the pressure whether high or low, would be different from what would be normally expected.

Abnormal operating pressure regardless if it is high pressure or low pressure can lead to serious consequences. High pressure can damage customer appliances and cause normal combustion to burn too high even causing the fire to leave the burner and extinguish itself and low pressure can cause pilot lights to extinguish themselves and when the pressure returns to normal cause gas to escape into the structure.

When abnormal operating pressure in a gas distribution system occurs the first reaction should be to protect life, property and make the area or gas system safe by either isolating the problem area or returning the abnormal pressure back to its intended operating pressure depending on whether the problem is high pressure or low pressure. If the operating pressure is low and has reached a point where there is a possibility that appliances might be affected or pilots have possibly gone out, that part of the system must be isolated or turned off. Remember, prior to returning that part of the system to service each meter in the section of the system must also be turned off at the valve located at each meter in accordance with procedural requirements. Failure to do so could result in gas escaping into the home or structure and igniting or exploding.

## LOSS OF SERVICE

Loss of service is straightforward. After first protecting life, property and making the area safe, the next action would be to notify the supervisor. The supervisor or individual responsible should conduct an evaluation as to what caused the loss of service. This may be because of a line break, low pressure in the system because of excessive load or possibly trash and debris in the regulator causing the regulator to fail. While that determination is being made, the area where the loss of service has occurred should be isolated by either turning off each valve at the meter and locking it off or shutting down the part of the system affected by the loss of service. Once the problem has been corrected, prior to placing that part of the system or that service back into service, the valve located at each meter should be turned off. Failure to do so could result in gas escaping into the home or structure and igniting or exploding.

## INADEQUATE ODORIZATION OR REPORTS OF GAS ODOR

Since gas is odorless and colorless without the proper amount of malodorant injected into the gas flow, leakage will probably go undetected. That is why it is important that quarterly odorant test be conducted to verify that the amount of odorant in the gas stream is easily detectable to customers and persons living in the vicinity of the gas facilities. Should quarterly tests determine that the odorant level has decreased to lower than normally detectable limits adjustment to the odorizer must be made immediately. Failure to take immediate corrective action can lead to catastrophic consequences including potential fires and or explosions.

## INADEQUATE CATHODIC PROTECTION

Inadequate cathodic protection or the lack of cathodic protection in anodic areas of the gas distribution system will eventually lead to gas leaks and failures. This is a relatively slow process and, in some cases, takes years for the underground piping to get to the point where leakage develops. That is why it is important for pipe-to-soil potential reading be taken at strategic locations throughout the gas distribution system to determine cathodic protection adequacy. Failure to respond to take corrective action can lead to gas leakage and potential gas line failure.

## LOSS OF SAFE ATMOSPHERE IN A CONFINED SPACE

This AOC is confined to vaults and enclosures where gas equipment and gas facilities such are regulators and relief valves are housed. Appliances burning out of adjustment, i.e. not enough combustion air can cause carbon monoxide to become present in homes and buildings. Carbon monoxide is a toxic gas. In the event that you have vaults or enclosures where operating gas equipment is housed and are required to enter these facilities, if you feel dizzy or disoriented leave the area immediately. Use ventilation to clear the atmosphere prior to returning.

Should the City of Carencro encounter a situation where there is an accident or incident, the operator is required to investigate the accident/incident in accordance with the requirements Section 2.2 of this Operation and Maintenance Manual. The operator uses employee feedback to ensure that the AOC(s) identified are representative of those that could reasonably be anticipated during performance of covered tasks.

On the following page is a list of names, titles/departments of persons and organizations that may need notification in the event of an emergency, accident or incident:

| TITLE | NAME | TELEPHONE NUMBER |
|---|---|---|
| **MAYOR** | GLENN L. BRASSEAUX | 1 (337) 896-8481 WORK<br>1 (337) 896-8541 HOME |
| **CITY MANAGER** | DON CHAUVIN | 1 (337) 886-7001 WORK<br>1 (337) 278-4089 CELL |
| **OPERATOR** | ONEAL WOODS | 1 (337) 298-1784 CELL |
| **EMPLOYEE** | KEVIN BAQUE | 1 (337) 356-3521 CELL |
| **EMPLOYEE** | BUSTER BROUSSARD | 1 (337) 849-6989 CELL |
| **EMPLOYEE** | MICHAEL LIVING | 1 (337) 896-8481 WORK |
| **CITY CLERK** | GWEN MARTIN | 1 (337) 886-7002 WORK |
| **CITY COUNCIL MEMBER** | ALFRED SINEGAL | 1 (337) 230-7805 |
| **CITY COUNCIL MEMBER** | ANTOINE BABINEAUX | 1 (337) 896-8534 |
| **CITY COUNCIL MEMBER** | KIMBERLY GUIDRY | 1 (337) 255-5557 |
| **CITY COUNCIL MEMBER** | JORDAN ARCENEAUX | 1 (337) 258-8403 |
| **CITY COUNCIL MEMBER** | DANIELLE CAPRITTO | 1 (337) 296-9208 |
| **CARENCRO POLICE CHIEF** | DAVID ANDERSON | 1 (337) 886-7030 WORK<br>1 (337) 230-7969 CELL |
| **CARENCRO FIRE CHIEF** | DAVID MOUTON | 1 (337) 886-7050 WORK<br>1 (337) 277-5990 CELL |
| **LA. STATE POLICE** | TROOP I | 1 (337) 262-5880 |
| **LAFAYETTE PARISH SHERIFF'S OFFICE** | | 911 |
| **CARENCRO FIRE DEPARTMENT** | | 911 |
| **ACADIAN AMBULANCE** | LAFAYETTE | 911 |
| **CIVIL DEFENSE** | | 911 |
| **LA. PIPELINE SAFETY** | STEVEN GIAMBRONE | 1 (225) 342-2989 |
| **LA. PIPELINE SAFETY** | WAYNE LEGER | 1 (337) 368-8877 |
| **HAZARDOUS MATERIAL DIVISION** | BATON ROUGE | 1 (225 925-6113 |
| **FLORIDA GAS COMPANY** | GARY DREADING | 1 (713) 989-2084 |
| **GULF SOUTH GAS COMPANY** | WAYNE BENIOT | 1 (713) 479-8690 |
| **EUNICE METER COMPANY** | BO FONTENOT | 1 (337) 457-8200 |
| **MUTUAL ASSISTANCE** | TOWN OF SUNSET | 1 (337) 662-3866 |
| **MUTUAL ASSISTANCE** | TOWN OF LEONVILLE | 1 (337) 879-0035 |
| **DOT OFFICE OF PIPELINE SAFETY** | WASHINGTON, DC. | 1 (202) 426-0700 |
| **COBURN SUPPLY** | OPELOUSAS | 1-337-948-8266<br>1-337-942-3684 Weekends<br>1-337-942-5543 Nights |
| **LOUISIANA UTILITY SUPPLY** | BATON ROUGE | 1-225-383-8916<br>1-800-743-8916<br>1-225-355-4769 Weekends |

## SECTION 2 RECORD KEEPING AND REPORTING OF INCIDENTS, SAFETY RELATED CONDITIONS, ANNUAL REPORTS, EIA- 176 REPORTS AND ORGANIZATIONAL REPORTS (PART 191*)*

### 2.1 RECORDS AND RECORD KEEPING

The City of Carencro shall maintain records, such as plans, programs, specifications, maps and permits, necessary to establish compliance with regulation §111. Such records shall be available for inspection at all times by the commissioner.

The Operator for the City of Carencro shall file with the commissioner a list including the names, addresses and telephone numbers of responsible officials or such persons who may be contacted in the event of an emergency. Such a list shall be kept current.

Notices, reports and plans pertinent to the City of Carencro gas facilities which are submitted to the United States Department of Transportation pursuant to the provisions of the federal code shall be forwarded simultaneously to the commissioner. These filings shall be deemed in full compliance with all obligations imposed for submitting such notices and reports, and when accomplished, shall release and relieve the person making same from further responsibility thereof.

Where a person is required to prepare and submit a report of an accident or incident pertinent to facilities covered by this regulation to a federal agency in compliance with the outstanding order of such agency, a copy of such report shall be submitted to the commissioner in lieu of filing a similar report which may be required by the state.

The commissioner may request the filing of additional information and reports upon such forms and in such manner as prescribed by him.

An updated and comprehensive system map(s) containing location and component description information on all facilities (excluding individual service lines), must be maintained by the operator and made available to the commissioner of conservation upon demand. An updated and comprehensive record of individual service lines containing location and component description information must be maintained by the operator and made available to the commissioner of conservation upon de mand. The aforementioned maps and records must be accompanied by information showing the location, size and type of pipe, and locations of key valves (system isolation valves), regulator stations, odorization injection and test locations and cathodic protection test locations.

The following records will be maintained for ten years.

- All DIMP (Integrity Management Plans),
- Annual Reports
- Work Orders
- Incident Reports
- Leak Survey Records
- Leak Repair Records
- Installation Records
- Pipe-to-soil voltage potential records
- Main and Service Inspection Records
- Rectifier Inspection Records
- Cathodic Protection Records
- Gas Analysis Records from Supplier
- Valve Maintenance and Inspection Records
- Pressure Limiting and Regulator Station Inspection Records
- Maintenance and Repair Records
- Drug and Alcohol Testing Records
- Operator Qualification Records
- Louisiana One-Call Ticket Records
- Excavation Damage Reports
- Patrolling Records
- Odorization Reports
- Mechanical Fitting Failure Records
- Pressure Test Records & System Maps are to be maintained for the life of the System

## 2.2 TELEPHONIC NOTICE OF CERTAIN INCIDENTS (191.5) (a)(b)

At the earliest practicable moment, within one hour following discovery, the operator shall give notice of any incident. For the purpose of this Operation, Maintenance and Emergency Manual, the following events are to be considered "**INCIDENTS".** Any event that:

- A death, or personal injury necessitating in-patient hospitalization; or
- Estimated property damage of $50,000 or more, including loss to the operator and others, or both, but excluding cost of gas lost; or
- Unintentional estimated gas loss of three million cubic feet or more
- An event that results in the emergency shutdown of the natural gas facility. Activation of an emergency shutdown system for reasons other than an actual emergency does not constitute an incident.
- An event that is significant, in the judgment of the operator, even though it did not meet the criteria identified above

Each notice required by Subsection A of this Section must be made to the National Response Center either by telephone to (800) 424-8802 (in Washington, DC, 202 267- 2675) or electronically at http:// www.nrc.uscg.mil and by telephone to the State of Louisiana to (225) 342-5505 or and must include the following information:

1. Names of operator and person making report and their telephone numbers;
2. The location of the incident;
3. The time of the incident:
4. The number of fatalities and personal injuries, if any;
5. All other significant facts that are known by the operator that are relevant to the cause of the incident or extent of the damages.

New Information. Within 48 hours after the confirmed discovery of an accident, to the extent practicable, an operator must revise or confirm its initial telephonic notice required in Subsection B of this Section with a revised estimate of the amount of product released, location of the failure, time of the failure, a revised estimate of the number of fatalities and injuries, and all other significant facts that are known by the operator that are relevant to the cause of the accident or extent of the damages.

Notification to (800) 424-8802 is not required unless property damage is greater than $50,000, including the cost of gas lost by the operator or others or both. See copy of Telephonic Report of Facility Leak on next page.

## 2.3 REPORT SUBMISSION REQUIREMENT (191.7)(a)(b)(d)

An operator must submit each report required by §191.7 electronically to the Pipeline and Hazardous Materials Safety Administration at ***http://opsweb.phmsa.dot.gov*** and a copy sent to La. DNR unless alternative reporting method is authorized in accordance with paragraph (d) below. An operator is not required to submit a safety-related conditions report electronically per §191.25.

If electronic reporting imposes an undue burden and hardship, an operator may submit a written request for an alternative reporting method to the Information Resources Manager, Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, PHP-20, 1200 New Jersey Avenue, SE, Washington DC 20590. The request must describe the undue burden and hardship. PHMSA will review the request and may authorize, in writing, an alternative reporting method. An authorization will state the period for which it is valid, which may be indefinite. An operator must contact PHMSA at 202-366-8075, or electronically to ***informatinsourcesmanager@dot.gov*** or make arrangements for submitting a report that is due after a request for alternative reporting is submitted but before an authorization or denial is received.

An operator must provide the NPMS data to the address identified in the NPMS operator standards manual available at www.npms.phmsa.dot.gov or by contacting the PHMSA geographic information systems manager at (202) 366-4595.

**STATE OF LOUISIANA**
**OFFICE OF CONSERVATION**
**PIPELINE SAFETY SECTION**

## TELEPHONIC LEAK REPORT

| | | | |
|---|---|---|---|
| Operator | | | |
| Reported by | | Phone No. | |

| | | | | | |
|---|---|---|---|---|---|
| Date | | Time of occurrence | | Time of Discovery | |
| Time/Date reported to LDNR | | NRC report no. | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Distribution | | Transmission | | Liquid | | Product | |
| | | | | | | Spill amount | |

| | | | | | |
|---|---|---|---|---|---|
| Pipe Size | | Steel ( ) | Plastic ( ) | Operating Pressure | |
| Numbers of customers out | | | | Duration of outage | |

| | |
|---|---|
| Location of incident | |
| | |

| | |
|---|---|
| Description of incident | |
| | |
| | |
| | |

| | | | | | |
|---|---|---|---|---|---|
| Reportable | | Non-Reportable | | Non-Jurisdictional | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Fire | Yes ( ) | No ( ) | | Fatalities | Yes ( ) | No ( ) | |
| Injuries | Yes ( ) | No ( ) | | Operator Judgment | Yes ( ) | No ( ) | |
| Courtesy call | Yes ( ) | | | Estimated damage amount | | | |

| | |
|---|---|
| Report taken by | |

## 2.4 INCIDENT REPORTS 191.9 (a)

Incidents are events that involve release of gas from the gas distribution system that cause death, personal injury or emergency shutdown of the gas distribution system. The City of Carencro will implement their emergency plan immediately should any of the described incidents occur and notify Pipeline Safety at the earliest practical moment following discovery. As soon as practical, but not to exceed thirty (30) days, City of Carencro will submit a written report (Form 7100.1) to the Commissioner of Conservation, Box 94275, Baton Rouge, Louisiana 70804-9275 and electronically to the Pipeline and Hazardous Materials Safety Administration at **http://opsweb.phmsa.dot.gov.** The following is the procedure for submitting your reports online:

**a)** Navigate to the Pipeline and Hazardous Materials Safety Administration at the following URL. **http://opsweb.phmsa.dot.gov**

b) Enter Operator ID and PIN (*the name that appears is the operator name assigned to the operator ID and PIN and is automatically populated by our database and cannot be changed by the operator at the time of filing*.)

c) Under "**Submit Reports**" on the left side of the screen, select the type of report you would like to create (i.e., gas transmission or gas distribution incident, or hazardous liquid accident) and proceed with entering your data. **Note:** *Data fields marked with a single asterisk are considered required fields that must be completed before the system will accept your initial filing*.

d) Click "**Submit**" when finished with your filing to have your report uploaded to our database; or click "**Save**" which doesn't submit the report to PHMSA but stores it in a draft status to allow you to come back to complete your filing at a later time. **Note:** *The "Save" feature will allow you to start a report and save a draft of it which you can print out to gather additional information and then come back to accurately complete your data entry before submitting it to PHMSA.*

e) Once you hit [Submit], the system will return you to the initial view of the screen that lists your [Save Incident/Accident Reports] in the bottom portion of the screen. **Note:** *To confirm that your report was successfully submitted to PHMSA, look for it in the bottom portion of the screen where you can also view a PDF of what you submitted.*

If electronic reporting imposes an undue burden and hardship, an operator may submit a written request for an alternative reporting method to the Information Resources Manager, Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, PHP-20, 1200 New Jersey Avenue, SE, Washington DC 20590. The request must describe the undue burden and hardship, PHMSA will review the request and may authorize, in writing, an alternative reporting method. An authorization will state the period for which it is valid. which may be indefinite. An operator must contact PHMSA at (202) 366-8075, or electronically to informationresourcesmanager@dot.gov or make arrangements for submitting a report that is due after the request for alternative reporting is submitted but before an authorization or denial is received.

## INCIDENT REPORTS 191.9 (b)

Should additional information subsequent to the initial report become available, a supplementary report with clear reference to the subject and date of the original report must be submitted. This report should be completed in full, legibly and in ink. No written report to the Information System Division is required if the estimated property damage, including cost of gas lost, of the operator or others, or both, is less than $50,000.

| NOTICE: This report is required by 49 CFR Part 191. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122. | OMB NO: 2137-0522<br>EXPIRATION DATE: 08/31/2020 |
|---|---|
| U.S. Department of Transportation<br>Pipeline and Hazardous Materials<br>Safety Administration | **INCIDENT REPORT – GAS DISTRIBUTION SYSTEM** | Report Date _____<br>No. _____<br>(DOT Use Only) |

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0522. Public reporting for this collection of information is estimated to be approximately 10 hours per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

**INSTRUCTIONS**

***Important:*** *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline/library/forms.*

**PART A – KEY REPORT INFORMATION** Report Type: *(select all that apply)* ☐ Original ☐ Supplemental ☐ Final

Last Revision Date

1. Operator's OPS-issued Operator Identification Number (OPID): /___/___/___/___/___/___/
2. Name of Operator: _____
3. Address of Operator:

3.a _____
(Street Address)

3.b _____
(City)

3.c State: /___/___/

3.d Zip Code: /___/___/___/___/___/ - /___/___/___/___/

4. Local time *(24-hr clock)* and date of the Incident:

/___/___/___/___/ Hour  /___/___/ Month  /___/___/ Day  /___/___/ Year

5. Location of Incident:

5.a _____
(Street Address or location description)

5.b _____
(City)

5.c _____
(County or Parish)

5.d State: /___/___/

5.e Zip Code: /___/___/___/___/___/ - /___/___/___/___/

5.f Latitude: /___/___/ . /___/___/___/___/___/

Longitude: - /___/___/___/ . /___/___/___/___/___/

6. National Response Center Report Number :

/___/___/___/___/___/___/___/

7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center:

/___/___/___/___/ Hour  /___/___/ Month  /___/___/ Day  /___/___/ Year

8. Incident resulted from:
   - ☐ Unintentional release of gas
   - ☐ Intentional release of gas
   - ☐ Reasons other than release of gas

9. Gas released : (select only one, based on predominant volume released)
   - ☐ Natural Gas
   - ☐ Propane Gas
   - ☐ Synthetic Gas
   - ☐ Hydrogen Gas
   - ☐ Landfill Gas
   - ☐ Other Gas ⇨ *Name: _____

10. Estimated volume of gas released: /___/___/,/___/___/___/ Thousand Cubic Feet (MCF)

11. Were there fatalities? ○ Yes ○ No
    If Yes, specify the number in each category:
    - 11.a Operator employees /___/___/___/___/
    - 11.b Contractor employees working for the Operator /___/___/___/___/
    - 11.c Non-Operator emergency responders /___/___/___/___/
    - 11.d Workers working on the right-of-way, but NOT associated with this Operator /___/___/___/___/
    - 11.e General public /___/___/___/___/
    - 11.f f Total fatalities (sum of above) /___/___/___/___/

12. Were there injuries requiring inpatient hospitalization? ○ Yes ○ No
    If Yes, specify the number in each category:
    - 12.a Operator employees /___/___/___/___/
    - 12.b Contractor employees working for the Operator /___/___/___/___/
    - 12.c Non-Operator emergency responders /___/___/___/___/
    - 12.d Workers working on the right-of-way, but NOT associated with this Operator /___/___/___/___/
    - 12.e General public /___/___/___/___/
    - 12.f f Total injuries (sum of above) /___/___/___/___/

13. Was the pipeline/facility shut down due to the incident?
    ○ Yes ○ No ⇨ Explain: _____

    If Yes, complete Questions 13.a and 13.b: *(use local time, 24-hr clock)*

    - 13.a Local time and date of shutdown /___/___/___/___/ (Hour) /___/___/ (Month) /___/___/ (Day) /___/___/ (Year)
    - 13.b Local time pipeline/facility restarted /___/___/___/___/ (Hour) /___/___/ (Month) /___/___/ (Day) /___/___/ (Year) ○ Still shut down* *(*Supplemental Report required)*

14. Did the gas ignite? ○ Yes ○ No

15. Did the gas explode? ○ Yes ○ No

16. Number of general public evacuated: /___/___/,/___/___/___/

17. Time sequence *(use local time, 24-hour clock)*:
    - 17.a Local time operator identified failure /___/___/___/___/ (Hour) /___/___/ (Month) /___/___/ (Day) /___/___/ (Year)
    - 17.b Local time operator resources arrived on site /___/___/___/___/ (Hour) /___/___/ (Month) /___/___/ (Day) /___/___/ (Year)

**PART B – ADDITIONAL LOCATION INFORMATION**

1. Was the Incident on Federal land? O Yes O No

2. Location of Incident: *(select only one)*
   - ☐ Operator-controlled property
   - ☐ Public property
   - ☐ Private property
   - ☐ Utility Right-of-Way / Easement

3. Area of Incident: *(select only one*)

   ☐ Underground Specify: O Under soil O Under a building O Under pavement
   O Exposed due to excavation O In underground enclosed space (e.g., vault)
   O Other _____
   Depth-of-Cover (in): /__ /,/ __ / __ / __ /

   ☐ Aboveground Specify: O Typical aboveground facility piping or appurtenance (e.g. valve or regulator station, outdoor meter set)
   O Overhead crossing
   O In or spanning an open ditch O Inside a building
   O In other enclosed space O Other _____

   ☐ Transition Area Specify: O Soil/air interface O Wall sleeve O Pipe support or other close contact area
   O Other _____

4. Did Incident occur in a crossing? O Yes O No
   If Yes, specify type below:

   ☐ Bridge crossing ⇨ Specify: O Cased O Uncased

   ☐ Railroad crossing ⇨ *(Select all that apply)* O Cased O Uncased O Bored/drilled

   ☐ Road crossing ⇨ *(Select all that apply)* O Cased O Uncased O Bored/drilled

   ☐ Water crossing ⇨ *(Select all that apply)* O Cased O Uncased O Bored/drilled

   Name of body of water (If commonly known): _____

   Approx. water depth (ft): /__ /,/ __ / __ / __ /

**PART C – ADDITIONAL FACILITY INFORMATION**

1. Indicate the type of pipeline system:
   - ☐ privately owned
   - ☐ municipally owned
   - ☐ investor owned
   - ☐ cooperative
   - ☐ Other ⇨ Specify: _____

2. Part of system involved in Incident: *(select only one)* ☐ Main ☐ Service ☐ Service Riser ☐ Outside Meter/Regulator set ☐ Inside Meter/Regulator set ☐ Farm Tap Meter/Regulator set ☐ District Regulator/Metering Station ☐ Other _____

   2.a. Year "Part of system involved in Incident" was installed: /___/___/___/___/___or ○ Unknown

3. When "Main" or "Service" is selected as the "Part of system involved in Incident" (from PART C, Question 2), provide the following:

   *3.a Nominal diameter of pipe (in): /___/___/./___/___/___/

   *3.b Pipe specification (e.g., API 5L, ASTM D2513): _____

   3.c Pipe manufacturer:_____or ○ Unknown

   3.d Year of manufacture: /___/___/___/___/___or ○ Unknown

4. Material involved in Incident: ☐ Steel ☐ Cast/Wrought Iron ☐ Ductile Iron ☐ Copper ☐ Plastic ☐ Reconditioned Cast Iron ☐ Unknown ☐ Other ⇨ Specify: _____

   4.a. If Steel ⇨ Specify seam type:_____or ○ None or ○ Unknown

   4.b. If Steel ⇨ Specify wall thickness *(inches)*: /___/./___/___/___/ or ☐ Unknown

   4.c. If Plastic ⇨ Specify type: ○ Polyvinyl Chloride (PVC) ○ Polyethylene (PE) ○ Cross-linked Polyethylene (PEX) ○ Polybutylene (PB) ○ Polypropylene (PP) ○ Acrylonitrile Butadiene Styrene (ABS) ○ Polyamide (PA) ○ Cellulose Acetate Butyrate (CAB) ○ Other _____ ○ Unknown

   4.d. If Plastic ⇨ Specify Standard Dimension Ratio (SDR): /___/___/___/___/___or wall thickness: /___/./___/___/___/ or ○ Unknown

   4.e. If Polyethylene (PE) is selected as the type of plastic in PART C, Question 4.c ⇨ Specify PE Pipe Material Designation Code (i.e., 2406, 3408, etc.) PE /___/___/___/___/ or ○ Unknown

5. Type of release involved: *(select only one)*
   - ☐ Mechanical Puncture ⇨ Approx. size: /___/___/___/./___/in. (axial) by /___/___/___/./___/in. (circumferential)
   - ☐ Leak ⇨ Select Type: ○ Pinhole ○ Crack ○ Connection Failure ○ Seal or Packing ○ Other
   - ☐ Rupture ⇨ Select Orientation: ○ Circumferential ○ Longitudinal ○ Other _____
     Approx. size: /___/___/___/./___/ in. (widest opening) by /___/___/___/___/./___/in. (length circumferentially or axially)
   - ☐ Other ⇨ *Describe: _____

| **PART D – ADDITIONAL CONSEQUENCE INFORMATION** | |
|---|---|

1. Class Location of Incident: *(select only one)*
   - ☐ Class 1 Location
   - ☐ Class 2 Location
   - ☐ Class 3 Location
   - ☐ Class 4 Location

2. Estimated Property Damage :
   - 2.a Estimated cost of public and non-Operator private property damage $ /___/___/___/,/___/___/___/,/___/___/___/
   - 2.b Estimated cost of Operator's property damage & repairs $ /___/___/___/,/___/___/___/,/___/___/___/
   - 2.c Estimated cost of Operator's emergency response $ /___/___/___/,/___/___/___/,/___/___/___/
   - 2.d Estimated other costs $ /___/___/___/,/___/___/___/,/___/___/___/
     Describe: _____
   - 2.e Total estimated property damage (sum of above) $ /___/___/___/,/___/___/___/,/___/___/___/

   Cost of Gas Released

   - 2.f Estimated cost of gas released $ /___/___/___/,/___/___/___/,/___/___/___/

3. Estimated number of customers out of service:
   - 3.a Commercial entities /___/,/___/___/___/
   - 3.b Industrial entities /___/,/___/___/___/
   - 3.c Residences /___/,/___/___/___/

**PART E – ADDITIONAL OPERATING INFORMATION**

1. Estimated pressure at the point and time of the Incident (psig): / / / / /
2. Normal operating pressure at the point and time of the Incident (psig): / / / / /
3. Maximum Allowable Operating Pressure (MAOP) at the point and time of the Incident (psig): / / / / /
4. Describe the pressure on the system relating to the Incident: *(select only one)*
   - ☐ Pressure did not exceed MAOP
   - ☐ Pressure exceeded MAOP, but did not exceed 110% of MAOP
   - ☐ Pressure exceeded 110% of MAOP

5. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Incident?
   - ☐ No
   - ☐ Yes ⇨ 5.a Was it operating at the time of the Incident? ○ Yes ○ No
     - 5.b Was it fully functional at the time of the Incident? ○ Yes ○ No
     - 5.c Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations) assist with the detection of the Incident? ○ Yes ○ No
     - 5.d Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Incident? ○ Yes ○ No

6. How was the Incident initially identified for the Operator? *(select only one)*
   - ☐ SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations)
   - ☐ Static Shut-in Test or Other Pressure or Leak Test
   - ☐ Controller
   - ☐ Air Patrol
   - ☐ Notification from Public
   - ☐ Notification from Third Party that caused the Incident
   - ☐ Local Operating Personnel, including contractors
   - ☐ Ground Patrol by Operator or its contractor
   - ☐ Notification from Emergency Responder
   - ☐ Other _____

   6.a If "Controller", "Local Operating Personnel, including contractors", "Air Patrol", or "Ground Patrol by Operator or its contractor" is selected in Question 6, specify the following: *(select only one)*
   - ○ Operator employee ○ Contractor working for the Operator

7. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Incident? *(select only one)*
   - ☐ Yes, but the investigation of the control room and/or controller actions has not yet been completed by the operator *(Supplemental Report required)*
   - ☐ No, the facility was not monitored by a controller(s) at the time of the Incident
   - ☐ No, the operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)*

     _____
     _____
     _____

   - ☐ Yes, Specify investigation result(s): *(select all that apply)*
     - ○ Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator) and other factors associated with fatigue
     - ○ Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator) and other factors associated with fatigue *(provide an explanation for why not)*

       _____
       _____
       _____

     - ○ Investigation identified no control room issues
     - ○ Investigation identified no controller issues
     - ○ Investigation identified incorrect controller action or controller error
     - ○ Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response
     - ○ Investigation identified incorrect procedures
     - ○ Investigation identified incorrect control room equipment operation
     - ○ Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response
     - ○ Investigation identified areas other than those above ⇨ Describe: _____

| **PART F – DRUG & ALCOHOL TESTING INFORMATION** | |
|---|---|

1. As a result of this Incident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?

   ○ No

   ○ Yes ⇨ 1.a Specify how many were tested: /___/___/
   1.b Specify how many failed: /___/___/

2. As a result of this Incident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?

   ○ No

   ○ Yes ⇨ 2.a Specify how many were tested: /___/___/
   2.b Specify how many failed: /___/___/

| **PART G –** APPARENT **CAUSE** | *Select only one box from PART G in the shaded column on the left representing the APPARENT Cause of the Incident, and answer the questions on the right. Describe secondary, contributing, or root causes of the Incident in the narrative (PART H).* |
|---|---|
| **G1 – Corrosion Failure** – ***only one **sub-cause** can be picked from shaded left-hand column | |
| ☐ External Corrosion | 1. Results of visual examination:<br>O Localized Pitting O General Corrosion<br>O Other _____<br>2. Type of corrosion: *(select all that apply)*<br>O Galvanic O Atmospheric O Stray Current O Microbiological O Selective Seam<br>O Other _____<br>3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)*<br>O Field examination O Determined by metallurgical analysis<br>O Other _____<br>4. Was the failed item buried under the ground?<br>O Yes ⇨ 4.a Was failed item considered to be under cathodic protection at the time of the incident?<br>O Yes ⇨ Year protection started: / / / / /<br>O No<br>4.b Was shielding, tenting, or disbonding of coating evident at the point of the incident?<br>O Yes O No<br>4.c Has one or more Cathodic Protection Survey been conducted at the point of the incident?<br>O Yes, CP Annual Survey ⇨ Most recent year conducted: / / / / /<br>O Yes, Close Interval Survey ⇨ Most recent year conducted: / / / / /<br>O Yes, Other CP Survey ⇨ Most recent year conducted: / / / / /<br>O No<br>O No ⇨ 4.d Was the failed item externally coated or painted? O Yes O No<br>5. Was there observable damage to the coating or paint in the vicinity of the corrosion?<br>O Yes O No<br>6. Pipeline coating type, if steel pipe is involved: *(select only one)*<br>O Fusion Bonded Epoxy O Coal Tar O Asphalt<br>O Polyolefin O Extruded Polyethylene O Field Applied Epoxy<br>O Cold Applied Tape O Paint O Composite O None<br>O Other _____<br>O Unknown |
| ☐ Internal Corrosion | 7. Results of visual examination:<br>O Localized Pitting O General Corrosion O Not cut open<br>O Other _____<br>8. Cause of corrosion: *(select all that apply)*<br>O Corrosive Commodity O Water drop-out/Acid O Microbiological O Erosion<br>O Other _____<br>9. The cause(s) of corrosion selected in Question 8 is based on the following; *(select all that apply)*<br>O Field examination O Determined by metallurgical analysis<br>O Other _____<br>10. Location of corrosion: *(select all that apply)*<br>O Low point in pipe O Elbow O Drop-out<br>O Other _____<br>11. Was the gas/fluid treated with corrosion inhibitors or biocides? O Yes O No<br>12. Were any liquids found in the distribution system where the Incident occurred?<br>O Yes O No |

**Complete the following if any Corrosion Failure sub-cause is selected AND the "Part of system involved in Incident" (from PART C, Question 2) is Main, Service, or Service Riser.**

13. Date of the most recent Leak Survey conducted: / / / / / / / / /
Month Day Year

14. Has one or more pressure test been conducted since original construction at the point of the Incident?
O Yes ⇨ Most recent year tested: / / / / / Test pressure (psig): / / / / / /
O No

## G2 – Natural Force Damage – *only one **sub-cause** can be picked from shaded left-handed column

| | |
|---|---|
| ☐ Earth Movement, NOT due to Heavy Rains/Floods | 1. Specify: O Earthquake O Subsidence O Landslide O Other _____ |
| ☐ Heavy Rains/Floods | 2. Specify: O Washouts/Scouring O Flotation O Mudslide O Other _____ |
| ☐ **Lightning** | 3. Specify: O Direct hit O Secondary impact such as resulting nearby fires |
| ☐ **Temperature** | 4. Specify: O Thermal Stress O Frost Heave O Frozen Components O Other _____ |
| ☐ High Winds | |
| ☐ **Other Natural Force Damage** | 5. Describe: _____ |

**Complete the following if any Natural Force Damage sub-cause is selected.**

6. Were the natural forces causing the Incident generated in conjunction with an extreme weather event? O Yes O No

6.a. If Yes, specify: *(select all that apply)* O Hurricane O Tropical Storm O Tornado O Other _____

| **G3 – Excavation Damage** – *only one **sub-cause** can be picked from shaded left-hand column | |
|---|---|
| ☐ Excavation Damage by Operator (First Party) | |
| ☐ **Excavation Damage by Operator's Contractor (Second Party)** | |
| ☐ **Excavation Damage by Third Party** | |
| ☐ **Previous Damage due to Excavation Activity** | **Complete the following ONLY IF the "Part of system involved in Incident" (from PART C, Question 2) is Main, Service, or Service Riser.**<br>1. Date of the most recent Leak Survey conducted: / / / (Month) / / / (Day) / / / (Year)<br>2. Has one or more pressure test been conducted since original construction at the point of the Incident?<br>O Yes ⇨ Most recent year tested: / / / / /<br>Test pressure (psig): / / / / / /<br>O No |

**Complete the following if Excavation Damage by Third Party is selected.**

3. Did the operator get prior notification of the excavation activity? O Yes O No

3.a If Yes, Notification received from: *(select all that apply)* O One-Call System O Excavator O Contractor O Landowner

**Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.**

4. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)? ○Yes ○ No

5. Right-of-Way where event occurred: *(select all that apply)*

☐ Public ⇨ Specify: ○ City Street ○ State Highway ○ County Road ○ Interstate Highway ○ Other

☐ Private ⇨ Specify: ○ Private Landowner ○ Private Business ○ Private Easement

☐ Pipeline Property/Easement
☐ Power/Transmission Line
☐ Railroad
☐ Dedicated Public Utility Easement
☐ Federal Land
☐ Data not collected
☐ Unknown/Other

6. Type of excavator: *(select only one)*

○ Contractor ○ County ○ Developer ○ Farmer ○ Municipality ○ Occupant
○ Railroad ○ State ○ Utility ○ Data not collected ○ Unknown/Other

7. Type of excavation equipment: *(select only one)*

○ Auger ○ Backhoe/Trackhoe ○ Boring ○ Drilling ○ Directional Drilling
○ Explosives ○ Farm Equipment ○ Grader/Scraper ○ Hand Tools ○ Milling Equipment
○ Probing Device ○ Trencher ○ Vacuum Equipment ○ Data not collected ○ Unknown/Other

8. Type of work performed: *(select only one)*

○ Agriculture ○ Cable TV ○ Curb/Sidewalk ○ Building Construction ○ Building Demolition
○ Drainage ○ Driveway ○ Electric ○ Engineering/Surveying ○ Fencing
○ Grading ○ Irrigation ○ Landscaping ○ Liquid Pipeline ○ Milling
○ Natural Gas ○ Pole ○ Public Transit Authority ○ Railroad Maintenance ○ Road Work
○ Sewer (Sanitary/Storm) ○ Site Development ○ Steam ○ Storm Drain/Culvert ○Street Light
○ Telecommunications ○Traffic Signal ○ Traffic Sign ○ Water ○ Waterway Improvement
○ Data not collected ○ Unknown/Other

*(This CGA-DIRT section continued on next page with Question 9.)*

9. Was the One-Call Center notified? ○ Yes ○ No

10. Type of Locator: ○ Utility Owner ○ Contractor Locator ○ Data not collected ○ Unknown/Other

11. Were facility locate marks visible in the area of excavation? ○ No ○ Yes ○ Data not collected ○ Unknown/Other

12 Were facilities marked correctly? ○ No ○ Yes ○ Data not collected ○ Unknown/Other

13. Did the damage cause an interruption in service? ○ No ○ Yes ○ Data not collected ○ Unknown/Other

13.a If Yes, specify duration of the interruption: /___/___/_____/_____/ hours

14 Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well)*:

☐ One-Call Notification Practices Not Sufficient: *(select only one)*

- ○ No notification made to the One-Call Center
- ○ Notification to One-Call Center made, but not sufficient
- ○ Wrong information provided

☐ Locating Practices Not Sufficient: *(select only one)*

- ○ Facility could not be found/located
- ○ Facility marking or location not sufficient
- ○ Facility was not located or marked
- ○ Incorrect facility records/maps

☐ Excavation Practices Not Sufficient: *(select only one)*

- ○ Excavation practices not sufficient (other)
- ○ Failure to maintain clearance
- ○ Failure to maintain the marks
- ○ Failure to support exposed facilities
- ○ Failure to use hand tools where required
- ○ Failure to verify location by test-hole (pot-holing)
- ○ Improper backfilling

☐ One-Call Notification Center Error

☐ Abandoned Facility

☐ Deteriorated Facility

☐ Previous Damage

☐ Data Not Collected

☐ Other / None of the Above *(explain)* _____

_____

_____

_____

_____

_____

| **G4 – Other Outside Force Damage** – *only one **sub-cause** can be selected from the shaded left-hand column | |
|---|---|
| ☐ Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident | |
| ☐ **Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation** | 1. Vehicle/Equipment operated by: *(select only one)*<br>O Operator O Operator's Contractor O Third Party |
| ☐ Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring | 2. Select one or more of the following IF an extreme weather event was a factor:<br>O Hurricane O Tropical Storm O Tornado<br>O Heavy Rains/Flood O Other _____ |
| ☐ Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation | |
| ☐ **Electrical Arcing from Other Equipment or Facility** | |
| ☐ **Previous Mechanical Damage NOT Related to Excavation** | **Complete the following ONLY IF the "Part of system involved in Incident" (from PART C, Question 2) is Main, Service, or Service Riser.**<br>3. Date of the most recent Leak Survey conducted: __/__/__ __/__/__ __/__/__ (Month / Day / Year)<br>4. Has one or more pressure test been conducted since original construction at the point of the Incident?<br>O Yes ⇨ Most recent year tested: __/__/__/__/__<br>Test pressure (psig): __/__/__/__/__/__<br>O No |
| ☐ Intentional Damage | 5. Specify:<br>O Vandalism O Terrorism<br>O Theft of transported commodity O Theft of equipment<br>O Other _____ |
| ☐ Other Outside Force Damage | 6. Describe: _____ |

| **G5 – Pipe, Weld, or Joint Failure** – *only one **sub-cause** can be selected from the shaded left-hand column | |
|---|---|
| ☐ **Body of Pipe** | 1. Specify: ○ Dent ○ Gouge ○ Bend ○ Arc Burn ○ Crack ○ Other _____ |
| ☐ Butt Weld | 2. Specify: ○ Pipe ○ Fabrication ○ Other _____ |
| ☐ **Fillet Weld** | 3. Specify: ○ Branch ○ Hot Tap ○ Fitting ○ Repair Sleeve ○ Other _____ |
| ☐ Pipe Seam | 4. Specify: ○ LF ERW ○ HF ERW ○ Flash Weld ○ DSAW ○ SAW ○ Spiral ○ Other _____ |
| ☐ Threaded Metallic Pipe | |
| ☐ **Mechanical Fitting** | 5. Specify the mechanical fitting involved:<br>○ Stab type fitting ○ Nut follower type fitting ○ Bolted type fitting<br>○ Other _____<br>6. Specify the type of mechanical fitting:<br>○ Service Tee ○ Coupling ○ Service Head Adapter<br>○ Basement Adapter ○ Riser ○ Elbow<br>○ Other _____<br>7. Manufacturer: _____<br>8. Year manufactured: /__/__/__/__/<br>9. Year installed: /__/__/__/__/<br>10. Other attributes:_____<br>11. . Specify the two materials being joined:<br>11.a First material being joined:<br>☐ Steel ☐ Cast/Wrought Iron<br>☐ Ductile Iron ☐ Copper ☐ Plastic<br>☐ Unknown<br>☐ Other ⇨ Specify: _____<br>11.b If Plastic ⇨ Specify: ○ Polyvinyl Chloride (PVC) ○ Polyethylene (PE)<br>○ Cross-linked Polyethylene (PEX) ○ Polybutylene (PB)<br>○ Polypropylene (PP) ○ Acrylonitrile Butadiene Styrene (ABS)<br>○ Polyamide (PA) ○ Cellulose Acetate Butyrate (CAB)<br>○ Other ⇨ Specify: _____<br>11.c Second material being joined:<br>☐ Steel ☐ Cast/Wrought Iron<br>☐ Ductile Iron ☐ Copper ☐ Plastic<br>☐ Unknown<br>☐ Other ⇨ Specify: _____<br>11.d If Plastic ⇨ Specify: ○ Polyvinyl Chloride (PVC) ○ Polyethylene (PE)<br>○ Cross-linked Polyethylene (PEX) ○ Polybutylene (PB)<br>○ Polypropylene (PP) ○ Acrylonitrile Butadiene Styrene (ABS)<br>○ Polyamide (PA) ○ Cellulose Acetate Butyrate (CAB)<br>○ Other ⇨ Specify: _____<br>12. . If used on plastic pipe, did the fitting – as designed by the manufacturer – include restraint?<br>○ Yes ○ No ○ Unknown<br>12.a If Yes, specify: ○ Cat. I ○ Cat. II ○ Cat. III ○ DOT 192.283 |

| | |
|---|---|
| ☐ Compression Fitting | 13. . Fitting type: _____<br>14. Manufacturer: _____<br>15. . Year manufactured: /__/__/__/__/<br>16. . Year installed: /__/__/__/__/<br>17. Other attributes _____<br>18. . Specify the two materials being joined:<br>18.a First material being joined:<br>☐ Steel ☐ Cast/Wrought Iron<br>☐ Ductile Iron ☐ Copper ☐ Plastic<br>☐ Unknown<br>☐ Other ⇨ Specify: _____<br>18.b If Plastic ⇨ Specify : ○ Polyvinyl Chloride (PVC) ○ Polyethylene (PE)<br>○ Cross-linked Polyethylene (PEX) ○ Polybutylene (PB)<br>○ Polypropylene (PP) ○ Acrylonitrile Butadiene Styrene (ABS)<br>○ Polyamide (PA) ○ Cellulose Acetate Butyrate (CAB)<br>○ Other ⇨ Specify: _____<br>18.c Second material being joined:<br>☐ Steel ☐ Cast/Wrought Iron<br>☐ Ductile Iron ☐ Copper ☐ Plastic<br>☐ Unknown<br>☐ Other ⇨ Specify: _____<br>18.d If Plastic ⇨ Specify: ○ Polyvinyl Chloride (PVC) ○ Polyethylene (PE)<br>○ Cross-linked Polyethylene (PEX) ○ Polybutylene (PB)<br>○ Polypropylene (PP) ○ Acrylonitrile Butadiene Styrene (ABS)<br>○ Polyamide (PA) ○ Cellulose Acetate Butyrate (CAB)<br>○ Other ⇨ Specify: _____ |
| ☐ Fusion Joint | 19. . Specify: ○ Butt, Heat Fusion ○ Butt, Electrofusion ○ Saddle, Heat Fusion<br>○ Saddle, Electrofusion ○ Socket, Heat Fusion ○ Socket, Electrofusion<br>○ Other _____<br>20. Year installed: /__/__/__/__/<br>21. Other attributes: _____<br>22. Specify the two materials being joined:<br>22.a First material being joined:<br>○ Polyvinyl Chloride (PVC) ○ Polyethylene (PE)<br>○ Cross-linked Polyethylene (PEX) ○ Polybutylene (PB)<br>○ Polypropylene (PP) ○ Acrylonitrile Butadiene Styrene (ABS)<br>○ Polyamide (PA) ○ Cellulose Acetate Butyrate (CAB)<br>○ Other ⇨ Specify: _____<br>22.b Second material being joined:<br>○ Polyvinyl Chloride (PVC) ○ Polyethylene (PE)<br>○ Cross-linked Polyethylene (PEX) ○ Polybutylene (PB)<br>○ Polypropylene (PP) ○ Acrylonitrile Butadiene Styrene (ABS)<br>○ Polyamide (PA) ○ Cellulose Acetate Butyrate (CAB)<br>○ Other ⇨ Specify: _____ |
| ☐ Other Pipe, Weld, or Joint Failure | 23. Describe: _____ |

**Complete the following if any Pipe, Weld, or Joint Failure sub-cause is selected.**

24. Additional Factors: *(select all that apply)* ○ Dent ○ Gouge ○ Pipe Bend ○ Arc Burn ○ Crack ○ Lack of Fusion
○ Lamination ○ Buckle ○ Wrinkle ○ Misalignment ○ Burnt Steel
○ Other _____

25. Was the Incident a result of:
☐ Construction defect, specify: ⇨ ○ Poor workmanship ○ Procedure not followed ○ Poor construction/installation procedures
☐ Material defect, specify: ⇨ ○ Long seam ○ Other _____
☐ Design defect
☐ Previous damage

26. Has one or more pressure test been conducted since original construction at the point of the Incident?
○ Yes ⇨ Most recent year tested: /___/___/___/___/ Test pressure (psig): /___/___/___/___/___/
○ No

## G6 – Equipment Failure – *only one **sub-cause** can be selected from the shaded left-hand column

| | |
|---|---|
| □ Malfunction of Control/Relief Equipment | 1. Specify: *(select all that apply)*<br>○ Control Valve ○ Instrumentation ○ SCADA<br>○ Communications ○ Block Valve ○ Check Valve<br>○ Relief Valve ○ Power Failure ○ Stopple/Control Fitting<br>○ Pressure Regulator<br>○ Other_____ |
| □ Threaded Connection Failure | 2. Specify: ○ Pipe Nipple ○ Valve Threads ○ Threaded Pipe Collar<br>○ Threaded Fitting<br>○ Other _____ |
| □ Non-threaded Connection Failure | 3. Specify: ○ O-Ring ○ Gasket ○ Other Seal or Packing<br>○ Other_____ |
| □ Valve | 4. Specify: ○ Manufacturing defect ○ Other _____<br>4.a Valve type: _____<br>4.b Manufactured by: _____<br>4.c Year manufactured: /___/___/___/___/ |
| ☐ Other Equipment Failure | 5. Describe: _____ |

## G7 – Incorrect Operation – *only one **sub-cause** can be selected from the shaded left-hand column

| | |
|---|---|
| ☐ **Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage** | |
| ☐ **Valve Left or Placed in Wrong Position, but NOT Resulting in an Overpressure** | |
| ☐ **Pipeline or Equipment Overpressured** | |
| ☐ **Equipment Not Installed Properly** | |
| ☐ **Wrong Equipment Specified or Installed** | |
| ☐ **Other Incorrect Operation** | 1. Describe: _____ |

**Complete the following if any Incorrect Operation sub-cause is selected.**

2. Was this Incident related to: *(select all that apply)*
   - ○ Inadequate procedure
   - ○ No procedure established
   - ○ Failure to follow procedure
   - ○ Other:* _____

3. What category type was the activity that caused the Incident:
   - ○ Construction
   - ○ Commissioning
   - ○ Decommissioning
   - ○ Right-of-Way activities
   - ○ Routine maintenance
   - ○ Other maintenance
   - ○ Normal operating conditions
   - ○ Non-routine operating conditions (abnormal operations or emergencies)

4. Was the task(s) that led to the Incident identified as a covered task in your Operator Qualification Program? ○ Yes ○ No

   4.a If Yes, were the individuals performing the task(s) qualified for the task(s)?

   - ○ Yes, they were qualified for the task(s)
   - ○ No, but they were performing the task(s) under the direction and observation of a qualified individual
   - ○ No, they were not qualified for the task(s) nor were they performing the task(s) under the direction and observation of a qualified individual

## G8 – Other Incident Cause – *only one **sub-cause** can be selected from the shaded left-hand column

| | |
|---|---|
| □ Miscellaneous | 1. Describe: |
| ☐ **Unknown** | 2. Specify: ○ Investigation complete, cause of Incident unknown<br>○ Still under investigation, cause of Incident to be determined*<br>*(*Supplemental Report required)* |

**PART H – NARRATIVE DESCRIPTION OF THE INCIDENT** *(Attach additional sheets as necessary)*

**PART I – PREPARER AND AUTHORIZED SIGNATURE**

Preparer's Name (type or print)

Preparer's Title (type or print)

Preparer's E-mail Address

Preparer's Telephone Number

Preparer's Facsimile Number

Authorized Signer

Date

Authorized Signer Telephone Number

Authorized Signer's Title

Authorized Signer's E-mail Address

# GENERAL INSTRUCTIONS

Each operator of a gas distribution system shall file Form PHMSA F 7100.1 for an incident that meets the criteria in 49 CFR §191.3 as soon as practicable but not more than 30 days after detection of the incident. Requirements for submitting reports are in §191.7 and §191.9.
Master meter operators are exempt from filing incident reports per §191.9(c).

The intentional and controlled release of gas for the purpose of maintenance or other routine operating activities need not be reported if the only reportable criterion is unintentional loss of gas of 3 million cubic feet or more as described in §191.3 under "Incident" (1)(iii).
Special considerations apply when a gas distribution system failure or release occurs involving secondary ignition. Secondary ignition is a fire where the origin of the fire is unrelated to the gas systems subject to Parts 191 or 192, such as electrical fires, arson, etc., and includes events where fire or explosion not originating from a gas distribution system failure or release was the primary *cause* of the gas distribution system failure or release, such as a house fire that subsequently resulted in – but was not caused by – a gas distribution system failure or release. An incident caused by secondary ignition is not to be reported unless a release of gas escaping from facilities subject to regulation under Parts 191 or 192 results in one or more of the consequences as described in §191.3 under "Incident" (1). The determination of consequences from a gas distribution system incident caused by secondary ignition, though, is an area of possible confusion when reporting incidents. This situation is particularly susceptible to confusion as compared to other Natural or Other Outside Force Damage because it is extremely difficult in most cases to establish whether and which consequences were attributable to the initiating fire (that is, the "secondary ignition" source itself) or to a subsequent fire due to a resulting gas distribution system failure or release. PHMSA is providing the following guidance for operators to use when secondary ignition is involved (sometimes referred to as "Fire First" incidents):

- A gas distribution system incident attributed to secondary ignition is to be reported to PHMSA if any fatalities or injuries are involved unless it can be established with reasonable certainty that all of the casualties either preceded the gas distribution system failure or release, or would have occurred whether or not the gas distribution system failure or release occurred.
- A gas distribution system incident attributed to secondary ignition is NOT to be reported to PHMSA if the only reportable criterion is unintentional loss of gas of 3 million cubic feet or more as described in §191.3 under "Incident"
  (1)(iii).
- A gas distribution system incident attributed to secondary ignition is NOT to be reported to PHMSA unless the damage to facilities subject to Parts 191 or 192 equals or exceeds $50,000.

These considerations apply to several gas distribution system incident cause categories as indicated in pertinent sections of these instructions.
Form PHMSA F 7100.1 and these instructions can be found on http://phmsa.dot.gov/pipeline/library/forms. The applicable documents are listed in the section titled Accident/Incident/Annual Reporting Forms.

## ONLINE REPORTING REQUIREMENTS

Incident Reports must be submitted online through the PHMSA Portal at https://portal.phmsa.dot.gov/portal, unless an alternate method is approved (see Alternate Reporting Methods below). You will not be able to submit reports until you have met all of the Portal registration requirements – see http://opsweb.phmsa.dot.gov/portal_message/PHMSA_Portal_Registration.pdf Completing these registration requirements could take several weeks. Plan ahead and register well in advance of the report due date.

Use the following procedure for online reporting:

1. Go to the PHMSA Portal at https://portal.phmsa.dot.gov/portal
2. Enter PHMSA Portal Username and Password ; press *enter*
3. Select OPID; press "*continue*" button.
4. On the left side menu under "Incident/Accident (2010 to present)" select "**ODES 2.0"**
5. Under "**Create Reports**" on the left side of the screen, select "Gas Distribution" and proceed with entering your data.
6. Click "**Submit**" when finished with your data entry to have your report uploaded to PHMSA's database as an official submission of an Incident Report; or click "**Save**" which doesn't submit the report to PHMSA but stores it in a draft status to allow you to come back to complete your data entry and report submission at a later time. *Note: The "Save" feature will allow you to start a report and save a draft of it which you can print out and/or save as a PDF to email to colleagues in order to gather additional information and then come back to accurately complete your data entry before submitting it to PHMSA.*
7. Once you click "**Submit**", the system will check if all applicable portions of the report have been completed. If portions are incomplete, a listing of these portions will appear above the row of Parts. If all applicable portions have been completed, the system will show your Saved Incident/Accident Reports in the top portion of the screen and your Submitted Incident/Accident Reports in the bottom portion of the screen. *Note: To confirm that your report was successfully submitted to PHMSA, look for it in the bottom portion of the screen where you can also view a PDF of what you submitted.*

**Supplemental Report Filing** – Follow Steps 1 through 4 above, and double-click a submitted report from the Submitted Incident/Accident Reports list. The report will default to a "Read Only" mode that is pre-populated with the data you submitted previously. To create a supplemental report, click on "Create Supplemental" found in the upper right corner of the screen. At this point, you can amend your data and make an official submission of the report to PHMSA as either a Supplemental Report or as a Supplemental Report *plus* Final Report (see "Specific Instructions, PART A, Report Type"), or you can use the "**Save**" feature to create a draft of your Supplemental Report to be submitted at some future date.

## Alternate Reporting Methods

Operators for whom electronic reporting imposes an undue burden and hardship may submit a written request for an alternate reporting method. Operators must follow the requirements in §191.7(d) to request an alternate reporting method and must comply with any conditions imposed as part of PHMSA's approval of an alternate reporting method.

## RETRACTING A 30-DAY WRITTEN REPORT

An operator who reports an incident in accordance with §191.9 (oftentimes referred to as a 30day written report) and upon subsequent investigation determines that the event did not meet the criteria in §191.3 may request that their report be retracted. Requests to retract a 30-day written report are to be emailed to InformationResourcesManager@dot.gov. Requests are to include the following information:

a. The Report ID (the unique 8-digit identifier assigned by PHMSA)
b. Operator name
c. PHMSA-issued OPID number
d. The number assigned by the National Response Center (NRC) when an immediate notice was made in accordance with §191.5. If Supplemental Reports were made to the NRC for the event, list all NRC report numbers associated with the event. e. Date of the event
f. Location of the event
g. A brief statement as to why the report should be retracted.

Note: PHMSA no longer requests that operators rescind erroneously reported "Immediate Notices" filed with the NRC in accordance with §191.5 (oftentimes referred to as "Telephonic Reports").

## SPECIAL INSTRUCTIONS

All applicable data fields must be completed before an Original Report will be accepted. Your Original Report cannot be submitted online until the required information has been provided, although your partially completed report can be saved online so that you can return at a later time to provide the missing information.

1. An entry should be made in each applicable space or check box, unless otherwise directed by the section instructions.
2. If the data is unavailable, enter "Unknown" for text fields and leave numeric fields and fields using check boxes or "radio" buttons blank.
3. Estimate data only if necessary. Provide an estimate in lieu of answering a question with "Unknown" or leaving the field blank. Estimates should be based on best-available information and reasonable effort.
4. For unknown or estimated data entries, the operator should file a Supplemental Report when additional or more accurate information becomes available.
5. If the question is not applicable, enter "N/A" for text fields and leave numeric fields and fields using check boxes or "radio" buttons blank. Do not enter zero unless this is the actual value being submitted for the data in question.
6. If **OTHER** is checked for any answer to a question, include an explanation or description in the text field provided, making it clear why "Other" was the necessary selection.

7. Pay close attention to each question for the phrase:
   a. ***(select all that apply)***
   b. ***(select only one)***

   If the phrase is not provided for a given question, then "select only one" applies. "Select only one" means that you should select the single, primary, or most applicable answer. DO NOT SELECT MORE ANSWERS THAN REQUESTED. "Select all that apply" requires that all applicable answers (one or more than one) be selected.
8. **Date format** = mm/dd/yyyy
9. **Time format:** All times are reported as a 24-hour clock:

   **Time format Examples:**

   a. (0000) = midnight = /0/0/0/0/
   b. (0800) = 8:00 a.m. = /0/8/0/0/
   c. (1200) = Noon = /1/2/0/0/
   d. (1715) = 5:15 p.m. = /1/7/1/5/
   e. (2200) = 10:00 p.m. = /2/2/0/0/

   **Local time** always refers to time at the site of the incident. Note that time zones at the incident site may be different than the time zone for the person discovering or reporting the event. For example, if a release occurs at an gas distribution system facility in Denver, Colorado at 2:00 pm MST, but a supervisor located in Houston is filing the report after having been notified at 3:00 pm CST, the time of the incident should be reported as 1400 hours based on the time in Denver, which is the physical site of the incident.

## SPECIFIC INSTRUCTIONS

## PART A – KEY REPORT INFORMATION

### Report Type: *(select all that apply)*

Check the appropriate report box or boxes to indicate the type of report being filed. Depending on the descriptions below, the following combinations of boxes – and only one of these combinations - may be selected:

- Original Report only
- Original Report *plus* Final Report
- Supplemental Report only
- Supplemental Report *plus* Final Report

☐ **Original Report**

Select if this is the FIRST report filed for this incident and you expect that additional or updated information will be provided later.

☐ **Original Report** *plus* ☐ **Final Report**

Select **both** Original Report and Final Report if ALL of the information requested is known and can be provided at the time the initial report is filed, including final property damage costs and apparent failure cause information. If new, updated, and/or corrected information becomes available, you are still able to file a Supplemental Report.

☐ **Supplemental Report**

Select only if you have already filed an Original Report AND you are now providing new, updated, and/or corrected information. Multiple Supplemental Reports are to be submitted, as necessary, in order to provide new, updated, and/or corrected information ***when it becomes available*** and, per §191.9(b), each Supplemental Report containing new, updated, and/or corrected information is to be filed as soon as practicable. Submission of new, updated, and/or corrected information is NOT to be delayed in order to accumulate "enough" to "warrant" a Supplemental Report, or to complete a Final Report. ***Supplemental Reports must be filed as soon as practicable following the Operator's awareness of new, updated, and/or corrected information.*** Failure to comply with these requirements can result in enforcement actions, including the assessment of civil penalties not to exceed $100,000 for each violation for each day that such violation persists up to a maximum of $1,000,000.

For Supplemental Reports filed online, all data previously submitted will automatically populate in the form. Page through the form to make edits and additions where needed.

☐ **Supplemental Report** *plus* ☐ **Final Report**

If an Original Report has already been filed AND new, updated, and/or corrected information is now being submitted via a Supplemental Report, AND the operator is reasonably certain that no further information will be forthcoming, then Final Report is to also be selected along with Supplemental Report. (See also the requirements stated above under "Supplemental Report".)

**In PART A, answer Questions 1 thru 17 by providing the requested information or by making- the appropriate selection.**

**1. Operator's OPS -Issued Operator Identification Number (OPID)**

For online entries, the OPID will automatically populate based on the selection you made when entering the Portal. If you have log-in credentials for multiple OPID, be sure the report is being created for the appropriate OPID. Contact PHMSA's Information Resources Manager at 202-3668075 if you need assistance with an OPID. Business hours are 8:30 AM to 5:00 PM Eastern Time.

**2. Name of Operator**

This is the company name associated with the OPID. For online entries, the name will automatically populate based on the OPID entered in A1. If the name that appears is not correct, you need to submit an Operator Name Change (Type A) Notification.

**3. Address of Operator**

For online entries, the headquarters address will automatically populate based on the OPID entered in A1. If the address that appears is not correct, you need to change it in the online Contacts module.

**4. Local time (24-hour clock) and date of the Incident**

Enter the earliest local date/time an incident reporting criteria was met. In some cases, this date/time must be estimated based on information gathered during the investigation.

See "Special Instructions", numbers 8 and 9 for examples of **Date format** and **Time format** expressed as a 24-hour clock.

**5. Location of Incident**

a. Provide the street address of the incident (enter "unknown" if no street address)
b. Provide the name of the city where the incident occurred. If the incident did not occur within a municipality, select Not Within Municipality in the City field.
c. Provide the name of the county or parish where the incident occurred.
d. Enter the 2-digit state abbreviation where the incident occurred.
e. Enter the zip code where the incident occurred.
f. The latitude and longitude of the incident are to be reported as Decimal Degrees with a minimum of 5 decimal places (e.g. Lat: 38.89664; Long: -77.04327), using the NAD83 or WGS84 datums.

If you have coordinates in degrees/minutes or degrees/minutes/seconds use the formula below to convert to decimal degrees:

degrees + (minutes/60) + (seconds/3600) = decimal degrees

e.g. 38° 53' 47.904" = 38 + (53/60) + (47.904/3600) = 38.89664°

All locations in the United States will have a negative longitude coordinate**, which has already been included on the data entry form so that operators do not have to enter the negative sign**.

If you cannot locate the incident with a GPS or some other means, there are online tools that may assist you at http://viewer.nationalmap.gov/viewer/. Any questions regarding the required format, conversion, or how to use the tools noted above can be directed to Amy Nelson (202-493-0591 or amy.nelson@dot.gov).

**6. National Response Center (NRC) Report Number**

§191.5 requires that incidents meeting the criteria outlined in §191.3 be reported directly to the **24-hour National Response Center (NRC) at 1-800-424-8802** at the earliest practicable moment (generally within 2 hours). The NRC assigns numbers to each call. The number assigned to that Immediate Notice (sometimes referred to as the "Telephonic Report") is to be entered in Question 6. When there is more than one NRC report for the incident, enter the first report in this field and remaining NRC report numbers in Part H – Narrative. If a NRC report was not made, select the option that best describes why: NRC Notification Not Required, NRC Notification Required But Not Made, Do Not Know NRC Report Number.

**7. Local time (24-hr clock) and date of initial telephonic report to the National Response Center**

Enter the time and date of the initial Immediate Notice of incident to the NRC. The time is to be shown by 24-hour clock notation, and is to reflect the time in the time zone where the incident was physically located. (See "Special Instructions", numbers 8 and 9.)

**8. Incident resulted from**

Indicate whether the incident resulted from intentional or unintentional release of gas or from reasons other than release of gas.

**9. Gas released**:

Select the type of gas released. An example of **Synthetic Gas** is manufactured gas based on naphtha. **Landfill Gas** includes biogas.

**10. Estimated volume of gas released**

Estimate the amount of gas that was released (in thousands of standard cubic feet, MCF) from the beginning of the incident until such time as gas is no longer being released from the gas distribution system or until intentional and controlled blowdown has commenced. Estimates are to be based on best-available information. *Important Note: Volumes consumed by fire and/or explosion are to be included in the estimated volume reported.*

**11. Were there fatalities?**

If a person dies at the time of the incident or within 30 days of the initial incident date due to injuries sustained as a result of the incident, report as a fatality. If a person dies subsequent to an injury more than 30 days past the incident date, report as an injury. (Note: This aligns with the Department of Transportation's general guidelines for all jurisdictional modes for reporting deaths and injuries.)

**Contractor employees working for the operator** are individuals hired to work for or on behalf of the operator of the gas distribution system. These individuals are not to be reported as "Operator employees".

**Non-Operator emergency responders** are individuals responding to render professional aid at the incident scene including on-duty and volunteer fire fighters, rescue workers, EMTs, police officers, etc. "Good Samaritans" that stop to assist are to be reported as "General public."

**Workers Working on the Right of Way, but NOT Associated with this Operator** means people authorized to work in or near the right-of-way, but not hired by or working on behalf of the operator of the gas distribution system. This includes all work conducted within the right-of-way including work associated with other underground facilities sharing the right-of-way, building/road construction in or across the right-of-way, or farming. This category most often includes employees of other underground facilities operators, or their contractors, working in or near a shared right-of-way. For distribution pipelines not located in a defined right-of-way, this category should be left blank.

**12. Were there injuries requiring inpatient hospitalization?**

Injuries requiring inpatient hospitalization are injuries sustained as a result of the incident and requiring hospital admission *and* at least one overnight stay.

See Question 11 for additional definitions that apply.

**13. Was the pipeline/facility shut down due to the Incident?**

Report any shutdowns that occur as a result of the incident, including but not limited to those required for damage assessment, temporary repair, permanent repair, and clean-up.

If No is selected, explain the reason that no shutdown was needed in the space provided.

If Yes is selected, complete questions 13.a and 13.b.

**13.a. Local time (24hr clock) and date of shutdown**
**13.b. Local time pipeline/facility restarted**

The time is to be shown by 24-hour clock notation, and is to reflect the time in the time zone where the incident was physically located. (See "Special Instructions", numbers 9 and 10.) Enter the time and date of the shutdown that is associated with the onset or occurrence of the incident in 13.a and the time and date of restart in 13.b. The intent with this data is to capture the total time that the gas distribution system or facility is shutdown due to the incident. If the gas distribution system or facility has not been restarted at the time of reporting, select "Still shut down" for Question 13.b and then include the restart time and date in a future Supplemental Report.

**14. Did the Gas Ignite?**

**Ignite** means the released gas caught fire**.**

**15. Did the Gas Explode?**

**Explode** means the ignition of the released gas occurred with a sudden and violent release of energy.

**16. Number of general public evacuated**

The number of people evacuated is to be estimated based on operator knowledge, or police, fire department, or other emergency responder reports. If there was no evacuation involving the general public, report zero (0). If an estimate is not possible for some reason, leave the field blank but include an explanation of why it was not possible to provide a number in PART H – Narrative Description of the Incident.

**17. Time sequence (use local time, 24-hour clock)**

In 17a, enter the date/time the operator became aware of the failure. The earliest date/time that an incident reporting criteria was met is reported in item A4. In some cases, the operator may become aware of a failure before an incident reporting criteria is met. In other cases, one or more incident reporting criteria may be met before the operator becomes aware of the failure. In 17b, enter the date/time operator responders, company or contract, arrived on site. These times are to be shown by 24-hour clock notation and reported in the time in the time zone where the incident occurred. (See "Special Instructions", numbers 8 and 9 and 10.) PHMSA will use this data to calculate incident response times.

## PART B – ADDITIONAL LOCATION INFORMATION

### 1. Was the incident on Federal Land?

Federal Lands means all lands the United States owns, including military reservations, except lands in National Parks and lands held in trust for Native Americans. Incidents at Federal buildings, such as Federal Court Houses, Custom Houses, and other Federal office buildings and warehouses, are NOT to be reported as being on Federal Lands.

### 2. Location of incident

**Operator-controlled property** would normally apply to an operator's facility, which may or may not have controlled access, but which is oftentimes fenced or otherwise marked with discernible boundaries. This "operator-controlled property" does not refer to the pipeline rightof-way/easement, which is a separate choice for this question.

### 3. Area of incident

This refers to the location on the gas distribution system at which gas was released, resulting in the incident. It does not refer to adjacent locations in which released gas may have accumulated or ignited.

**Underground** means pipe, components, or other facilities installed below the natural ground level, road bed, or below the underwater natural bottom.

**Under pavement** includes under streets, sidewalks, paved roads, driveways, and parking lots.

**Exposed due to Excavation** means that a normally buried facility had been exposed by any party (operator, operator's contractor, or third party) preparatory to or as a result of excavation. The cause of the release, however, may or may not necessarily be related to excavation damage. This category could include a corrosion leak not previously evidenced by stained vegetation, but found during excavation, or a release caused by a non-excavation vehicle where contact happened to occur while the facility was exposed for excavation repair or examination. Natural forces might also damage a facility that happened to be temporarily exposed. In each case, the cause is to be appropriately reported in PART G of this form.

**Aboveground** means pipe, components, or other facilities that are above the natural grade.

**Typical aboveground facility piping** includes any pipe or components installed aboveground such as those at regulating stations or valve sites.

**Transition area** means the junction of differing material or media between pipes, components, or facilities such as those installed at a belowground-aboveground junction (soil/air interface), another environmental interface, or in close contact to supporting elements such as those at water crossings and meter stations.

**4. Did Incident occur in a crossing?**

Use **Bridge Crossing** if the pipeline is suspended above a body of water or roadways, railroad right-of-way, etc. either on a separately designed pipeline bridge or as a part of or connected to a road, railroad, or passenger bridge.

Use **Railroad Crossing** or **Road Crossing**, as appropriate, if the pipeline is buried beneath rail bed or road bed.

Use **Water Crossing** if the pipeline is in the water, beneath the water, in contact with the natural ground of the lake bed, etc., or buried beneath the bed of a lake, reservoir, stream, or creek, whether the crossing happens to be flowing water at the time of the incident or not.. T he name of the body of water is to be provided if it is commonly known and understood among the local population. (The purpose of this information is to allow persons familiar with the area in which the incident occurred to identify the location and understand it in its local context. Research to identify names that are not commonly used is not necessary since such names would not fulfill the intended purpose. If a body of water does not have a name that is commonly used and understood in the local area, this field may be left blank).

For **Approximate Water Depth (ft)** of the lake, reservoir, etc., estimate the typical water depth at the location and time of the incident, ignoring seasonal, weather-related, and other factors which may affect the water depth from time to time.

## PART C – ADDITIONAL FACILITY INFORMATION

**1. Indicate the type of pipeline system:**

Designate the type of gas distribution system on which the incident occurred.

**2. Part of system involved in Incident**

This should be the part of the system principally involved in the incident, from which gas was released resulting in reportable consequences. If the failure occurred on an item not provided in this section, select "Other" and specify in the space provided the item involved in the incident.

**3. When "Main" or "Service" is selected as the "Part of system involved in incident," (from PART C, Question 2), provide the following**:

**Nominal diameter of pipe** is also called **Nominal pipe size.** It is the diameter in whole number inches (except for pipe less than 4") used to describe the pipe size; for example, 8-5/8 pipe has a nominal pipe size of 8". Decimals are unnecessary for this measure (except for pipe less than 4").

**Pipe Specification** is the specification to which the pipe or component was manufactured, such as API 5L or ASTM A106.

**4. Material involved in incident**:

Identify the type of material involved and provide additional information as indicated.

**5. Type of release involved**:

**Mechanical puncture** means a puncture of the facility, typically by a piece of equipment such as would occur if the facility were pierced by directional drilling or a backhoe bucket tooth. Not all excavation-related damage will be a "mechanical puncture." (Precise measurement of size – e.g., micrometer – is not needed. Approximate measurements can be provided in inches and one decimal.)

**Leak** means a failure resulting in an unintentional release of gas that is often small in size, usually resulting a low flow release of low volume, although large volume leaks can and do occur on occasion.

**Rupture** means a loss of containment that immediately impairs the operation of the gas distribution system or facility. Facility ruptures often result in a higher flow release of larger volume. The terms "circumferential" and "longitudinal" refer to the general direction or orientation of the rupture relative the pipe's axis. They do not exclusively refer to a failure involving a circumferential weld such as a girth weld, or to a failure involving a longitudinal weld such as a pipe seam. (Precise measurement of size – e.g., micrometer – is not needed. Approximate measurements can be provided in inches and decimals.)

## PART D – ADDITIONAL CONSEQUENCE INFORMATION

### 2. Estimated Property Damage

All relevant costs available at the time of submission must be included in the initial written Incident Report as well as being updated as needed on Supplemental Reports. This includes (but is not limited to) costs due to property damage to the operator's facilities and to the property of others, facility repair and replacement, gas distribution service restoration and relighting, leak locating, and environmental cleanup and damage. Do NOT include cost of gas lost.
Additionally, do NOT include costs incurred for facility repair, replacement, or changes that are NOT related to the incident and which are typically done solely for convenience. An example of doing work solely for convenience is working on non-leaking facilities unearthed because of the incident. Litigation and other legal expenses related to the incident are not reportable.

Operators are to report costs based on the best estimate available at the time a report is submitted. It is likely that an estimate of final repair costs may not be available when the initial report must be submitted (30 days, per §191.9). The best available estimate of these costs is to be included in the initial report. For convenience, this estimate can be revised, if needed, when Supplemental Reports are filed for other reasons, however, when no other changes are forthcoming, Supplemental Reports are to be filed as new cost information becomes available. If Supplemental Reports are not submitted for other reasons, a Supplemental Report is to be filed for the purpose of updating or correcting the estimated cost if these costs differ from those already reported by 20 percent or $20,000, whichever is greater.

**Public and non-operator private property damage** estimates generally include physical damage to the property of others, the cost of investigation and remediation of a site not owned or operated by the Company, laboratory costs, third party expenses such as engineers or scientists, and other reasonable costs, excluding litigation and other legal expenses related to the incident.

**Operator's property damage** estimates generally include physical damage to the property of Operator or Owner Company such as the estimated installed value of the damaged pipe, coating, component, materials, or equipment due to the incident, excluding the cost of any gas lost. Also, to be excluded are litigation and other legal expenses related to the incident.
When estimating the **Cost of repairs** to company facilities, the standard shall be the cost necessary to safely restore property to its predefined level of service. Property damage estimates include the cost to access, excavate, and repair the facility using methods, materials, and labor necessary to re-establish operations at a predetermined level. These costs may include the cost of repair sleeves or clamps, re-routing of piping, or the removal from service of an appurtenance or facility component. When more comprehensive repairs or improvements are justified but not required for continued operation, the cost of such repairs or replacement is not attributable to the incident. Costs associated with improvements to the gas distribution system to mitigate the risk of future failures are not included.
Estimated cost of **Operator's emergency response** includes emergency response operations necessary to return the incident site to a safe state, actions to minimize the volume of gas released, conduct reconnaissance, and to identify the extent of incident impacts. They include

materials, supplies, labor, and benefits. Costs related to stakeholder outreach, media response, etc. are not to be included.

**Other costs** are to include any and all costs which are not included above. Cost of any gas lost is NOT to be reported here, but is to be reported under **Cost of Gas Released**. Operators are to NOT use this category to report any costs which belong in cost categories separately listed above.

**Costs** are to be reported in only one category and are not to be double-counted. Costs can be split between two or more categories when they overlap more than one reporting category.

**Cost of Gas Released**

**Cost of gas released** is to be based on the volume reported in PART A, Question 10.

**3. Estimated number of customers out of service**:

Count number of individual services in each category that were affected, not number of persons served.

**PART E – ADDITIONAL OPERATING INFORMATION**

**2. Normal operating pressure at point and time of the incident (psig)**

If the normal operating pressure of a distribution system varies throughout the year (e.g., seasonally), report the normal operating pressure at the time the incident occurred.

**5. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the incident?**

This does not mean a system designed or used exclusively for leak detection.

**5.a. Was it operating at the time of the Incident?**

Was the SCADA system in operation at the time of the incident?

**5.b. Was it fully functional at the time of the Incident?**

Was the SCADA system capable of performing all of its functions, whether or not it was actually in operation at the time of the incident? If no, describe functions that were not operational in PART H – Narrative Description of the Incident.

**5.c. and d. Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations) assist with the detection or confirmation of the Incident?**

Select Yes if SCADA-based information was used to confirm the incident even if the initial report or identification may have come from other sources. Use of SCADA data for subsequent estimation of amount of gas lost, etc. is not considered use to confirm the incident.

Select No if SCADA-based information was not used to assist with identification of the incident.

**6. How was the Incident initially identified for the Operator? (*select only one*)**

**Controller** means a qualified individual whose function within a shift is to remotely monitor and/or control the operations of entire or multiple sections of distribution pipelines or systems via a SCADA system from a control room, and who has operational authority and accountability for the daily remote operational functions of gas distribution systems.

**Local Operating Personnel including contractors** means employees or contractors working on behalf of the operator outside the control room.

**7. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Incident?**

Select only one of the choices to indicate whether an investigation was/is being conducted (Yes) or was not conducted (No). If an investigation has been completed, select all the factors that apply in describing the results of the investigation.

**Cause** means an action or lack of action that directly resulted in the gas distribution system incident.

**Contributing factor** means an action or lack of action that when added to the existing circumstances heightened the likelihood of the release or added to the impact of the release.

**Controller Error** means that the controller failed to identify a circumstance indicative of a release event, such as an abnormal operating condition, alarm, pressure drop, change in flow rate, or other similar event.

**Incorrect Controller action** means that the controller errantly operated the means for controlling an event. Examples include opening or closing the wrong valve, or hitting the wrong switch or button.

## PART F – DRUG & ALCOHOL TESTING INFORMATION

Requirements for post-accident drug and alcohol tests are in 49 CFR §199.105 and §199.225 respectively. If the incident circumstances were such that tests were not required by these sections, and if no tests were conducted, select No. If tests were administered, select Yes and report separately the number of operator employees and contractors working for the operator who were tested and the number of each that failed such tests.

## PART G – APPARENT CAUSE

### PART G – Apparent Cause

**Select the one, single sub-cause listed under sections G1 thru G8 that best describes the apparent cause of the Incident. These sub-causes are contained in the shaded column on the left under each main cause category. Answer the corresponding questions that accompany your selected sub-cause, and describe any secondary, contributing, or root causes of the Incident in PART H – Narrative Description of the Incident.**

### G1 – Corrosion Failure

**Corrosion** includes a release or failure caused by galvanic, atmospheric, stray current, microbiological, or other corrosive action. A corrosion release or failure is not limited to a hole in the pipe or other piece of equipment. If the bonnet or packing gland on a valve or flange on piping deteriorates or becomes loose and leaks due to corrosion and failure of bolts, it is classified as Corrosion. (Note: If the bonnet, packing, or other gasket has deteriorated to failure, whether before or after the end of its expected life, but not due to corrosive action, report it under a different cause category, such as G7 Incorrect Operation for improper installation or G6 - Equipment Failure if the gasket failed.)

### External Corrosion

**4.a. Under cathodic protection** means cathodic protection in accordance with §192.455, §192.457, and §192.463. Recognizing that older facilities may have had cathodic protection added over a number of years, provide an estimate if exact year cathodic protection started is unknown.

### Internal Corrosion

### 10. Location of corrosion

A **low point in pipe** includes portions of the pipe contour in which water might settle out. This includes, but is not limited to, the low point of vertical bends at a crossing of a foreign line or road/railroad, etc., an elbow, a drop out or low point drain.

**11. Was the gas/fluid treated with corrosion inhibitors or biocides?**

Select Yes if corrosion inhibitors or biocides were included in the gas/fluid transported.

**Either External or Internal Corrosion**

**14. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Incident?**

Information from the initial post-construction hydrostatic test is not to be reported.

**G2 – Natural Force Damage**

**Natural Force Damage** includes a release or failure resulting from earth movement, earthquakes, landslides, subsidence, lightning, heavy rains/floods, washouts, flotation, mudslide, scouring, temperature, frost heave, frozen components, high winds, or similar natural causes.

**Earth Movement NOT due to Heavy Rains/Floods** refers to incidents caused by land shifts such as earthquakes, landslides, or subsidence, but not mudslides which are presumed to be initiated by heavy rains or floods.

**Heavy Rains/Floods** refer to all water-related natural force causes. While mudslides involve earth movement, report them here since typically they are an effect of heavy rains or floods.

**Lightning** includes both damage and/or fire caused by a direct lighting strike and damage and/or fire as a secondary effect from a lightning strike in the area. An example of such a secondary effect would be a forest fire started by lightning that results in damage to a gas distribution system asset which results in an incident. ( See also the discussion of "secondary ignition" under the *General Instructions*.)

**Temperature** includes weather-related temperature and thermal stress effects, either heat or cold, where temperature was the initiating cause.

> **Thermal stress** refers to mechanical stress induced in a pipe or component when some or all of its parts are not free to expand or contract in response to changes in temperature.
>
> **Frozen components** would include incidents where components are inoperable because of freezing and those due to cracking of a piece of equipment due to expansion of water during a freeze cycle.

**High Winds** includes damage caused by wind induced forces. Select this category if the damage is due to the force of the wind itself. Damage caused by impact from objects blown by wind are to be reported under section G4 - Other Outside Force Damage.

**Other Natural Force Damage.** Select this sub-cause for types of Natural Force Damage not included otherwise, and describe in the space provided. If necessary, provide additional explanation in PART H – Narrative Description of the Incident.
Answer Questions 6 and 6.a if the incident occurred in conjunction with an extreme weather event such as a hurricane, tropical storm, or tornado. If an extreme weather event related to something other than a hurricane, tropical storm, or tornado was involved, indicate Other and describe the event in the space provided.

**G3 – Excavation Damage**

**Excavation Damage** includes a release or failure resulting directly from excavation damage by operator's personnel (oftentimes referred to as "first party" excavation damage) or by the operator's contractor (oftentimes referred to as "second party" excavation damage) or by people or contractors not associated with the operator (oftentimes referred to as "third party" excavation damage). Also, this section includes a release or failure determined to have resulted from previous damage due to excavation activity. For damage from outside forces OTHER than excavation which results in a release, use G2 - Natural Force Damage or G4 - Other Outside Force, as appropriate. Also, for a strike, physical contact, or other damage to a gas distribution system or facility that apparently was NOT related to excavation and that results in a delayed or eventual release, report the incident under G4 as "Previous Mechanical Damage NOT related to Excavation."

**Excavation Damage by Operator (First Party)** refers to incidents caused as a result of excavation by a direct employee of the operator.

**Excavation Damage by Operator's Contractor (Second Party)** refers to incidents caused as a result of excavation by the operator's contractor or agent or other party working for the operator.

**Excavation Damage by Third Party** refers to incidents caused by excavation damage resulting from actions by personnel or other third parties not working for or acting on behalf of the operator or its agent.

**Previous Damage due to Excavation Activity** refers to incidents that were apparently caused by prior excavation activity and that then resulted in a delayed or eventual release. Indications of prior excavation activity might come from the condition of the pipe when it is examined, or from records of excavation at the site, or through metallurgical analysis or other inspection and/or testing methods. Dents and gouges in the 10:00-to-2:00 o'clock positions on the pipe, for instance, may indicate an earlier strike, as might marks from the bucket or tracks of an earth moving machine or similar pieces of equipment.

**2. Has one or more pressure test been conducted since original construction at the point of the incident?**

Information from the initial post-construction hydrostatic test is not to be reported.

**4. – 14.** Complete these questions for any excavation damage sub-cause. Instructions for answering these questions can be found at CGA's web site, https://www.damagereporting.org/dr/control/userGuide.do.

**G4 – Other Outside Force Damage**

**Other Outside Force Damage** includes, but are not limited to, a release or failure resulting from non-excavation-related outside forces, such as nearby industrial, man-made, or other fire or explosion; damage by vehicles or other equipment; failures due to mechanical damage; and, intentional damage including vandalism and terrorism.

**Nearby Industrial, Man-made or Other Fire/Explosion as Primary Cause of Incident** applies to situations where the fire occurred before - and *caused* - the release**.** (See also the discussion of "secondary ignition" under the *General Instructions*.) Examples of such an incident would be an explosion or fire that originated at a house or neighboring installation (chemical plant, tank farm, or other industrial facility) or structure, debris, or brush/trees that results in a release at the operator's gas distribution system or facility. This includes forest, brush, or ground fires that are caused by human activity. If the fire, however, is known to have been started as a result of a lightning strike, the incident's cause is to be classified under G2 - Natural Force Damage. Arson events directed at harming the gas distribution system or the operator are to be reported as G4 - Intentional Damage (see below). This sub-cause is NOT to be used if the release occurred first and then the gas released from the gas distribution system or facility ignited.

**Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation**. An example of this sub-cause would be damage to a meter set caused by vehicle impact. Other motorized vehicles or equipment include tractors, backhoes, bulldozers and other tracked vehicles, and heavy equipment that can move. Include under this sub-cause incidents caused by vehicles operated by the gas distribution system operator, the gas distribution system's contractor, or a third party and specify the vehicle/equipment operator's affiliation from one of these three groups. Gas distribution system incidents resulting from vehicular traffic loading or other contact are to also be reported in this category. If the activity that caused the incident involved digging, drilling, boring, grading, cultivation, or similar excavation activities, report under G3 - Excavation Damage.

**Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring.** This sub-cause includes impacts by maritime equipment or vessels (including their anchors or anchor chains or other attached equipment) that have lost their moorings and are carried into the gas distribution system or facility by the current. This sub-cause also includes maritime equipment or vessels set adrift as a result of severe weather events and carried into the gas distribution system or facility by waves, currents, or high winds. In such cases, also indicate the type of severe weather event. Do NOT report in this sub-cause incidents which are caused by impact of maritime equipment or vessels while they are engaged in their normal or routine activities; such incidents are to be reported as "Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation" under this section G4 (see below) so long as those activities are not excavation

activities. If those activities are excavation activities such as dredging or bank stabilization or renewal, the incident is to be reported under G3 - Excavation Damage.

**Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation.** This sub-cause includes incidents due to shrimping, purseining, oil drilling, or oilfield workover rigs, including anchor strikes, and other routine or normal maritime-related activities UNLESS the movement of the maritime asset was inadvertent and due to a severe weather event (this type of incident is to be reported under "Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring" in this section G4); or, the incident was caused by excavation activity such as dredging of waterways or bodies of water (this type of incident is to be reported under G3 - Excavation Damage").

**Electrical Arcing from Other Equipment or Facility** such as a pole transformer or adjacent facility's electrical equipment.

**Previous Mechanical Damage NOT Related to Excavation.** This sub-cause covers incidents where damage occurred at some time prior to the release that was apparently NOT related to excavation activities, and would include prior outside force damage of an unknown nature, prior natural force damage, prior damage from other outside forces, and any other previous mechanical damage other than that which was apparently related to prior excavation. Incidents resulting from previous damage sustained during construction, installation, or fabrication of the pipe, weld, or joint from which the release eventually occurred are to be reported under G5 – Pipe, Weld, or Joint Failure. (See this sub-cause for typical indications of previous construction, installation, or fabrication damage.) Incidents resulting from previous damage sustained as a result of excavation activities should be reported under G3 – Previous Damage due to Excavation Activity. (See this sub-cause for typical indications of prior excavation activity.)

**Intentional Damage**

**Vandalism** means willful or malicious destruction of the operator's gas distribution system or facility or equipment. This category would include arson, pranks, systematic damage inflicted to harass the operator, motor vehicle damage that was inflicted intentionally, and a variety of other intentional acts. ( See also the discussion of "secondary ignition" under the *General Instructions*.)

**Terrorism**, per 28 CFR §0.85 General Functions, includes the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives. Operators selecting this item are encouraged to also notify the FBI.

**Theft of commodity or Theft of equipment** means damage by any individual or entity, by any mechanism, specifically to steal, or attempt to steal, the transported gas or gas distribution system equipment.

**Other** Describe in the space provided and, if necessary, provide additional explanation in

**PART H – Narrative Description of the Incident.**

**Other Outside Force Damage.** Select this sub-cause for types of Other Outside Force Damage not included otherwise, and describe in the space provided. If necessary, provide additional explanation in PART H – Narrative Description of the Incident.

**G5 – Pipe, Weld, or Joint Failure**

Use this section to report failures **only for main or service pipe, or welds, joints, or connections joining main pipe or service pipe**.

This section includes releases in or failures of main or service pipe, or welds, joints, or connections joining main pipe or service pipe due to material defect, design defect, , or in-service stresses such as vibration, fatigue, and environmental cracking.

**Mechanical Fitting, Question 7, Manufacturer**
**Compression Fitting, Question 14, Manufacturer**

Operators should take care in identifying the manufacturer. S ome types of fittings are commonly referred to as "Dresser fittings" (for example) even though the particular fitting may have been manufactured by a different company. O perators should report here the company that actually manufactured the involved fitting.

**Fitting** means a device, usually metal, for joining lengths of pipe into various piping systems. It includes couplings, ells, tees, crosses, reducers, unions, caps and plugs.

**Material defect** means an inherent flaw in the material or weld that occurred in the manufacture or at a point prior to construction, fabrication or installation.

**Design defect** means an aspect inherent in a component to which a subsequent failure has been attributed that is not associated with errors in installation, i.e., is not a construction defect. This could include, for example, errors in engineering design.

**14. Has one or more hydrotest or other pressure test been conducted since original construction at the point of the Incident?**

Information from the initial post-construction hydrostatic test is not to be reported. Records of test pressure from past pressure tests may not be available. In such cases, the operator is to estimate the test pressure using best available information.

**G6 – Equipment Failure**

This section applies to failures of items **other than main or service pipe, or welds, joints, or connections joining main pipe or service pipe**.

**Equipment Failure** includes a release or failure resulting from: malfunction of control/relief equipment including valves, regulators, or other instrumentation; failures of compressors, or compressor-related equipment; failures of various types of connectors, connections, and appurtenances; failures of the body of equipment, vessel plate, or other material (including those caused by construction, material, or design defects or anomalies); and, all other equipment related failures.

**Malfunction of Control/Relief Equipment.** Examples of this type of incident cause include: ove rpressurization resulting from malfunction of control or alarm device; malfunction of relief valve; valves failing to open or close on command; or valves which opened or closed when not commanded to do so. If overpressurization or some other aspect of this incident was caused by incorrect operation, the incident is to be reported under G7 - Incorrect Operation.

**ESD System Failure** means failure of an emergency shutdown system.

**Other Equipment Failure.** Select this sub-cause for types of Equipment Failure not included otherwise, and describe in the space provided. If necessary, provide additional explanation in PART H – Narrative Description of the Incident.

**G7 – Incorrect Operation**

**Incorrect Operation** includes a release or failure resulting from operating, maintenance, repair, or other errors by facility personnel, including, but not limited to, improper valve selection or operation, inadvertent overpressurization, improper selection of procedures, incorrect installation of equipment, and failure to follow manufacturer instructions.

**Other Incorrect Operation.** Select this sub-cause for types of Incorrect Operation not included otherwise, and describe in the space provided. If necessary, provide additional explanation in PART H – Narrative Description of the Incident.

**G8 – Other Incident Cause**

This section is provided for incidents whose cause is currently unknown, or where investigation into the cause has been exhausted and the final judgment as to the cause remains unknown, or where a cause has been determined which does not fit into any of the main cause categories listed in sections G1 thru G7.

If the incident cause is known but doesn't fit in any category in sections G1 through G7, select **Miscellaneous** and enter a description of the incident cause, continuing with a more thorough explanation in PART H - Narrative Description of the Incident.

If the incident cause is unknown at time of filing this report, select **Unknown** in this section and select one reason from the accompanying two choices. Once the operator's investigation into the incident cause is completed, the operator is to file a Supplemental Report as soon as practicable either reporting the apparent cause or stating definitively that the cause remains Unknown, along with any other new, updated, and/or corrected information pertaining to the incident. T his Supplemental Report is to include all new, updated, and/or corrected information pertaining to *all* portions of the report form known at this time, and not only that information related to the apparent cause.

**Important Note:** Whether the investigation is completed or not, or if the cause continues to be unknown, Supplemental Reports are to be filed reflecting new, updated, and/or corrected information ***as and when this information becomes available***. In those cases in which investigations are ongoing for an extended period of time, operators are to file a Supplemental Report within one year of their last report for the incident even in those instances where no new, updated, and/or corrected information has been obtained, with an explanation that the cause remains under investigation in PART H – Narrative Description of the Incident. Additionally, final determination of the apparent cause and/or closure of the investigation does NOT preclude the need for the operator's filing of additional Supplemental Reports as and when new, updated, and/or corrected information becomes available.

## PART H – NARRATIVE DESCRIPTION OF THE INCIDENT

Concisely describe the incident, including the facts, circumstances, and conditions that may have contributed directly or indirectly to causing the incident. Include secondary, contributing, or root causes when possible, or any other factors associated with the cause that are deemed pertinent. U se this section to clarify or explain unusual conditions, to provide sketches or drawings, and to explain any estimated data. Operators submitting reports on-line will be afforded the opportunity to attach/upload files (in PDF or JPG format only) containing sketches, drawings, or additional data.

If you selected Miscellaneous in section G8, the narrative is to describe the incident in detail, including all known or suspected causes and possible contributing factors.

## PART I – PREPARER AND AUTHORIZED SIGNATURE

The Preparer is the person who compiled the data and prepared the responses to the report and who is to be contacted for more information (preferably the person most knowledgeable about the information in the report or who knows how to contact the person or persons most knowledgeable). E nter the Preparer's e-mail address if the Preparer has one, and the phone and fax numbers used by the Preparer.

The Authorized Signer is responsible for assuring the accuracy and completeness of the reported data. In addition to their title, a phone number and email address are to be provided for the Authorized Signer.

## 2.5 ANNUAL REPORTS (191.11)

The City of Carencro submits an annual report as required by Pipeline Safety for the gas distribution system on Department of Transportation Form RSPA F 7100.1-1. This report is submitted annually for the previous calendar year and must be submitted no later than March 15 of the following year. One copy of this written report is submitted to the Commissioner of Conservation, Box 94275, Baton Rouge, Louisiana 70804. Online submittal of this report is required unless an alternative reporting method is granted by PHMSA. To request an alternative method of submittal the operator may submit a written request for an alternative reporting method to the Information Resources Manager, Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, PHP-20, 1200 New Jersey Avenue, SE Washington DC 20509. The request must describe the undue burden and hardship.

To submit the annual Report Online the operator must have an Office of Pipeline Safety (OPS) provided Operator ID and Personal Identification Number (PIN)/password.

The following procedure provides **Online Submittal Instructions**:

1. Navigate to PHMSA's, Office of Pipeline Safety web site, Pipeline Safety Community, located at htpp://www.phmsa.dot.gov.pipeine
2. Click the "**Online Data Entry**" hyperlink listed in the first column. This takes you to the OPS Online Data Entry and Operator Registration System.
3. Click on the "**Gas Distribution System Annual Report**" hyperlink under the Gas Distribution Systems subtitle. This takes you to the PHMSA Portal login screen.
4. Enter your "Username" and "Password and click on "**Login".**
5. Create or modify record:
   a) To create a new *Gas Distribution System Annual Report*, click "**Submit New**". Enter the "Calendar Year" for which the report is being filed.

   OR

   b) To modify an existing *Gas Distribution System Annual Report;* locate the report using the "Search" function. Once the report is located, click "**Create Supplemental**" and make the necessary changes.
6. Follow the detailed instructions below to complete Parts A - 1.
7. Click "**Save**" when finished.
8. A copy of the report can be printed or downloaded in PDF format.
9. For distribution pipelines subject to the jurisdiction of a State agency pursuant to certification under 49 U.S.C. § 60105, send a copy of the report to the Commissioner of Conservation, Box 44275, Baton Rouge, Louisiana 70804.

Beginning in March 2011 additional information is required to be included in the Annual Report. New information includes:

1. Number of Excavation Damages
2. Number of Excavation Tickets
3. Number of EFV's Installed
4. Estimated Number of EFV's in System

In addition to the above report, the American Gas Association, Department of Statistics may request an "Annual Report of Gas Operation" and "Immediate Report of an Employee Disabling Injury". These reports may be submitted at the requested by the American Gas Association, Inc.

When completing **PART C of the Annual Report, "CAUSE OF LEAK"**, use the following definitions to determine the cause of each leak reported. This information is used by SHRIMP to address risks associated with the City of Carencro Gas Distribution System.

**CORROSION:** Problems resulting from a hole in the pipe or other component that was caused by galvanic, bacterial, chemical, stray current, or other corrosive action such as Atmospheric Corrosion, External Corrosion, Internal Corrosion and Stress Corrosion Cracking.

**EQUIPMENT:** Problems resulting from malfunction of control/relief equipment including valves, regulators, meters or other instrumentation; stripped threads or broken pipe couplings on nipples, valves, or seal failures on gaskets, O-rings, seal/pump packing, or similar leaks.

**INCORRECT OPERATIONS:** Problems resulting from inadequate procedures or safety practices, failure to follow correct procedures, operator error and over pressurization events.

**MATERIAL, WELDS OR JOINTS:** Problems resulting from failure of original sound material from force applied during construction that caused a dent, gouge, excessive stress, or other defect that eventually resulted in a leak. This includes problems due to faulty wrinkle bends, faulty field welds, mechanical couplings and damage sustained in transportation to the construction or fabrication site. Also include problems resulting from a defect in the pipe material, component, or the longitudinal weld or seam due to faulty manufacturing procedures. Problems from material deterioration, other than corrosion, after exceeding the reasonable service life, should be addressed under Other.

**EXCAVATION DAMAGE:** Problems resulting from damage caused by earth moving or other equipment, tools, or vehicles. Include problems from damage by operator's personnel or contractor or people not associated with the operator. Excavation damage includes Blasting, Cross Bores, Failure to Notify and Locator Error

**NATURAL FORCES:** Problems resulting from earth movements, earthquakes, landslides, subsidence, lightning, heavy rains/floods, washouts, flotation, mudslide, scouring, temperature, frost heave, frozen components, high winds, or similar natural causes.

**OTHER OUTSIDE FORCE DAMAGE:** Include Problems caused by vehicles hitting above ground facilities, grass cutting equipment cutting service riser, fire or explosion, logging and deliberate or willful acts, such as vandalism..

**OTHER:** Problems resulting from any other cause, such as exceeding the service life, not attributable to the above causes.

**METER LEAKS:** Gas leaks found on meters as a result of customer complaints of gas smell or for any reason do not need to be reported in Part C of your Annual report if the leak can be repaired without disassembling the meter. If a fitting or meter nut that is leaking and it can just be tightened to stop the leak you do not need to report that leak.

**NOTICE:** This report is required by 49 CFR Part 191. Failure to report may result in a civil penalty not to exceed $100,000 for each violation for each day the violation continues up to a maximum of $1,000,000 as provided in 49 USC 60122.

**OMB No. 2137-0629**
**Expiration Date 5/31/2018**

| | | DOT USE ONLY | |
|---|---|---|---|
| U.S. Department of Transportation<br>Pipeline and Hazardous Materials Safety Administration | **ANNUAL REPORT FOR CALENDAR YEAR 20__**<br>**GAS DISTRIBUTION SYSTEM** | **Initial Date Submitted** | |
| | | **Report Submission Type** | |
| | | **Date Submitted** | |

**A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is. Public reporting for this collection of information is estimated to be approximately 16 hours per submission, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.**

***Important:*** *Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline/library/forms.*

**PART A - OPERATOR INFORMATION** | **DOT USE ONLY**

**1. NAME OF OPERATOR**

_____

**2. LOCATION OF OFFICE WHERE ADDITIONAL INFORMATION MAY BE OBTAINED**

_____
Number and Street

_____
City and County

_____
State and Zip Code

**3. OPERATOR'S 5 DIGIT IDENTIFICATION NUMBER**

/ / / / / /

**4. HEADQUARTERS NAME & ADDRESS, IF DIFFERENT**

_____
Number and Street

_____
City and County

_____
State and Zip Code

**5. STATE IN WHICH SYSTEM OPERATES:/ / / (provide a separate report for each state in which system operates)**

**6. THIS REPORT PERTAINS TO THE FOLLOWING COMMODITY GROUP** *(Select Commodity Group based on the predominant gas carried and complete the report for that Commodity Group. File a separate report for each Commodity Group included in this OPID.)*

☐ Natural Gas
☐ Synthetic Gas
☐ Hydrogen Gas
☐ Propane Gas
☐ Landfill Gas
☐ Other Gas → Name of Other Gas:

**7. THIS REPORT PERTAINS TO THE FOLLOWING TYPE OF OPERATOR** *(Select Type of Operator based on the structure of the company included in this OPID for which this report is being submitted.)***:**

☐ Investor Owned
☐ Municipally Owned
☐ Privately Owned
☐ Cooperative
☐ Other Ownership specify:

| PART B - SYSTEM DESCRIPTION | Report miles of main and number of services in system at end of year. |
|---|---|

**1. GENERAL**

| | STEEL | | | | PLASTIC | CAST/ WROUGHT IRON | DUCTILE IRON | COPPER | OTHER | Reconditioned Cast Iron | SYSTEM TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UNPROTECTED | | CATHODICALLY PROTECTED | | | | | | | | |
| | BARE | COATED | BARE | COATED | | | | | | | |
| MILES OF MAIN | | | | | | | | | | | |
| NO. OF SERVICES | | | | | | | | | | | |

**2. MILES OF MAINS IN SYSTEM AT END OF YEAR**

| MATERIAL | UNKNOWN | 2" OR LESS | OVER 2" THRU 4" | OVER 4" THRU 8" | OVER 8" THRU 12" | OVER 12" | SYSTEM TOTALS |
|---|---|---|---|---|---|---|---|
| STEEL | | | | | | | |
| DUCTILE IRON | | | | | | | |
| COPPER | | | | | | | |
| CAST/WROUGHT IRON | | | | | | | |
| PLASTIC<br>1. PVC | | | | | | | |
| 2. PE | | | | | | | |
| 3. ABS | | | | | | | |
| 4. OTHER PLASTIC | | | | | | | |
| OTHER<br><br>Reconditioned Cast Iron | | | | | | | |
| SYSTEM TOTALS | | | | | | | |

Describe Other Material: _____

**3. NUMBER OF SERVICES IN SYSTEM AT END OF YEAR** — **AVERAGE SERVICE LENGTH_____FEET**

| MATERIAL | UNKNOWN | 1" OR LESS | OVER 1" THRU 2" | OVER 2" THRU 4" | OVER 4" THRU 8" | OVER 8" | TOTAL |
|---|---|---|---|---|---|---|---|
| STEEL | | | | | | | |
| DUCTILE IRON | | | | | | | |
| COPPER | | | | | | | |
| CAST/WROUGHT IRON | | | | | | | |
| PLASTIC<br>1. PVC | | | | | | | |
| 2. PE | | | | | | | |
| 3. ABS | | | | | | | |
| 4. OTHER PLASTIC | | | | | | | |
| OTHER<br><br>Reconditioned Cast Iron | | | | | | | |
| SYSTEM TOTALS | | | | | | | |

**Describe Other Material:** _____

| 4. MILES OF MAIN AND NUMBER OF SERVICES BY DECADE OF INSTALLATION | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| UN-KNOWN | PRE-1940 | 1940-1949 | 1950-1959 | 1960-1969 | 1970-1979 | 1980-1989 | 1990-1999 | 2000-2009 | 2010-2019 | TOTAL |
| MILES OF MAIN | | | | | | | | | | |
| NUMBER OF SERVICES | | | | | | | | | | |

| PART C - TOTAL LEAKS AND HAZARDOUS LEAKS ELIMINATED/REPAIRED DURING YEAR | | | | |
|---|---|---|---|---|
| | Mains | | Services | |
| CAUSE OF LEAK | Total | Hazardous | Total | Hazardous |
| CORROSION FAILURE | | | | |
| NATURAL FORCE DAMAGE | | | | |
| EXCAVATION DAMAGE | | | | |
| OTHER OUTSIDE FORCE DAMAGE | | | | |
| PIPE, WELD, OR JOINT FAILURE | | | | |
| EQUIPMENT FAILURE | | | | |
| INCORRECT OPERATION | | | | |
| OTHER CAUSE | | | | |

NUMBER OF KNOWN SYSTEM LEAKS AT END OF YEAR SCHEDULED FOR REPAIR _____

| PART D – EXCAVATION DAMAGE | PART E – EXCESS FLOW VALVE (EFV) DATA |
|---|---|
| 1. Total Number of Excavation Damages by Apparent Root Cause *Calc*<br>a. One-Call Notification Practices Not Sufficient: _____<br>b. Locating Practices Not Sufficient: _____<br>c. Excavation Practices Not Sufficient: _____<br>d. Other: _____<br>2. Number of Excavation Tickets _____ | Total Number Of Services with EFV Installed During Year _____<br>Estimated Number of Services with EFVs In the System At End Of Year _____<br>Total Number of Manual Service Line Shut-off Valves Installed During Year _____<br>Estimated Number of Services with Manual Service Line Shut-off Valves Installed in the System at End of Year_____ |

| PART F - TOTAL NUMBER OF LEAKS ON FEDERAL LAND REPAIRED OR SCHEDULED FOR REPAIR | PART G - PERCENT OF UNACCOUNTED FOR GAS |
|---|---|
| | Unaccounted for gas as a percent of total input for the12 months ending June 30 of the reporting year.<br><br>[(Purchased gas + produced gas) minus (customer use + company use + appropriate adjustments)] divided by (purchased gas + produced gas) equals percent unaccounted for.<br><br>Input for year ending 6/30_____%. |

**PART H – ADDITIONAL INFORMATION**

**PART I - PREPARER**

| | |
|---|---|
| **Preparer's Name and Title** | **Area Code and Telephone Number** |
| **Preparer's email address** | **Area Code and Facsimile Number** |
| Name and Title of Person Signing | **Area Code and Telephone Number** |

## INSTRUCTION (rev 1-31-2017) FOR COMPLETING FORM PHMSA F 7100.1-1 (rev 1-31-2017) ANNUAL REPORT FOR CALENDAR YEAR 20 GAS DISTRIBUTION SYSTEM

OMB No. 2137-0629 Expires: 1/31/2018

All section references are to Title 49 of the Code of Federal Regulations. Reporting requirements are contained in Part 191, "Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports and Safety Related Condition Reports." Except as provided in §191.11(b), each operator of a gas distribution pipeline (see definitions below) must submit an annual report Form PHMSA F 7100.11 for the preceding calendar year not later than March 15th. Be sure to report TOTAL miles of main pipeline and services in the system at the end of the reporting year, including additions to the system during the year. The annual reporting period is on a calendar year basis ending on December 31st of each year.
If you need copies of the Form PHMSA F 7100.1-1 and/or instructions, they can be found on http://www.phmsa.dot.gov/pipeline/library/forms. The documents are included in the section titled Accident/Incident/Annual Reporting Forms.

**ONLINE SUBMISSION IS REQUIRED UNLESS AN ALTERNATIVE REPORTING METHOD IS GRANTED BY PHMSA**

### ALTERNATE REPORTING METHOD

If electronic reporting imposes an undue burden and hardship, an operator may submit a written request for an alternative reporting method to the Information Resources Manager, Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, PHP-20, 1200 New Jersey Avenue, SE Washington DC 20590. The request must describe the undue burden and hardship. PHMSA will review the request and may authorize, in writing, an alternative reporting method. An authorization will state the period for which it is valid, which may be indefinite. An operator must contact PHMSA at 202-366-8075, or electronically to informationresourcesmanager@dot.gov or make arrangements for submitting a report that is due after a request for alternative reporting is submitted but before an authorization or denial is received.

### ONLINE REPORTING METHOD

Annual Reports must be submitted online through the PHMSA Portal at https://portal.phmsa.dot.gov/portal, unless an alternate method is approved (see Alternate Reporting Methods below).
You will not be able to submit reports until you have met all of the Portal registration requirements – see http://opsweb.phmsa.dot.gov/portal_message/PHMSA_Portal_Registration.pdf Completing these registration requirements could take several weeks. Plan ahead and register well in advance of the report due date.

**Use the following procedure for online reporting**:

1. Go to the PHMSA Portal at https://portal.phmsa.dot.gov/portal
2. Enter PHMSA Portal Username and Password; press enter
3. Select OPID; press "continue" button.

4. Under "Create Reports" on the left side of the screen, under Annual select "Gas Distribution" and proceed with entering your data. Note: Data fields marked with a single asterisk are considered required fields that must be completed before the system will accept your initial submission. Also, only one annual report by commodity for an OPID may be submitted per year.
5. To save intermediate work without formally submitting it to PHMSA, click Save. To modify a draft of an annual report that you saved, go to Saved Reports and click on Gas Distribution. Locate your saved report by the date, report year, or commodity. Select the record by clicking on it once, and then click Modify above the record.
6. Once all sections of the form have been completed, click on Validate to ensure all required fields have been completed and data meets all other requirements. A list of errors will be generated that must be fixed prior to submitting an Annual Report.
7. Click Submit when you have completed the Report (for either an Initial Report or a Supplemental Report), and are ready to initiate formal submission of your Report to PHMSA.
8. A confirmation message will appear that confirms a record has been successfully submitted. To save or print a copy of your submission, go to Submitted Reports on the left hand side, and click on Gas Distribution. Locate your submitted report by the date, report year, or Commodity Group, and then click on the PDF icon to either open the file and print it, or save an electronic copy.
9. To submit a Supplemental Report, go to Submitted Reports on the left hand side, and click on Gas Distribution. Locate your submitted report by the date, report year, or Commodity Group. Select the record by clicking on it once, and then click "Create Supplemental".

## GENERAL INSTRUCTIONS

The following definitions are from § 192.3:

1. "Distribution line" means a pipeline other than a gathering or transmission line.
2. "Gathering line" means a pipeline that transports gas from a current production facility to a transmission line or main.
3. "Transmission line" means a pipeline, other than a gathering line, that: a. Transports gas from a gathering line or storage facility to a distribution center, storage facility, or large volume customer that is not downstream from a distribution center; b. Operates at a hoop stress of 20 percent or more of SMYS; or
   c. Transports gas within a storage field. A large volume customer may receive similar volumes of gas as a distribution center, and includes factories, power plants, and institutional users of gas.
4. "Operator" means a person who engages in the transportation of gas.

   Make an entry in each block for which data are available. Estimate data if necessary. Avoid entering any data in the UNKNOWN columns, if possible. Some companies may have very old pipe for which installation records do not exist. Estimate the total of such mileage in the UNKNOWN column of Part B, item 2 "Miles of Main in System at End of Year" and item 3 "Number of Services in System at End of Year", and item 4 "Miles of Main and Number of Services by Decade of Installation."

Do not report miles of pipe, pipe segments, or pipeline in feet. When main miles and service counts for the same set of pipelines is reported in different parts of the form, the online system will require the different parts to be consistent. Main miles and service counts over 60 must be within 0.5% of the baseline and values under 60 must be within 0.3 miles for main and service counts must match exactly. Part B4, decade of installation, will serve as the baseline for main miles and service counts. For example, if you report 60 miles of main in Part B4, the miles of main in Parts B1 and B2 must be within 0.3 miles of 60. For main miles, use the number of decimal places needed to satisfy these consistency checks. Service counts may only be entered as positive integers.

For a given OPID, a separate Annual Report is required for each Commodity Group within that OPID. As an example, if an operator uses a single OPID and has one set of pipeline facilities transporting natural gas and another transporting landfill gas, this operator must file two Annual Reports – one Annual Report covering natural gas facilities and a second for the landfill gas facilities. When a pipeline facility transports two or more Commodity Groups, the pipeline facility should be reported only once under the predominantly transported Commodity Group.

## PART A – OPERATOR INFORMATION

1. Name of Operator
   This is the company name associated with the OPID. For online entries, the name will be automatically populated based on the OPID entered in A3. If the name that appears is not correct, you need to submit an Operator Name Change (Type A) Notification.
2. Location of Office Where Additional Information May Be Obtained
   Enter the appropriate address.
3. Operator's 5-digit Identification Number (OPID)
   For online entries, the OPID will automatically populate based on the selection you made when entering the Portal. If you have log-in credentials for multiple OPID, be sure the report is being created for the appropriate OPID. Contact PHMSA's Operator Hotline at 202-366-8075 if you need assistance with an OPID.
4. Headquarters Name and Address
   This is the headquarters address associated with the OPID. For online entries, the address will automatically populate based on the OPID entered in A3. If the address that appears is not correct, you need to change it in the online Contacts module.
5. State of Operation
   Enter the State for which information is being reported. Submit a separate report for each State in which the company operates a gas distribution pipeline system.
6. Commodity Group
   It is a PHMSA requirement that operators submit separate Reports for each Commodity Group within a particular OPID.

***File a separate Annual Report for each of the following Commodity Groups:***

1. Natural Gas
2. Synthetic Gas (such as manufactured gas based on naphtha)
3. Hydrogen Gas
4. Propane Gas
5. Landfill Gas (includes biogas)

Other Gas – If this Commodity Group is selected, report the name of the other gas in the space provided.

**Note:** When a pipeline facility transports two or more of the above Commodity Groups, the pipeline facility should be reported only once under the predominantly transported Commodity Group. For example, if an operator has a pipeline segment that is used to transport natural gas during the majority of the year and propane for a couple of weeks, that operator should only file an annual report for the natural gas. If an operator has two pipeline segments with one pipeline segment used to transport natural gas and the other pipeline segment transporting hydrogen gas, that operator should file two annual reports - 1 report for natural gas and 1 report for hydrogen gas.

7. Operator Type

Enter the Type of Operator based on the structure of the company included in this OPID for which this report is being submitted.

**PART B – SYSTEM DESCRIPTION**

"Coated" means pipe coated with any effective hot or cold applied dielectric coating or wrapper.

"Reconditioned Cast Iron" means cast iron gas distribution pipe that has been lined internally by use of suitable materials that ensure safe operation at an MAOP not to exceed the previously established MAOP. "Reconditioned Cast Iron" does not include cast iron pipe inserted with a gas pipe that is, by itself, suitable for gas service under Part 192, e.g., an ASTM D2513 pipe meeting code requirements for the intended gas service. Such insertions shall be reported as the material used in the insertion. The intent of the definition is to make a clear distinction between a liner and inserted pipe. An example of "Reconditioned Cast Iron" would be the insertion of a liner inside cast iron pipe where the liner relies on the structural integrity of the cast iron pipe. For details on liner insertion, see ASTM F2207, Standard Specification for Cured-in-Place Pipe Lining System for Rehabilitation of Metallic Gas Pipe. Methods of installation like pipe-splitting or bursting that involve the installation of a new stand-alone pipe while the host pipe is destroyed does not result in "Reconditioned Cast Iron".

"PVC" means polyvinyl chloride plastic.

"PE" means polyethylene plastic.

"ABS" means acrylonitrile-butadiene-styrene plastic.

"Cathodically protected" applies to both "bare" and "coated."

"Other" means a pipe of any material not specifically designated on the form. If you enter miles of main or services in the "other" category, describe these materials in the appropriate text box.

"Number of service" is the number of service lines, not the number of customers served.
Provide miles of main and numbers of services by decade installed in Part B, Section 4.
If you do not know the decade of installation of the pipe because there are no records containing such information, enter an estimate in the UNKNOWN column. The sum total of

mileage and number of services reported for Part B, section 4 must be consistent with total mileage and number of services reported in sections 1, 2, and 3 in Part B.

## PART C – TOTAL LEAKS AND HAZARDOUS LEAKS ELIMINATED/REPAIRED DURING YEAR

In the appropriate column, include the total number of leaks and the number of hazardous leaks eliminated by repair, replacement or other action during the reporting year. The number of "hazardous leaks" eliminated or repaired during the year is reported as a performance measure for integrity management per § 192.1007(g). When reporting leaks or hazardous leaks eliminated by replacing or abandoning a segment of pipe, count the leaks that existed in the pipe segment before it was replaced or abandoned. Also include leaks and hazardous leaks reported on form PHMSA 7100.1, "Incident
Report Gas Distribution Systems." A reportable incident is one described in § 191.3. Do not include leaks that occurred during testing.

A "leak" is defined as an unintentional escape of gas from the pipeline. Do NOT report a leak determined to be non-hazardous and eliminated by lubrication, adjustment, or tightening.

A "hazardous leak" means 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. A "hazardous leak" which occurs aboveground or belowground is a leak and must be reported.

Operators who do not grade leaks for hazard, but rather repair all leaks when found, need not grade repaired leaks solely for the purpose of this report. Such operators treat all leaks as if hazardous. Operators who do not grade leaks must report the same values for both total and hazardous leaks for each cause.

The "number of known system leaks at the end of the year scheduled for repair" is the total number pipeline system leaks being monitored and scheduled for repair at the end of the calendar year. Monitored leaks also include those leaks which have been temporarily repaired until a permanent repair can be performed. These leaks are non-hazardous unless reclassified following the operator's operation and maintenance procedures.

Leak causes are classified as:

**CORROSION FAILURE**: Leak caused by galvanic, atmospheric, stray current, microbiological, or other corrosive action. A corrosion release or failure is not limited to a hole in the pipe or other piece of equipment. If the bonnet or packing gland on a valve or flange on piping deteriorates or becomes loose and leaks due to corrosion and failure of bolts, it is classified as Corrosion. (Note: If the bonnet, packing, or other gasket has deteriorated to failure, whether before or after the end of its expected life, but not due to corrosive action, report it under a different cause category, such as G4 Incorrect Operation for improper installation or G6 Equipment Failure if the gasket failed)

**NATURAL FORCE DAMAGE**: Leak caused by outside forces attributable to causes **NOT** involving humans, such as earth movement, earthquakes, landslides, subsidence, heavy rains/floods, lightning, temperature, thermal stress, frozen components, high winds (Including damage caused by impact from objects blown by wind), or other similar natural causes. Lightning includes both damage and/or fire caused by a direct lighting strike and damage and/or fire as a secondary effect from a lightning strike in the area. An example of such a secondary effect would be a forest fire started by lightning that results in damage to a gas distribution system asset which results in an incident.

**EXCAVATION DAMAGE**: Leak resulting directly from excavation damage by operator's personnel (oftentimes referred to as "first party" excavation damage) or by the operator's contractor (oftentimes referred to as "second party" excavation damage) or by people or contractors not associated with the operator (oftentimes referred to as "third party" excavation damage). Also, this section includes a release or failure determined to have resulted from previous damage due to excavation activity. For damage from outside forces OTHER than excavation which results in a release, use Natural Force Damage or Other Outside Force, as appropriate.

**OTHER OUTSIDE FORCE DAMAGE**: Leak resulting from outside force damage, other than excavation damage or natural forces such as: • Nearby Industrial, Man-made or Other Fire/Explosion as Primary Cause of Incident (unless the fire was caused by natural forces, in which case the leak should be classified Natural Forces. Forest fires that are caused by human activity and result in a release should be reported as Other Outside Force), • Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation. Other motorized vehicles/equipment includes tractors, mowers, backhoes, bulldozers and other tracked vehicles, and heavy equipment that can move. Leaks resulting from vehicular traffic loading or other contact (except report as "Excavation Damage" if the activity involved digging, drilling, boring, grading, cultivation or similar activities. • D amage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels so long as those activities are not excavation activities. If those activities are excavation activities such as dredging or bank stabilization or renewal, the leak repair should be reported as "Excavation Damage". • Previous Mechanical Damage NOT Related to Excavation. A leak caused by damage that occurred at some time prior to the release that was apparently NOT related to excavation activities, and would include prior outside force damage of an unknown nature, prior natural force damage, prior damage from other outside forces, and any other previous mechanical damage other than that which was apparently related to prior excavation. Leaks resulting from previous damage sustained during construction, installation, or fabrication of the pipe, weld, or joint from which the release eventually occurred are to be reported under "Pipe, Weld, or Joint Failure". Leaks resulting from previous damage sustained as a result of excavation activities should be reported under "Excavation Damage" unless due to corrosion in which case it should be reported as a corrosion leak. • Intentional Damage/. Vandalism means willful or malicious destruction of the operator's pipeline facility or equipment. This category would include pranks, systematic damage inflicted to harass the operator, motor vehicle damage that was inflicted intentionally, and a variety of other intentional acts. • Terrorism, per 28 C .F.R. § 0.85 G eneral functions, includes the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives. • T heft. Theft means damage by any individual or entity, by any mechanism, specifically to steal, or attempt to steal, the transported gas or pipeline equipment.

**PIPE, WELD, OR JOINT FAILURE** : Leak resulting from a material defect within the pipe, component or joint due to faulty manufacturing procedures, design defects, or in-service stresses such as vibration, fatigue and environmental cracking. Material defect means an inherent flaw in the material or weld that occurred in the manufacture or at a point prior to construction, fabrication or installation. Design defect means an aspect inherent in a component to which a subsequent failure has been attributed that is not associated with errors in installation, i.e., is not a construction defect. This could include, for example, errors in engineering design. Fitting means a device, usually metal, for joining lengths of pipe into various piping systems. It includes couplings, ells, tees, crosses, reducers, unions, caps and plugs. Any leak that is associated with a component or process that joins pipe such as threaded connections, flanges, mechanical couplings, welds, and pipe fusions that leak as a result from poor construction should be classified as "Incorrect Operation". Leaks resulting from failure of original sound material from force applied during construction that caused a dent, gouge, excessive stress, or other defect, including leaks due to faulty wrinkle bends, faulty field welds, and damage sustained in transportation to the construction or fabrication site that eventually resulted in a leak, should be reported as "Pipe, Weld or Joint Failure".

**EQUIPMENT FAILURE**: Leak caused by malfunctions of control and relief equipment including regulators, valves, meters, compressors, or other instrumentation or functional equipment, Failures may be from threaded components, Flanges, collars, couplings and broken or cracked components, or from O- Ring failures, Gasket failures, seal failures, and failures in packing or similar leaks. Leaks caused by over pressurization resulting from malfunction of control or alarm device; relief valve malfunction: and valves failing to open or close on command; or valves which opened or closed when not commanded to do so. If over pressurization or some other aspect of this incident was caused by incorrect operation, the incident should be reported under "Incorrect Operation."

**INCORRECT OPERATION**: Leak resulting from inadequate procedures or safety practices, or failure to follow correct procedures, or other operator error. It includes leaks due to improper valve selection or operation, inadvertent over pressurization, or improper selection or installation of equipment. It includes a leak resulting from the unintentional ignition of the transported gas during a welding or maintenance activity.

**OTHER CAUSE:** Leak resulting from any other cause not attributable to the above causes. A best effort should be made to assign a specific leak cause before choosing the Other cause category. An operator replacing a bare steel pipeline with a history of external corrosion leaks without visual observation of the actual leak, may form a hypothesis based on available information that the leak was caused by external corrosion and assign the Corrosion cause category to the leak.

## PART D – EXCAVATION DAMAGE

Excavation damages are reported as a measure of the effectiveness of integrity management programs (§ 192.1007(g)).

Report the "Number of Excavation Damages" experienced during the calendar year by the following apparent root cause which are classified as:

One-Call Notification Practices Not Sufficient: Damages resulting from no notification made to the One-Call Center; or notification to one-call center made, but not sufficient; or wrong information provided to One Call Center.

**Locating Practices Not Sufficient**: Damages resulting from facility could not be found or located; or facility marking or location not sufficient; or facility was not located or marked; or incorrect facility records/maps.

**Excavation Practices Not Sufficient**: Damages resulting from failure to maintain marks; or failure to support exposed facilities; or failure to use hand tools where required; or failure to test-hole (pot-hole); or improper backfilling practices; or failure to maintain clearance; or other insufficient excavation practices.

**Other:** Damages resulting from One-Call Center error; or abandoned facility; or deteriorated facility; or previous damage or data not collected; or other.

The Total Number of Excavation Damages will be calculated automatically based on the data entered. For this purpose, "Excavation Damage" means 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, plastic pipe tracer wire, lateral support, cathodic protection or the housing for the line device or facility.

Report also the "Number of Excavation Tickets" received during the year, (i.e., receipt of information by the operator from the notification center).

## PART E – EXCESS FLOW VALVE (EFV) AND SERVICE VALVE DATA

Report the number of EFV and manual service line shut-off valves installed during the calendar year. Report the estimated total number of EFV and manual service line shut-off valves in the system at the end of the calendar reporting year. Be sure to include the number installed during the calendar year when reporting the estimated number in the system at the end of the calendar year.

## PART F – TOTAL NUMBER OF LEAKS ON FEDERAL LAND REPAIRED/ELIMINATED OR SCHEDULED FOR REPAIR

Federal Lands: As defined in 30 U.S.C. §185, federal lands means "all lands owned by the United States except lands in the National Park System, lands held in trust for an Indian or Indian tribe, and lands on the Outer Continental Shelf." Indicate only those leaks repaired, eliminated, or scheduled for repair during the reporting year, including those incidents reported on Form PHMSA F 7100.1.

## PART G – PERCENT OF UNACCOUNTED FOR GAS

"Unaccounted for gas" is gas lost; that is, gas that the operator cannot account for as usage or through appropriate adjustment. Adjustments are appropriately made for such factors as variations in temperature, pressure, meter-reading cycles, or heat content; calculable losses from construction, purging, line breaks, etc., where specific data are available to allow reasonable calculation or estimate; or other similar factors.

State the amount of unaccounted for gas as a percent of total input for the 12 months ending June 30 of the reporting year.

[(Purchased gas + produced gas) minus (customer use + company use + appropriate adjustments)] divided by (purchased gas + produced gas) equals percent unaccounted for.

Do not report "gained" gas. If a net gain of gas is indicated by the calculations, report "0%" here. (Decimal or fractional percentages may be entered.)

## PART H – ADDITIONAL INFORMATION

Include any additional information which will assist in clarifying or classifying the reported data.

## PART I - PREPARER

PREPARER is the name of the person most knowledgeable about the report or the person to be contacted for more information. Please include the direct phone number and email address as applicable (e-mail address is desired but not required). It should be noted that PHMSA will use your e-mail address to issue correspondence that is normally sent via mass mailings. "Correspondence" includes notifications such as the annual reminder letter for Annual Report filings.

## POTENTIAL CAUSES FOR UNACCOUNTED GAS LOSS

As part of the annual reporting process to PHMSA and Louisiana Department of Natural Resources, Pipeline Safety Division, each gas distribution system is responsible for reporting "Unaccounted for Gas". Unaccounted for gas is the gas that you have purchased from your gas supplier minus the gas you have sold to your customers. Generally, if you purchased more gas than you sold, that difference is considered unaccounted for gas or gas lost. Below is information that may help you determine the possible causes for unaccounted for gas.

## PHMSA ANNUAL REPORT PART G UNACCOUNTED FOR GAS

1. **MEASUREMENT**
2. **ERORS IN SALES OR PURCHASES**
3. **LEAKAGE**
4. **GAS LOSS BY OTHER MEANS SHSUCH AS THEFT OR VANDALISUM**

**MEASUREMENT**

a) Meters not being properly read. All meters in the field should be read and reading should stop at the 1000-foot hand. The field reading would be in 100 ccf which correlates to the billing in the office being in 100 ccf.
b) Read all meters each billing cycle to make sure no one is using gas and not being billed. (office and field locations need to match)
c) If a meter location stops using gas remove the meter and cap outlet do not leave the meter at a location that is not using gas.
d) Meters that are not registering properly.
    1. Read every meter in the billing cycle to check for consumption. (ie to make sure each meter is registering)
    2. Every time there is a transfer of service or a new meter set, conduct a low flow test (with a low flow adapter) to make sure each meter will register a low flow of gas such as a pilot, gas light, or other low flow appliance. Otherwise gas is being lost.
e) Outlet regulator pressure check each regulators outlet pressure at the meter when there is a transfer of service or new meter set. (make sure the pressure matches the index) Standard index the pressure is set at 4 ounces on residential meters. Red indexes the regulator is set to match the index. (example 2-pound, 5-pound, 10 pounds or the amount stated on the index)
f) Large meters check the pressure make sure the pressure that is going through the meter to serve the customer has the correct pressure factor for the billing, or has a compensating red index, or an emcorrector, or pressure factor to compensate for pressure.
g) Billing for large meters should be in ccf or mcf to match the billing program in the office.
h) Have a meter change out program once a meter is set over time it will not measure accurately (they will go slow which is a gas lost) Normally a change out program would be between 10 to 12 years. A practice to establish the accuracy of the meters in the field would be helpful. This can be done by having your meter repair company do a proof of a meter that had been the field for a number of years to see how accurate it still is to give

you an idea of the condition of the meters that are still in service of approximately the same age.

i) Make sure that meters are being properly sized properly. Check the BTU rating of each appliance add them all up take off three zeros and that is the amount of gas that would be used by that particular customer. (Example these ratings are not accurate but for use in this exercise heating system 100,000 BTU water heater 50,000 BTU, stove 20,000 BTU, oven 20,000 BTU, generator 300,000 BTU this would equate to 490 cubic feet per hour so you would size a meter the would pass 490 cubic feet per hour ideally this would be the mid-range of the meter such as a 415 meter would work for this situation it will pass between 400 to 900 cubic feet per hour.) Under sized meter will give free gas to customers.

**BILLING**

a) Make sure supplier meters are accurate and calibrated periodically.
b) Make sure all meters in the field are read or checked each month and that each meter in the field has a billing record in the office.
c) Make sure your billing system has a program that recognizes a substantial difference in usage of gas from one billing period to another.
d) Correct pressure factors are being used that match in the field and in the office.
e) Field readings of ccf or mcf should match with office
f) Fuel adjustment are being made.
g) Make sure gas used by you in your daily operation is being accounted for as being used although not billed.

**LEAKAGE**

a) Make sure that gas is properly odorized so leaks can be detected and reported by the public ourselves, or any third party.
b) Customer call for leaks should be promptly investigated using leak detection equipment (ie search instrument then combustible gas indicator to pinpoint and repair the leak)
c) Leak survey as require then repair leaks promptly. If unaccounted is too high consider extending the leak survey area beyond compliance rules and or more frequently.
d) Calculate gas loss form damage to the gas line either by you, your contractor or third party. This is gas that is loss but can be accounted for.
e) Calculate gas loss from purging or blow down. This is gas loss that can be accounted for.

**GAS LOSS BY OTHER MEANS**

a) Gas can be stolen by turning on a gas meter that is out of service. (We recommend removing all inactive meters.)
b) Customer tapping into existing service. (Patrol system and check all inactive meters and risers each month. Remove all inactive meters and inactive risers that will not be put back into service.
c) Remove and or plug all inactive meter gas can pass through a closed valve.
d) Relief valves going off due to overpressure or failure. (This can be calculated)

**ANNUAL REPORT OF NATURAL AND SUPPLEMENTAL GAS SUPPLY AND DISPOSITION EIA-176**

Annual completion of the EIA-176 form is mandatory under the Federal Administration Act of 1974 (Public Law 93-275) and must be filed by March 1 of each calendar year. Submittal of this form may be by made as follows:

Mailed to:

**EIA-176**
**U. S. Department of Energy**
**Oil & Gas Survey**
**Ben Franklin Station**
**P.O. Box 279**
**Washington, DC 20044-0279**

**Via Email**: OOG.SURVEYS@eia.gov

**Via Fax**: **(202) 586-1076**

Online https://signon.eia.doe.gov/upload/noticeoog.jsp

On the following page is a copy of the EIA-176 Form, OMB No. 1905-0175

U.S. Energy Information Administration

OMB No. 1905-0175
Expiration Date: 12/31/2017
Version No.: 2015.01
Burden: 12.0 hours

# ANNUAL REPORT OF NATURAL AND SUPPLEMENTAL GAS SUPPLY & DISPOSITION
## FORM EIA-176

This report is **mandatory** under the Federal Energy Administration Act of 1974 (Public Law 93-275). Failure to comply may result in criminal fines, civil penalties and other sanctions as provided by law. For the sanctions and the provisions concerning the confidentiality of information submitted on this form, see instructions. **Title 18 USC 1001 makes it a criminal offense for any person knowingly and willingly to make to any Agency or Department of the United States any false, fictitious, or fraudulent statements as to any matter within its jurisdiction.**

### PART 1. RESPONDENT IDENTIFICATION DATA

REPORT PERIOD: Year: 2 0 ☐ ☐

EIA ID NUMBER: 1 7 6 ☐ ☐ ☐ ☐ ☐ ☐ ☐

If this is a resubmission, enter an "X" in the box: ☐

If any Respondent Identification Data has changed since the last report, enter an "X" in the box: ☐

Company Name: _____

Operations in (State): _____

Contact Name: _____

Phone No.: _____ Ext: _____

Fax No.: _____

Address 1: _____

Address 2: _____

City: _____ State: _____ Zip: _____ - _____

Email address: _____

### PART 2. SUBMISSION INFORMATION

A completed form must be filed by March 1

Form may be submitted using one of the following methods:

**Mail to:** EIA-176
U. S. Department of Energy
Oil & Gas Survey
Ben Franklin Station
P.O. Box 279
Washington, DC 20044-0279

**Email:** OOG.SURVEYS@eia.gov

**Fax:** **(202) 586-1076**

**Secure File Transfer:**
https://signon.eia.doe.gov/upload/noticeoog.jsp

**Questions?** **Call: (877) 800-5261**

### PART 3. COMPANY CHARACTERISTICS

A. Type of Operations (check all that apply)

| | | | | | |
|---|---|---|---|---|---|
| 1. | ☐ | Distribution company - investor owned | 8. | ☐ | Storage operator |
| 2. | ☐ | Distribution company - municipally owned | 9. | ☐ | Synthetic natural gas (SNG) plant operator |
| 3. | ☐ | Distribution company - privately owned | 10. | ☐ | Producer |
| 4. | ☐ | Distribution company - cooperative | 11. | ☐ | Gatherer |
| 5. | ☐ | Distribution company - other ownership | 12. | ☐ | Liquefied natural gas (LNG) peak facility operator |
| 6. | ☐ | Interstate pipeline (FERC regulated) | 13. | ☐ | Liquefied natural gas (LNG) marine terminal |
| 7. | ☐ | Intrastate pipeline | 14. | ☐ | Other (specify) |

B. Vehicles Powered by Natural Gas

1. Does your company's vehicle fleet include vehicles powered by natural gas? Yes ☐ No ☐
2. If yes, how many vehicles in your company's fleet are powered by natural gas? _____
3. If you sell natural gas directly to the public at a fueling facility, what was the natural gas pump price on December 31 of the report year, in cents per gasoline gallon equivalent? _____

C. Customer Choice Program

If there is a Customer Choice program available in your service territory, enter the number of customers currently eligible for and participating in the Customer Choice program at the end of the calendar year.

| | Eligible | Participating |
|---|---|---|
| Residential | _____ | _____ |
| Commercial | _____ | _____ |

D. Sales/Acquisitions

1. Did your distribution territory increase or decrease in size in the report state due to acquisition or sale this year? If Yes, please describe the sale or acquisition in the Comments box below. Yes ☐ No ☐

**Comments: (To separate one comment from another, press ALT+ENTER)**

eia U.S. Energy Information Administration

OMB No. 1905-0175
Expiration Date: 12/31/2017
Version No.: 2015.01

## ANNUAL REPORT OF NATURAL AND SUPPLEMENTAL GAS SUPPLY & DISPOSITION
## FORM EIA-176

REPORT PERIOD: Year: 2 0 | COMPANY NAME: | Resubmission ☐
EIA ID NUMBER: 1 7 6

### PART 4. NATURAL AND SUPPLEMENTAL GAS SUPPLY FOR THE REPORT STATE

| ITEM DESCRIPTION | VOLUME (Mcf @ 14.73 psia and 60°) | COST | NOTES* E | NOTES* F |
|---|---|---|---|---|
| 1.0 If you are a producer, report production within the report state of: | | | | |
| 1.1 Natural gas** (if reporting natural gas production, lease use data should also be reported on line 15.0) | | | | |
| 1.2 Synthetic natural gas (SNG) | | | | |
| 2.0 If you are a storage operator, report operations within the report state of: | | | | |
| 2.1 Underground storage withdrawals | | | | |
| 2.2 Liquefied natural gas (LNG) storage withdrawals (regasification) | | | | |
| 3.0 If you are an interstate pipeline company or other company receiving physical custody at state lines or U.S. borders, report receipts | | | | |
| From company ▾ In state or country ▾ Means of transport ▾ | | | | |
| From company ▾ In state or country ▾ Means of transport ▾ | | | | |
| From company ▾ In state or country ▾ Means of transport ▾ | | | | |
| From company ▾ In state or country ▾ Means of transport ▾ | | | | |
| 4.0 If you are a distributor, report receipts at city gates within the report state | | | | |
| 4.1 Purchase gas received in distribution service area for delivery to your sales customers | | | | |
| 4.2 Receipts of gas in distribution service area for delivery to your transportation customers | | | | |
| 5.0 Report any other receipts of natural gas within the report state (excluding federal offshore) | | | | |
| 6.0 Supplemental gaseous fuels supplies (specify type) ▾ | | | | |
| ▾ | | | | |
| 7.0 Total supply within report state (**sum of all items in lines 1.0 through 6.0**) | | | | |

### PART 5. LIQUEFIED NATURAL GAS (LNG) STORAGE INVENTORY

| | VOLUME (Mcf @ 14.73 psia and 60°) | CAPACITY (Mmcf per day) | NOTES* E | NOTES* F |
|---|---|---|---|---|
| 8.0 If you operate a natural gas facility, report inventory as of December 31 of the report year | | | | |
| 8.1 Liquefied natural gas (LNG) facility | | | | |
| 8.2 Marine terminal facility | | | | |

*Check E if data reported are an estimate; check F if you are providing a footnote in Part 7 for this data item.

**If reporting Natural Gas Production (1.1), data should also be reported on lease use (15.0).

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Version No.: 2015.01

## ANNUAL REPORT OF NATURAL AND SUPPLEMENTAL GAS SUPPLY & DISPOSITION
## FORM EIA-176

REPORT PERIOD: Year: 2 0 | COMPANY NAME: | Resubmission ☐
EIA ID NUMBER: 1 7 6

**PART 6. NATURAL AND SUPPLEMENTAL GAS DISPOSITION FOR THE REPORT STATE**

9.0 Heat content of gas delivered to consumers (Btu/cf)

| ITEM DESCRIPTION | NUMBER OF CUSTOMERS | VOLUME (Mcf @ 14.73 psia and 60° F) | REVENUE (Including taxes) (whole dollars) | NOTES* E | NOTES* F |
|---|---|---|---|---|---|
| 10.0 Deliveries of natural gas that you **do own** to end-use consumers within the report state *(for assistance in determining proper categorization of customers, see page 3 of instructions)* | | | | | |
| 10.1 Residential | | | | | |
| 10.2 Commercial | | | | | |
| 10.3 Industrial | | | | | |
| 10.4 Electric power | | | | | |
| 10.5 Vehicle fuel | | | | | |
| 10.6 Other (not included in above categories) _____ (Specify type) | | | | | |
| 11.0 Deliveries of natural gas that you **do not own** to end-use consumers within the report state *(for assistance in determining proper categorization of customers, see page 3 of instructions)* | | | | | |
| 11.1 Residential | | | | | |
| 11.2 Commercial | | | | | |
| 11.3 Industrial | | | | | |
| 11.4 Electric power | | | | | |
| 11.5 Vehicle fuel | | | | | |
| 11.6 Other (not included in above categories) _____ (Specify type) | | | | | |

*Check E if data reported are an estimate; check F if you are providing a footnote in Part 7 for this data item.

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## ANNUAL REPORT OF NATURAL AND SUPPLEMENTAL GAS SUPPLY & DISPOSITION
## FORM EIA-176

REPORT PERIOD: Year: 2 0 | COMPANY NAME: | Resubmission
EIA ID NUMBER: 1 7 6

### PART 6. NATURAL AND SUPPLEMENTAL GAS DISPOSITION FOR THE REPORT STATE (continued)

| ITEM DESCRIPTION | VOLUME (Mcf @ 14.73 psia and 60°) | NOTES* E | NOTES* F |
|---|---|---|---|
| 12.0 Natural gas consumed in your operations: | | | |
| 12.1 Space heat of your facilities | | | |
| 12.2 New pipeline fill | | | |
| 12.3 Pipeline distribution or storage compressor use | | | |
| 12.4 Other .....(specify type) | | | |
| 13.0 If you are a storage operator, report operations within the report state of: | | | |
| 13.1 Underground storage injections (including new fields) | | | |
| 13.2 Liquefied natural gas (LNG) storage injections | | | |
| 14.0 If you are an interstate pipeline company or other company moving gas across or to state lines or U.S. borders, report volumes transported | | | |
| To company ... In state or country ... Means of transport | | | |
| To company ... In state or country ... Means of transport | | | |
| To company ... In state or country ... Means of transport | | | |
| To company ... In state or country ... Means of transport | | | |
| 15.0 Lease use (reported by producers only) | | | |
| 16.0 Returned to oil and/or gas reservoirs, used for repressuring, reinjection (reported by producers only) | | | |
| 17.0 Losses from leaks, damage, accidents, migration and/or blow down within the report state: | | | |
| 18.0 Other disposition within the report state (not included above): | | | |
| 18.1 To distribution companies | | | |
| 18.2 To other pipelines in the report state | | | |
| 18.3 To storage operators in the report state | | | |
| 18.4 To other ..... (specify type) | | | |
| | | | |
| 19.0 Total disposition (**sum of all items 10.1 through 18.4**) | | | |
| 20.0 Difference between gas supply (+) and disposition (-) (Part 4 line 7.0 minus Part 6 line 19.0) (this value may be a negative number) | | | |

*Check E if data reported are an estimate; check F if you are providing a footnote in Part 7 for this data item.

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## ANNUAL REPORT OF NATURAL AND SUPPLEMENTAL GAS SUPPLY & DISPOSITION
## FORM EIA-176

REPORT PERIOD: Year: 2 0 | COMPANY NAME: | Resubmission
EIA ID NUMBER: 1 7 6

### PART 7. FOOTNOTES

| Part No. | Item No. | Footnote |
|---|---|---|
| | | |
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## ORGANIZATION REPORT FORM PLS-OR-1

Form PLS-OR-1 must be filed prior to the beginning of the first operation that is within the jurisdiction of the Office of Conservation or when an organization name is being changed. Form PSL-OR 1 must also be filed annually by the specified date. The Office of Conservation will provide a renewal notice by mailing a blank PLS-OR-1 Form. T he form must be completed in its entirety. Complete instructions for completion and submittal of this form is on the following pages. If you have any questions, please call (225) 342-5505. Completed forms are to be submitted by mail to:

**Department of Natural Resources**
**Office of Conservation - Pipeline Division**
**P.O. Box 94275**
**Baton Rouge, La. 70804-9275**

**ORGANIZATION REPORT** **2011FORM PLS-OR-1**

**READ THE INSTRUCTIONS * COMPLETE ENTIRE FORM**

1. Purpose of Filing ( ) Initial Filing ( ) Change of Address Only
( ) Annual Refiling
( ) Organization Name Change

2. OOC Code Number

3. Type of Operation ( ) Gas Transmission ( ) Municipal ( ) Master Meter
( ) Gas Gathering ( ) Gas Utility District
( ) Hazardous Liquid ( ) Privately Owned Distribution

3a. Initial Date of LA Operation

4. Certified Intrastate Natural Gas Transporter? Yes No Certified Date

5. Current Plan of Organization (Select ONE ONLY)
( ) Corporation - State where Inc.___ ( ) Company ( ) Joint Venture
( ) LLC ( ) Individual ( ) Trade Name
( ) Partnership ( ) Trust ( ) Other

5a. LA Secretary of State Charter Number:

6. Organization - Name & Mailing Address

(A) Contact Person for Organization

(B) Contact Person in case of Emergency:
Phone No.:
Fax No.:
E-Mail Address:

7. Address for Official Correspondence including Citations.

Contact Person( must be a V.P. or higher for privite entity)
Name / Title:
Phone No.:
Fax No.:
E-Mail Address:

8. Three Primary Officers (Only one necessary if individual, if government enity leave blank) COMPANY FEDERAL TAX ID NO.

(1) Name:
Address: Title:

(2) Name:
Address: Title:

(3) Name:
Address: Title:

9. Complete page 2 for DOT SPECIALIST & BILLING CONTACTS (See Instructions)

10. If a change of organization name, give previous name and OOC code number:

Name: No. Eff. Date:

11. Each registered organization shall notify this Office, in writing, following the filing of a voluntary petition for bankruptcy under any Chapters of Title 11 (Bankruptcy) of the United States Code (11 U.S.C.) by or against. The notification will indicate the name of the court and date of filing.

CERTIFICATE: I DECLARE UNDER PENALTIES AS PRESCRIBED IN LRS 30:17, THAT I AM AUTHORIZED TO MAKE THIS REPORT, THAT THIS REPORT WAS PREPARED BY ME OR UNDER MY SUPERVISION AND DIRECTION, AND THAT DATA AND FACTS STATED THEREIN ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE.

PRINTED NAME TITLE DATE

SIGNATURE TELEPHONE NO.:

FOR OOC USE ONLY

DATE: APPROVED BY:

## INSTRUCTIONS

Form PLS-OR-1: Organization Report

**WHO IS TO FILE FORM PLS-OR-1**: Each entity performing operations within the jurisdiction of the Office of Conservation. A separate Form PLS OR-1 must be filed for each type of operation.

**WHEN TO FILE FORM PLS-OR-1**: Form PLS-OR-1 must be filed prior to beginning the first operation that is within Office of Conservation jurisdiction or when an organization name is being changed. Initial filing shall be valid for the first calendar year.

Form PLS-OR-1 must be re-filed annually by the date specified. The Office of Conservation will provide a renewal notice by mailing a blank Form PLS-OR-1. **THIS FORM MUST BE COMPLETED IN IT'S ENTIRETY**. SIGN and DATE the PLS-OR-1 and return to the Office of Conservation in Baton Rouge by the date required.

**ADDRESS INSTRUCTIONS**: Each name and address line is limited to 30 spaces in length. Each name is limited to one line while each address is limited to four lines. Use abbreviations where necessary to conform to these limits.

**SPECIFIC ITEMS ON FORM PLS-OR-1:**

1. Check the proper block to show the purpose of filing.

2. Your permanent code number is assigned upon initial filing of your PLS-OR-1. If you change your organization name, a new number will be assigned, do not give your previously assigned OOC Code Number in this space (See No. 9). Please see the second page of your bil to the right of operator for you OOC #.

3. Check proper block to show type of operation. **A separate Form PLS-OR-1 must be filed for each type of operation.**

   3a. Please indicate the Initial Date of Operation in Louisiana.

4. Check yes if company has received a Certificate of Transportation from the Commmissioner of Conservation.

5. Check the appropriate plan of organization. Select one only.

   5a. Please indicate the LA Secretary of State charter/organization ID number (if applicable), such as, Corporations, Incorporated companies, LLC, or Partneships.

6. This is the official name of your organization as carried on Office of Conservation records and LA Secretary of State records, if applicable. ADDRESS, ALONG WITH AN EMERGENCY CONTACT, PHONE NUMBER, ETC ARE REQUIRED PURSUANT TO R.S. 30:4B. ALL OF THIS INFORMATION MUST BE PROVIDED.

7. Address to which Official Correspondence should be directed, the Contact Person, telephone number, fax number and e-mail address. The Contact Person **must** hold a position of Vice President or higher for a private entity. Examples of Contact Persons are listed below for other type organizations.

| | |
|---|---|
| Municipals | Mayor |
| Partnerships | Managing Partner |
| GUD | President or VP of Board |

8. List **ONLY** the **THREE** highest ranking officers of the organization and give their full legal name (**AGENTS NOT ACCEPTABLE**). Do not attach a listing of any others. The street address for each Officer **MUST** be different from that shown for the organization in No. 5. If plan of organization is an individual, only No. 1 under primary officer is to be completed and the address may be the same as shown in No. 5. **COMPANY'S FEDERAL TAX ID NUMBER MUST BE LISTED.** The information provided will be used solely for the administration and enforcement of the laws pertaining to the Office of Conservation.

9. Complete Page 2 as an option of organization address for DOT Compliance Specialist and Billing Correspondence. Otherwise, such correspondence will be directed to the address provided at No. 6. Each name and address line is limited to 30 spaces in length. Each name is limited to one line, while each address is limited to four lines.Use abbreviations where necessary to conform to these limits.

10. If you have changed your organization name, give the previous name of the organization , as well as the previously assigned OOC Code Number.

**IF YOU HAVE ANY QUESTIONS PLEASE CALL (225) 342-5505.**

**RETURN TO:**
**DEPARTMENT OF NATURAL RESOURCES**
**OFFICE OF CONSERVATION - PIPELINE DIVISION**
**P.O. BOX 94275**
**BATON ROUGE, LA. 70804-9275**

Office of Conservation (OOC) Code Number: _____

***(Please see the second page of your bill next to operator for the correct OOC #)***

Organization Name: _____

**(To be completed by Pipeline Operators)**

ADDRESS TO WHICH DOT COMPLIANCE SPECIALIST & ANNUAL REPORT CORRESPONDENCE SHOULD BE DIRECTED:

CONTACT PERSON:

PHONE NUMBER: ( ) /
AREA CODE NUMBER

FAX NUMBER: ( ) /
AREA CODE NUMBER

E-MAIL ADDRESS:

**(To be completed by All Pipeline Operators)**

ADDRESS TO WHICH USER FEE & BILLING CORRESPONDENCE SHOULD BE DIRECTED:

CONTACT PERSON:

PHONE NUMBER: ( ) /
AREA CODE NUMBER

FAX NUMBER: ( ) /
AREA CODE NUMBER

E-MAIL ADDRESS:

**(To be completed only by Certified Intratstate Natural Gas Transporters)**

ADDRESS FOR PIPELINE OPERATIONS CONTACT:

CONTACT PERSON:

PHONE NUMBER: ( ) /
AREA CODE NUMBER

FAX NUMBER: ( ) /
AREA CODE NUMBER

E-MAIL ADDRESS:

**INSTRUCTIONS:**

This form is to be filed **annually**. Each name and address line is limited to 30 spaces in length. Each name is limited to one line while each address is limitied to four lines. Use abbreviations where necessary to conform to these limits.

## DAMIS REPORT - DRUG AND ALCOHOL TESTING

A DAMIS Report for drug and alcohol testing may or may not be required to be submitted each calendar year. T his report is to document drug testing analysis of company employees and specifically any positive drug test of employees to PHMSA. This report must be completed online and submitted by January 15 of each calendar year. To make this submittal follow the instructions outlined below:

Go to website **https://portal.phmsa.dot.gov** (This is the PHMSA Portal)

Enter your **User Name**

Enter your **Password**

User Name and Password are the same as the user name and password you use when preparing your Annual Report online

When you are prompted to do so, enter your **OPID Number**. (Your OPID number is on the front cover of your Operation and Maintenance Manual)

Access the message in the Portal by clicking the DAMIS link at the bottom of the left-side menu.

At this point it will tell you if you need to send in the DAMIS Report

## 2.6 DISTRIBUTION SYSTEM: MECHANICAL FITTING FAILURE REPORTS (191.12

Each mechanical fitting failure required by §192.1009 must be submitted on a Mechanical Fitting Failure Report Form PHMSA F-7100.1-2. The City of Carencro will submit a mechanical fitting failure report for each mechanical fitting failure that occurs within a calendar year not later than March 15 of the following year. The City of Carencro may elect to submit its reports throughout the year. The City of Carencro will also report this information to the Office of Conservation, P.O. Box 94275, B aton Rouge, La. 70814-9275. See Section 9.0 for Mechanical Fitting Failure Form.

## 2.7 NATIONAL REGISTRY OF PIPELINE AND LNG OPERATORS (191.22)(a)(b)(c)(d)

OPID Request: Any operator of a gas pipeline or pipeline facility effective January 1, 2012 must either have already obtained or must request an Operator Identification Number. This OPID is assigned to an operator for the pipeline or pipeline system for which the operator has primary responsibility. To obtain an OPID, an operator must complete an OPID Assignment Request DOT Form PHMSA F1000.1 though the National Registry of Pipeline and LNG Operators in accordance with §191.7.

OPID Validation: Any operator who already been assigned one or more OPID by January 1, 2011 must validate the information associated with each OPID through the National Registry of Pipeline and LNG Operators at *http://opsweb.phmsa.dot.gov*, and La. DNR of certain events and correct that information as necessary, no later than June 30, 2012.

**Changes**: Each operator of a gas pipeline, gas pipeline facility, LNG plant or LNG facility must notify PHMSA electronically through the National Registry of Pipeline and LNG Operators at ***http://opsweb.phmsa.dot.gov*** of certain events. For intrastate facilities subject to the jurisdiction of the Office of Conservation, a copy must also be submitted to Office of Conservation, P.O. Box 94275, Baton Rouge, LA 70804-9275 as follows:

(1) An operator must notify PHMSA of any of the following events not later than 60 days before the event occurs:

i. Construction or any planned rehabilitation, replacement, modification, upgrade, up-rate, or update of a facility, other than a section of line pipe, that cost $10 million or more. If 60-day notice is not feasible because of an emergency, an operator must notify PHMSA as soon as practicable;
ii. Construction of 10 or more miles of a new pipeline; or replacement pipeline;
iii. Construction of a new LNG plant or LNG facility.
iv. Reversal of product flow direction when the reversal is expected to last more than 30 days. This notification is not required for pipeline systems already designed for bi-directional flow;

(2) An operator must notify PHMSA of any of the following events not later than 60 days before the event occurs:

(i) A change in the primary entity responsible (i.e., with an assigned OPID) for managing or administering a safety program required by this part covering pipeline facilities operated under multiple OPIDs.

(ii) A change in the name of the operator;

(iii) A change in the entity (e.g., company, municipality) responsible for an existing pipeline, pipeline segment, pipeline facility or LNG facility;

(iv) The acquisition or divestiture of 50 or more miles of a pipeline or pipeline system subject to Part 192 of this subchapter

Reporting: An operator must use the OPID issued by PHMSA for all reporting requirem3ents covered under this subchapter and for submissions to the National Pipeline Mapping System.

## 2.8 REPORTING SAFETY-RELATED CONDITIONS (191.23)(a)

Employees of the City of Carencro must be able to recognize and react to Safety Related Conditions and should remain alert to any changes in the system that is out of the ordinary. Changes to the gas distribution system that are out of the ordinary or changes that are not normal include but are not limited to the following and must be reported in accordance with §191.25:

- General Corrosion that has reduced the wall thickness to less than that required for the MAOP and localized corrosion pitting to a degree where leakage might result.
- Unintended Movement or abnormal loading by environmental causes
- Any crack or other material defect that impairs the structural integrity or reliability of an LNG facility that contains, controls, or processes gas or LNG
- Material Defects or Physical Damage that impairs the serviceability of a pipeline
- Malfunction or Operating Error Causing Pressure Increase Above MAOP Allowable Limits
- Any Leak That Constitutes Activation of the Emergency Plan
- Shut Down of The Gas Distribution System
- Any Other Condition That Could Lead to an Imminent Hazard

## 2.9 FILING SAFETY RELATED CONDITION REPORTS (191.25)(a)(b)

Any of the items identified in Section 2.4 is to be reported to the Operator immediately. Should the event or condition not be able to be corrected immediately or before the deadline for filing the safety related condition report, a Safety-Related Condition Report shall be filed. This record will be maintained as a part of the Record Retention Program. This report must be filed concurrently (received by the commissioner and associate administrator, OPS) in writing within five (5) working days (not including Saturday, Sunday, state or federal holidays) after the day a representative of the operator first determines that the condition exists, but not later than 10 working days after the day a representative of the operator discovers the condition. Separate conditions may be described in a single report if they are closely related. Reports shall be mailed to the Commissioner of Conservation, Office of Conservation, PO Box 94275, Baton Rouge, LA 70804-9275 or may be transmitted by electronic mail to PipelineInspectors@la.gov and concurrently to the Office of Pipeline Safety Administration, U.S. Department of Transportation at InformationResourcesManager@dot.gov or by facsimile at (202) 366-7128. As part of the Record Retention Program safety Related Condition Reports will be maintained. The report must be headed "Safety Related Condition Report" and provide the following information:

- Name and principal address of the operator.
- Date of the report
- Name, job title, and business telephone number of person submitting the report.
- Name, job title, and business telephone number of person who determined that the condition exits.
- Date condition was discovered and date condition was first determined to exist.
- Location of condition, with reference to the State (and town, city, or parish) and nearest street address
- Description of the condition, including circumstances leading to its discovery, any significant effects of the condition on s afety, and the name of the commodity transported or stored.
- The corrective action taken (including reduction of pressure or shutdown) before the report is submitted and the planned follow-up future corrective action, including the anticipated schedule for starting and concluding such action.

On the following page is a Safety Related Condition Form.

**CITY OF CARENCRO**
**OPERATION AND MAINTENANCE MANUAL**

**STATE OF LOUISIANA**
**OFFICE OF PIPELINE SAFETY**
**SAFETY RELATED CONDITION REPORT**

## Owner / Operator Information

| | | | |
|---|---|---|---|
| Owner | | Operated By | |
| Address | | Address | |
| | | | |
| Date of Repor | | | |

| | | | |
|---|---|---|---|
| Date condition discovered | | Date condition determined to exis | |

| | | | |
|---|---|---|---|
| Person submitting report | | | |
| Title | | Phone number | |

| | | | |
|---|---|---|---|
| Person who determined condition | | | |
| Title | | Phone number | |

## Pipeline Information

| | | | | | | |
|---|---|---|---|---|---|---|
| Distribution | | Transmission | | Liquid | | |
| | | | | | Product | |

| | | | | | |
|---|---|---|---|---|---|
| Pipe Size | | Steel ( ) | Plastic ( ) | MAOP / MOP | |
| | | | Operating pressure at time of condition | | |

## Cause of report

| | | |
|---|---|---|
| | Corrosion | |
| | Unintended movement or Abnormal loading | |
| | Any crack or Material defect / LNG | |
| | Material defect or Physical damage / Pipeline | |
| | Malfunction or Operating error that causes overpressure | |
| | Leak that constitutes an emergency | |
| | Condition that causes 20% reduction in operating pressure | |
| | Other | Explain: |

**CITY OF CARENCRO**
**OPERATION AND MAINTENANCE MANUAL**

**SAFETY RELATED CONDITION REPORT**

## Condition Information

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Condition within 220 yards of | | N/A | | Within right of way of activ | | N/A | | |
| | Building intended for human occupancy | | | Railroad | | | Paved road | |
| | Outdoor place of assembly | | | Street | | | Highway | |

| |
|---|
| Location of conditio |
| |
| |
| |

| |
|---|
| Description of condition |
| |
| |
| |
| |

| |
|---|
| How discovered |
| |
| |
| |

## Corrective action

| |
|---|
| Corrective action taken |
| |
| |
| |

## Planned follow up / Future corrective action

| | | |
|---|---|---|
| Anticipated corrective action dates | Start: | Completion: |

| |
|---|
| Proposed corrective actio |
| |
| |
| |
| |

## 2.10 CUSTOMER NOTIFICATION (192.16)

City of Carencro Gas Department does not maintain customer piping beyond the meter. As a result, the section of underground piping beyond the gas meter and owned by the customer is subject to leaks and corrosion. The customer is responsible for maintaining and repairing this section of gas piping from leakage. The City of Carencro has only a few customer meters set at the property line where the customer piping is subject to corrosion and leakage. A Public Notice has been sent to all customers advising them of this and the fact that the utility does not provide maintenance services on customer piping. However, in the event of problems with the customer piping, the City of Carencro Gas Department will offer assistance (who to notify to correct problem) and/or turn off gas service if necessary. All new gas customers must be notified of the their responsibility associated with maintenance of customer piping beyond the meter within ninety (90) days after connecting to the gas distribution system. See copy of letter on next page.

# CITY OF CARENCRO
# NATURAL GAS CUSTOMERS

Customer Notification

The City of Carencro DOES NOT maintain any buried gas piping between the gas meter and the building or structure being served, and therefore, the customer is solely responsible for the maintenance of that buried gas piping. In addition, the City of Carencro does not maintain any gas piping inside any structure or building being served.

You are also advised that:

Un-maintained buried gas piping may be subject to the potential hazards of corrosion and leakage. Customers buried gas piping should therefore be periodically inspected for leaks and also inspected for corrosion if the piping is metallic and repaired if any unsafe conditions are found.

Additionally, when excavating near buried gas piping, the piping should be located in advance, and the excavation done by hand. Call Louisiana One-Call at 1-800-272-3020 to locate your customer owned buried gas piping and other buried utility facilities in the vicinity of your excavation. You are also advised that qualified plumbers and heating contractors can assist in locating, inspecting and repairing customer buried gas piping.

If we can answer any questions regarding this notice, please call us at 337-896-8481.

Sincerely,

Glenn L. Brasseau
Mayor

## 2.11 MARKING OF MATERIAL (192.63)(a)

This gas system uses piping, material and fittings and other components that have been marked by the manufacturer as prescribed in the specification or standard to which is was manufactured. Thermoplastic fittings are marked in accordance with ASTM D 2513.

The markings on thermoplastic fittings will indicate size, material, manufacturer, pressure rating, and temperature rating, and as appropriate, type, grade, and model. Surfaces of pipe and components that are subject to stress for internal gas pressure will not be field die stamped and if any item is marked by die stamping, the die must have blunt or rounded edges that will minimize stress concentrations. This is also discussed in Section 192.281 and 192.283 of this Operation and Maintenance Manual.

As of November 20, 2018, the Pipeline and Hazardous Materials Safety Administration (PHMSA) published the Final Rule which went into effect **January 22, 2019**. **ALL PLASTIC PIPE AND COMPONENTS** manufactured after December 31, 2019 be marked as prescribed in the specification or standard to which it was manufactured and that those markings be legible until the time of installation.

## 2.12 DISTRIBUTION LINE VALVES 192.181) (a)(b)(c)

The City of Carencro distribution system has valves spaced so as to reduce the time to shut down a section of main in an emergency. Valve spacing is determined by the operating pressure, the size of the mains and the local physical conditions.

Each regulator station owned and operated by City of Carencro controlling the flow or pressure of gas in the distribution system must have a valve installed on the inlet piping at a distance from the regulator station sufficient to permit the operation of the valve during an emergency that might preclude access to the station.

Each valve on a main installed for operating or emergency purposes must comply with the following:

1. The valve must be placed in a readily accessible location so as to facilitate it operation in and emergency.
2. The operating stem or mechanism must be readily accessible.
3. If the valve is installed in a buried box or enclosure, the box or enclosure must be installed so as to avoid transmitting external loads to the main.

## SECTION 3 - JOINING OF PIPELINE MATERIALS (SUBPART E)

### 3.1 WELDING OF STEEL PIPELINES (192.225)(a)(b)

In general, little of no steel piping is used in maintenance, repairs and extensions to the Gas Distribution System. Most steel gas lines within the distribution system were installed prior to 1970. The only steel piping presently being installed is in the form of transition fittings used to connect existing steel gas lines to polyethylene mains and services for extensions or additions to the gas distribution system or for installing taps for new services. When welding is used to extend gas lines, welding must be performed by a qualified welder in accordance with welding procedures qualified under Section 5, **section 12, or Appendix A of API Std 1104 (incorporated by reference, see §507) or Section IX of the ASME Boiler and Pressure Vessel Code (ASME BPVC) (incorporated by reference, see §507)** The quality of the test welds used to qualify welding procedures shall be determined by destructive testing in accordance with the applicable welding standard(s). Welders must be qualified in accordance with Section 6 of API 1104 (ibr, see §192.7) or Section IX of the ASME Boiler and Pressure Vessel Code (ibr, see §192.7). However, a welder qualified under an earlier edition than listed in appendix A of this part may weld but may not requalify under that earlier edition. Each welding procedure must be recorded in detail, including the results of the qualifying tests. Records must be retained and followed whenever the procedure is used.

This test consists of Appendix C – Qualifications of welding for low stress levels pipe. Welders must requalify annually in accordance with Section 6 of API 1104 or section IX of the ASME Boiler and Pressure Vessel Code. Prior to any welding on the City of Carencro Gas Distribution System all welders must provide the City of Carencro with welding certifications. Copies of these welder certificates will be maintained as part of the records retention program.

This process is Electric Arc Welding on piping and fittings with a diameter of 1.75 and above with a wall thickness of 0.125" to 0.322". The joint design is "V" Bevel or Butt Joint and requires 3 beads. The pipe axis is to be in a fixed position with the direction of the welding process in a downhill direction. The surface area should be cleaned using power and/or hand tools or a combination of both taking care to remove all rust, dirt and all other foreign material before starting the welding process and the pipe or component must be aligned to provide the most favorable condition for deposit of the root bead. The welding area should be pre-heated sufficiently to drive moisture from the weld area. The fitting should be positioned, and tack welded sufficiently to prevent shifting and warping during the welding process. Speed of travel during the welding process should be fast enough to prevent excessive undercutting and slow enough to prevent pinholes from forming behind the arc. All slag should be removed from bead surface with chisels and/or wire brush before starting to weld the next bead. No more than five (5) to seven (7) minutes is allowed between passes. For miter joints the pipe alignment must not have deflection of more than 12 ½° and must be at least one pipe diameter away from other miter joints. The finished welded surface will be cleaned prior to wrapping and burying pipe. No welding is permitted in inclement or rainy weather.

Unacceptable welds must be removed or repaired. Welds that are repaired must have the defect removed down to sound metal, and the segment to be repaired must be preheated if conditions exist which would adversely affect the quality of the weld repair. After repair, the weld must be inspected and found acceptable.

### 3.1.1 QUALIFICATION OF WELDERS (192.227)(a)(b)

Welders must be qualified by **Section 6 of API Std 1104 (incorporated by reference, see § 192.7) or section IX of the ASME Boiler and Pressure Vessel Code (BPVC) (incorporated by reference, see § 192.7).** However, a welder qualified under an earlier edition than listed in § 192.7 of this part may weld but may not re-qualify under that earlier edition. See exception in .227(b).

A welder may qualify to perform welding on pipe to be operated at a pressure that produces a hoop stress of less than 20 percent of SMYS by performing an acceptable test weld, for the process to be used, under the test set forth in Section I of Appendix C of this Operation and Maintenance Manual. Each welder who is to make a welded service line connection to a main must first perform an acceptable test weld under section II of Appendix C of this Operation and Maintenance Manual as a requirement of the qualifying test.

Prior to any welding on the Gas Distribution System, all welders must provide **the applicable welding procedure and his current welding certification**. Copies of these documents will be maintained as part of the records retention program.

**Appendix C – Qualification of Welders for Low Stress Level Pipe**

I. Basic Test

The test is made on pipe 12 inches or less in diameter. The test weld must be made with the pipe in a horizontal fixed position so that the test weld includes at least one section of overhead position welding. The beveling, root opening, and other details must conform to the specifications of the procedure under which the welder is being qualified. Upon completion, the test weld is cut into four coupons and subjected to a root bend test. If, as a result of this test, two or more of the four coupons develop a crack in the weld material, or between the weld material and base metal, that is more than 1/8 inch long in any direction, the weld is unacceptable. Cracks that occur on the corner of the specimen during testing are not considered.

II. Additional Tests for Welders of Service line Connections to mains.
A service line connection fitting is welded to a pipe section with the same diameter as a typical main. The weld is made in the same position as it is made in the field. The weld is unacceptable if it shows a serious undercutting or if it has rolled edges. The weld is tested by attempting to break the fitting off of the run pipe. The weld is unacceptable if it breaks and shown incomplete fusion, overlap, or poor penetration at the junction of the fitting and run pipe.

III. Periodic Tests for Welders of Small Service Lines

Two samples of the welder's work, each about eight inches long with the weld located approximately in the center, are cut from steel service line and test as follows:

1. One sample is centered in a guided bend testing machine and bent to the contour of the die for a distance of two inches on each side of the weld. If the sample shows any breaks or cracks after removal from the bending machine, it is unacceptable.
2. The ends of the second sample are flattened and the entire joint subjected to a tensile strength test. If failure occurs adjacent to or in the weld metal, the weld is unacceptable. If a tensile strength testing machine is not available, this sample must also pass the bending test prescribed in Subsection 1 of this Section.

Presently, there are no qualified welders employed by the City of Carencro. Qualified contract personnel perform all welding performed on the City of Carencro Gas Distribution System.

### 3.1.2 WELDER LIMITATIONS (192.229)(a)(b)(c)

Welders who perform welding activities for the City of Carencro Gas Department whose qualification is based on nondestructive testing may **not** weld on compressor station pipe and components. The City of Carencro does not conduct any nondestructive testing of welds. Welders may only weld with a particular welding process if that welder has engaged in that welding process within the preceding six (6) months. Any welder who has qualified under Part 192.227(a) may **not** weld on pipe to be operated at a pressure that produces a hoop stress of 20 percent or more of SMYS unless within the preceding 6 calendar months the welder has had one weld tested and found acceptable under the Sections 6 or 9 of API Standard 1104. Welders may maintain an ongoing qualification status by performing welds tested and found acceptable under the above acceptance criteria at least twice each calendar year, but at intervals not exceeding 7 1/2 months. Welders who qualified under an earlier edition of API Standard 1104, "Standard for Welding Pipelines and Related Facilities" and ASME Boiler and Pressure Vessel Code, Section IX "Welding Qualifications may weld but may **not** requalify under that earlier edition.

Welders may not weld on pipe to be operated at a pressure that produces a hoop stress of less than 20 percent of SMYS unless the welder is tested in accordance with .229(c)(1) or re-qualifies under .229(d)(1) or (d)(2). Welders qualified under .227(b) may not weld unless re-qualified within 1 year/ 15 months or, within the preceding 7 1/2 calendar months, but at least twice each calendar year, the welder has had—

A production weld cut out, tested, and found acceptable in accordance with the qualifying test; or

For welders who work only on service lines 2 inches (51 millimeters) or smaller in diameter, two sample welds tested and found acceptable in accordance with the test in section III of Appendix C of this part.

### 3.1.3 PROTECTION FROM WEATHER (192.321)

The welding operation must be protected from weather conditions that would impair the quality of the completed weld. Consequently, no welding activities will be undertaken in rain or snow unless the welding activity is conducted in a sheltered environment with cover over the weld area.

### 3.1.4 MITER JOINTS (192.223)(a)(b)(c)

Pipe alignment must be considered when welding pipe ends or pipe and fittings together using a miter joint. A miter joint on steel pipe to be operated at a pressure that produces a hoop stress of 30 percent or more of SMYS may not deflect the pipe more than 3°.

A miter joint on steel pipe to be operated at a pressure that produces a hoop stress of less than 30 percent, but more than 10 percent, of SMYS may not deflect the pipe more than 12 1/2° and must be a distance equal to one pipe diameter or more away from any other miter joint, as measured from the crotch of each joint.

A miter joint on steel pipe to be operated at a pressure that produces a hoop stress of 10 percent or less of SMYS may not deflect the pipe more than 90°.

### 3.1.5 PREPARATION FOR WELDING (192.325)

Before beginning any welding, the welding surfaces must be clean and free of any material that may be detrimental to the weld, and the pipe or component must be aligned to provide the most favorable condition for depositing the root bead. This alignment must be preserved while the root bead is being deposited.

### 3.1.6 INSPECTION AND TEST OF WELDS (192.241)(a)(b)(c)

Welds made on the City of Carencro Gas Distribution System shall be visually inspected to insure that:

- The welding is performed in accordance with the welding procedure; and
- The weld is acceptable in accordance with the standards in section 9 of API Standard 1104.

Welds that are visually inspected and approved by a qualified welding inspector do not require nondestructive examination if the pipe has a nominal diameter of less than six (6") inches or the pipeline is to be operated at a pressure that produces a hoop stress of less than 40% percent of SMYS and the welds are so limited in number that nondestructive testing is impractical. The City of Carencro does not have any gas lines that operate at a pressure that produces a hoop stress of 20% percent or more of SMYS and therefore there is no requirement for nondestructive testing of welds.

The acceptability of a weld that is nondestructively tested or visually inspected is determined according to the standards in Section 9 of API Standard 1104 (ibr, see §192.7). However, if a girth weld is unacceptable under those standards for a reason other than a crack, and if Appendix A to API 1104 applies to the weld, the acceptability of the weld may be further determined under that appendix.

### 3.1.7 REPAIR OR REMOVAL OF DEFECTS (192.245)(a)(b)(c)

Each weld that is unacceptable must be removed or repaired. A weld must be removed if it has a crack that is more than 8 percent of the weld length.

Each weld that is repaired must have the defect removed down to sound metal and the segment to be repaired must be preheated if conditions exist which would adversely affect the quality of the weld repair. After repair, the segment of the weld that was repaired must be inspected to ensure its acceptability.

Repair of a crack, or of any defect in a previously repaired area must be in accordance with written weld repair procedures that have been qualified under §192.225. Repair procedures must provide that the minimum mechanical properties specified for the welding procedure used to make the original weld are met upon completion of the final weld repair.

## 3.2 JOINING OF MATERIAL OTHER THAN BE WELDING (192.273)(a)(b)(c)

Gas distribution pipelines owned and operated by the City of Carencro shall be designed and installed so that each joint will sustain the longitudinal pullout or thrust forces caused by contraction and/or expansion of the piping or by anticipated external or internal loading/pressure. All joints including pipe end to pipe and pipe end to fitting(s) will be constructed in accordance with written procedures that have been proven by test or experience to produce strong gastight joints. Each joint must be inspected.

Metal piping may also be joined using compression couplings and/or bolt on dresser couplings. The City of Carencro Gas Department use Style 90 steel bolt on dresser couplings and fittings. However, should the need arise, other styles of dresser couplings and fitting may also be used provided they meet the requirements of the Department of Transportation Code of Federal Regulations title 49, Part 192. When joining metal piping with any style of bolt on couplings or compression couplings, the following procedure will be used:

All two (2") and smaller compression couplings installed on the City of Carencro gas distribution system will be ASTM D 2513 Category one (1) only. For applications larger than two (2"), the compression coupling will be designated as category one (1) or two (2) type fittings.

Compression couplings on steel gas mains and services found leaking will be repaired or replaced. Additionally, any compression coupling used to join steel piping systems that is exposed and it is determined that the coupling was installed prior to 1980, the coupling must be replaced.

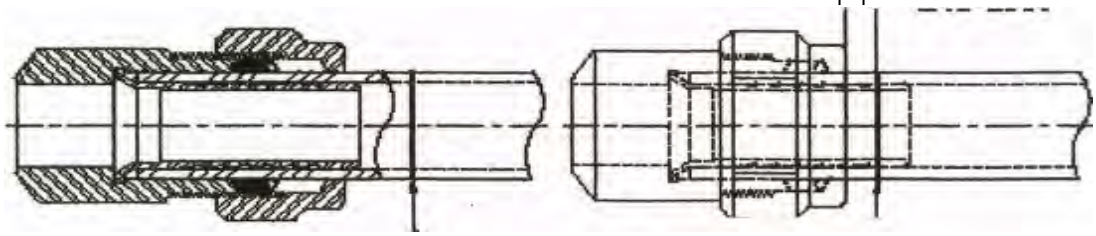
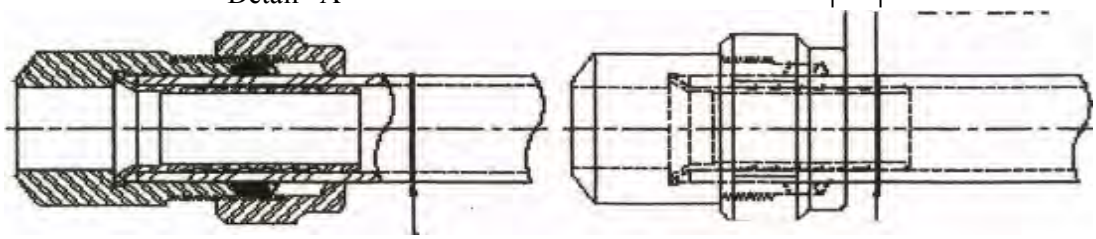
Joining of polyethylene pipe using the fusion method is made in accordance with written procedures that have been proven by experience to produce strong gastight joints. The procedures being used by the City of Carencro meet the Sustained Pressure Test or the Minimum Hydrostatic Pressure Test (Quick Burst) of ASTM D 2513. Procedures for polyethylene (PE) pipe fusion are detailed in section 3.2.1 of this Operation and Maintenance Manual.

The City of Carencro may also use mechanical fittings to join polyethylene pipe such as Permasert Stab Fittings and Continental compression couplings. These fittings are used to extend mains and services and for repairs. On the following pages are procedures for installing steel compression couplings and for installing compression couplings on polyethylene piping.

**CITY OF CARENCRO**
**OPERATION AND MAINTENANCE MANUAL**

## PROCEDURE FOR INSTALLING STEEL COMPRESSION COUPLINGS

| | ACTION | INFORMATION |
|---|---|---|
| 1. | Cut pipe ends square, deburr outside and inside of pipe and clean thoroughly to assure there is no coating, dirt, grease, etc. on the assembly area of the pipe. | Failure to clean pipe thoroughly or to deburr inside and outside of pipe may result in leakage. |
| 2. | If coupling PE pipe eliminate any static charge by spraying pipe with soapy water and wrapping wet rags around pipe and allow them to make good contact with the soil. | |
| 3. | Remove the nut and gasket from the compression coupling and slide the nut and gasket onto the pipe. | |
| 4. | Measure the length of the compression coupling so that the ends of the pipe are centered in the compression coupling. | Length of compression divided by 2 equals stab depth **L ÷ 2 = Stab depth** |
| 5. | Mark the stab length on the pipe to be inserted into the compression coupling. (See Detail "A") | See examples of compression coupling size and corresponding stab depth below. |
| | **FOR COMPRESSION COUPLING SIZES**<br>¾" X 5" & 1" X 5'<br>3-1/4" STAB LENGTH<br>2" COMPRESSION COUPLING<br>6" STAB LENGTH<br>**NOTE: USE TAPE MEASURE TO MEASURE PROPER STAB DEPTH** | |
| 6. | Insert stiffner into ends of PE Pipe. | Failure to insert stiffner may cause the PE pipe to become "out-of-round" and leak.<br>NOTE: DO NOT use hammer to drive stiffner into pipe. |
| 7. | Slide compression coupling nut and gasket onto pipe | Using soapy water on the gasket makes it easier to slide gasket. |
| 8. | Insert ends of PE pipe into the compression couplings. | |
| 9. | Tighten compression nut using pipe wrenches for tightening nut and as back-up to keep the barrel of the compression coupling from turning. | When nuts are tightened, the line marked on the pipe for stab depth should be no more than 3/8" from the face of the nut for ¾" X 5" and 1" X 5" compression couplings. If not the coupling must be reassembled on the pipe.<br>For 2" compression couplings, line marked for stab depth should be no more than ¾" from face of nut, if not, reassemble. |

| | | |
|---|---|---|
| | **¾" & 1" Couplings**<br>Detail "A"<br>3/8" Nut Face to Mark<br>  <br>**STAB LENGTH 3-1/4"** **Detail "B"**<br><br>**2" Couplings**<br>¾"<br>Nut Face to Mark<br>Detail "A"<br>  <br>**STAB LENGTH 6"** **Detail "B"** | |
| 10. | After compressions couplings have been tightened leak tight, check for leaks with soapsuds. | 0% leakage is required. |
| 11. | Pressure test all new installed piping to 150% of the MAOP. | Use pressure test procedure in O&M Manual |

Below are the recommended wrench sizes for use with Dresser Compression Couplings and Fittings:

| Nominal Steel Pipe Size (I.D. | Recommended Wrench Size |
|---|---|
| 1/4" | 10" |
| 3/8" | 10" |
| 1/2" | 14" |
| 3/4" | 14" |
| 1' | 18" |
| 1 1/4" | 18" |
| 1 1/2" | 24" |
| 2" | 24" |

**NOTE:**
**Use armored gaskets or bond coupling for cathodic protection and pipe locating continuity**

# DRESSER
## STYLE 90 FITTINGS

Style 90 Couplings and Fittings for steel pipe have extra rugged construction for heavy duty service, such as underground piping, or in locations where there is constant vibration.

They are available in standard, insulating and locking couplings, street ells, tees, etc. Supplied as standard with plain Grade 27 gaskets, they may also be equipped with Dresser ARMORED® gaskets or with Grade 42 oil resistant gaskets. For temperatures over 212°F, carded fiberglass high temperature gaskets are recommended.

## DRESSER
### STYLE 90
### BLACK COMPRESSION COUPLINGS,
W. ARMORED GASKET

**WATER, GAS**

| | SIZE | MIN. ORDER | MASTER CARTON |
|---|---|---|---|
| 2806002 | ½" | 1 | 20 |
| 2806004 | ¾" | 1 | 24 |
| 2806006 | 1" | 1 | 20 |
| 2806008 | 1¼" | 1 | 16 |
| 2806010 | 1½" | 1 | 10 |
| 2806012 | 2" | 1 | 10 |

## DRESSER
### STYLE 90
### LOCK COUPLING
ARMORED GASKET

**WATER, GAS**

| | SIZE | MIN. ORDER | MASTER CARTON |
|---|---|---|---|
| 2815202 | ¾" | 1 | 24 |
| 2815204 | 1" | 1 | 20 |
| 2815206 | 1¼" | 1 | 16 |
| 2815208 | 1½" | 1 | 10 |
| 2815210 | 2" | 1 | 10 |

## DRESSER
### STYLE 90
### INSULATING COUPLING FOR GAS APPLICATIONS

**for GAS, INSULATED**

| | SIZE | MIN. ORDER | MASTER CARTON |
|---|---|---|---|
| 2815802 | ¾" | 1 | 25 |
| 2815804 | 1" | 1 | 20 |
| 2815806 | 1¼" | 1 | 16 |
| 2815808 | 1½" | 1 | 12 |
| 2815810 | 2" | 1 | 10 |

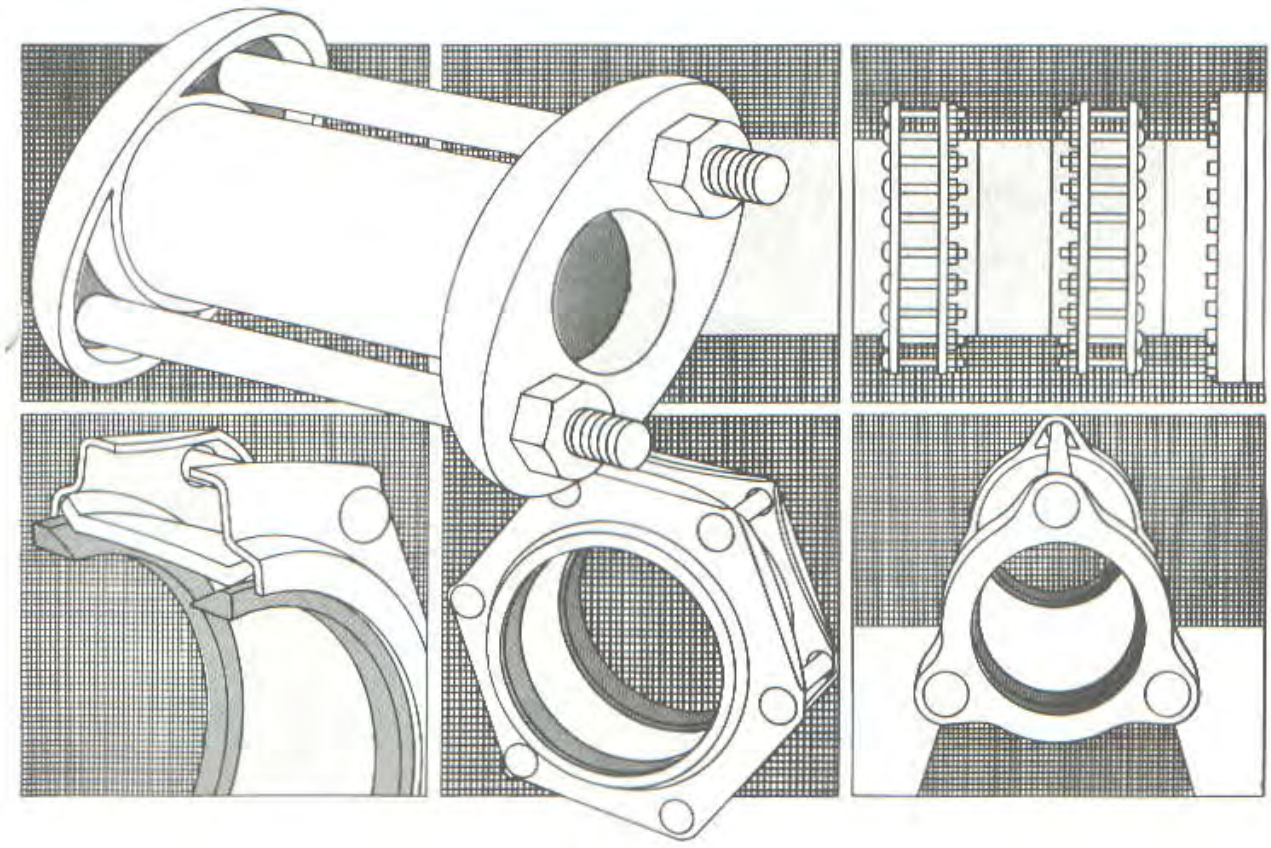
Smith-Blair GCC-451 9/94

# Clamp and Coupling products

# 451 steel couplings

For Steel Pipe
Gas Service

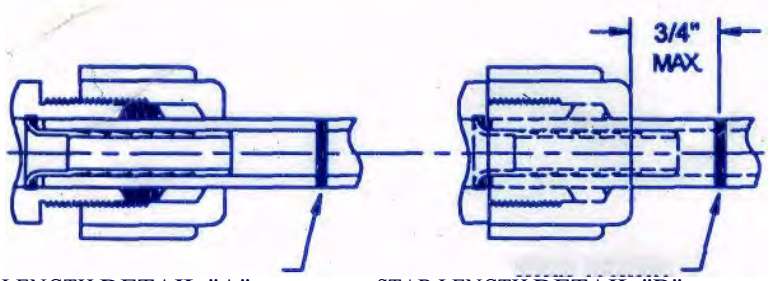
MEETS D.O.T. TITLE 49, SECT. 192
(Restraint Required)



SMITH-BLAIR, INC.

The City of Carencro Gas Distribution System may also use PVC coated compression couplings to join polyethylene pipe provided a metal insert can be placed inside the pipe walls to prevent the polyethylene pipe from becoming deformed and the gasket material is compatible with polyethylene pipe. Compression couplings will also have an internal band to prevent the polyethylene pipe from pulling out of the coupling. Joining of polyethylene piping with compression type couplings shall be accomplished in accordance with the following procedural requirements:

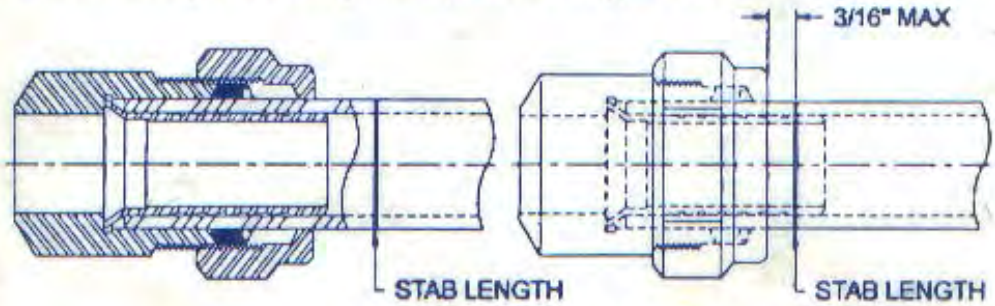
**PROCEDURE FOR INSTALLING COMPRESSION COUPLINGS ON PE PIPELINES**

| | ACTION | INFORMATION |
|---|---|---|
| 1. | Cut the ends of the polyethylene pipe being joined square. | |
| 2. | Inspect and clean ends of the polyethylene pipe thoroughly to assure there is no dirt, gouges, grease, oil or scratches on the assembly area of the pipe. | This will prevent leakage and allow a tight seal by the "O" ring. |
| 3. | Bevel the outside edge of the end of the polyethylene pipe using a chamfering tool. | Beveling the outside edge of the end of the pipe allows the pipe to be inserted through the retaining nuts and "O" ring seals easily. |
| 4. | Measure and mark the stab length on the PE Pipe | This assures that the coupling will be centered over the joining ends of the PE Pipe. (**See stab depth measurement below**) |
| | 3/8" OD, 5/8" OD.<br>7/8" OD, ½" IPS<br>2" STAB LENGTH<br><br>1-1/8" OD, 3/4" IPS, 1" IPS<br>2-3/8" STAB LENGTH<br><br>**NOTE: THESE MEASUREMENT ARE NOT PRECISE, USE TAPE MEASURE** | |
| 5. | Loosen compression nut until seal ring is no longer compressed, then insert pipe until it bottoms in outlet. (SEE Detail "A") | Failure to loosen the compression nut may lead to damage of the O'Ring. |
| 6. | Tighten compression nut until it shoulders against the outlet. **DO NOT OVERTIGHTEN** (SEE DETAIL "B") | Line marked for stab length should be no more than ¾" from face of nut. |
| |  <br>STAB LENGTH DETAIL "A" STAB LENGTH DETAIL "B" | |
| 7. | Turn gas on and soap test the area for leaks. | Make necessary repairs to any leakage. Only "0" leakage is acceptable. Fitting must be 100% leak tight. |

## PLASTIC COMPRESSION OUTLET ASSEMBLY INSTRUCTIONS

1. Cut pipe ends square, deburr outside and inside, clean thoroughly to assure there is no dirt, grease, oil, etc. on assembly area of pipe.
2. Mark stab length on pipe (see examples for correct pipe or tubing size and corresponding stab length). If a line shield nut is used, see examples for line shield nut stab depths.

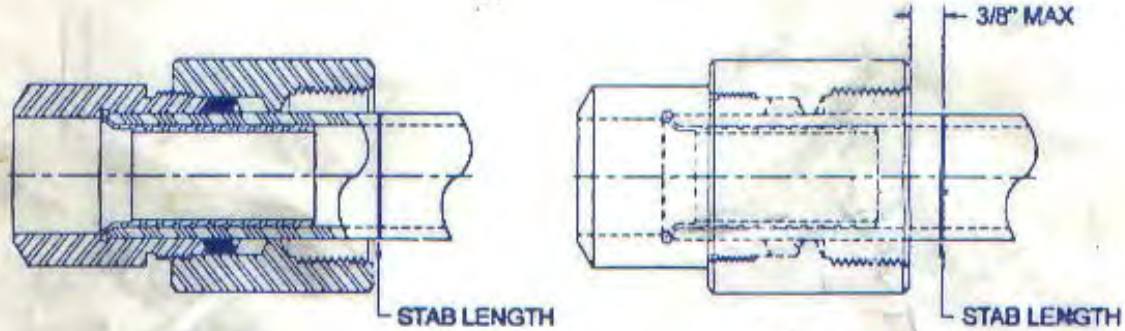
3. Loosen compression nut and insert pipe until it bottoms in outlet. (See detail "A")
4. Tighten compression nut until it shoulders against the outlet. (See detail "B") Line marked for stab length should be no more than 3/16" (3/8" for line shield nuts) from face of nut, if not, reassemble. (**NOTE:** If outlet is for 1-1/4" IPS, compression nut will not shoulder against outlet. Tighten compression nut to approx. 90 ft.lbs.)




DETAIL "A" DETAIL "B"

## NOTICE

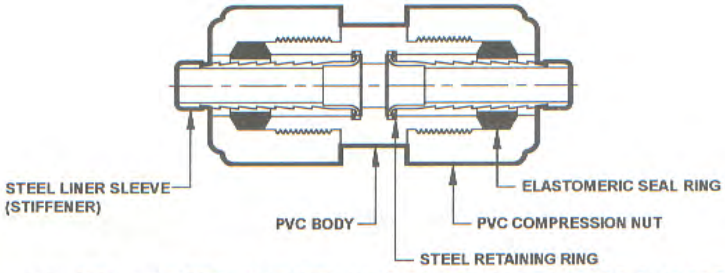
**IF FITTING USES A LINE SHIELD NUT USE THE FOLLOWING STAB LENGTHS**



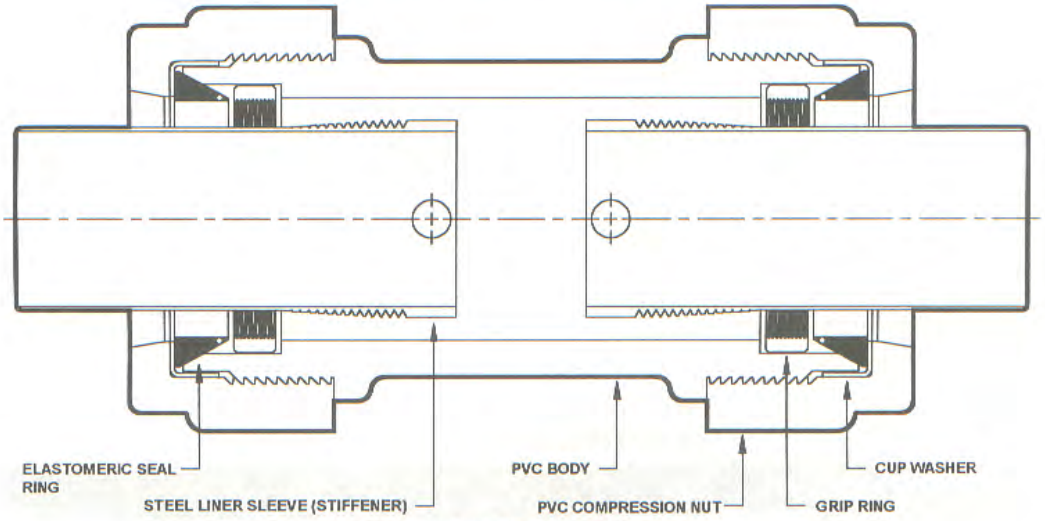

DETAIL "A" DETAIL "B"

CONTINENTAL® INDUSTRIES, INC. PLASTIC GAS DISTRIBUTION PRODUCTS

## 2957 STYLE
## PVC Compression Fittings
## For All Polyethylene Pipe




1/4" CTS, 1/2" CTS, 3/4" CTS, 1" CTS, 1/2" IPS, 3/4" IPS & 1" IPS




1 1/4" IPS & 2" IPS

- **QUICKLY AND EASILY INSTALLED** because it's pre-assembled. Just insert tubing and tighten compression nut (except for 1 1/4" & 2" IPS, see instructions on shipping bag). May be used on any type pipe; no flaring or special preparation required
- **DESIGNED FOR MAXIMUM PULL-OUT STRENGTH**
- **PERMANENT LEAK-PROOF JOINT**
- **ECONOMICAL AND EXTREMELY VERSATILE**
- **GASKET FULLY RETAINED TO PREVENT COLD FLOW - HAS MAXIMUM RESISTANCE TO AGING AND COMPRESSION SET**

04/30/96 For Assistance Call 1-800-558-1373 or FAX 1-800-788-1668 P1.1.1

Joining Polyethylene pipe may also be made using the Butt fusion method. Joining of polyethylene pipe using the fusion method is made in accordance with written procedures that have been proven by experience to produce strong gastight joints. These joints will be inspected to insure compliance with procedural requirements. Procedures for joining polyethylene pipe are detailed in section 3.2.1 of this Operation and Maintenance Manual.

The City of Carencro may use Perfection Permasert Stab Fittings to join both PE service lines and main lines. The Permaset stab fitting prevents pull-out of the piping or tubing when inserted into the fitting using the following procedure.

## PROCEDURE FOR INSTALLATION OF PERMASERT STAB FITTING

| | | |
|---|---|---|
| 1 | Cut the PE Pipe so that the end is cut square. | |
| 2 | Wipe with a clean dry cloth. Inspect the last several inches of the PE piping for damage. If any, cut again to remove damaged area. | |
| 3 | Use the Perfection chamfering tool for a proper O.D. Chamfer. This chamfer permits the PE piping to be completely stabbed without affecting the internal seals. | |

| | | |
|---|---|---|
| 4 | Use a soft felt tip pen, crayon or grease pencil to mark the stab depth as indicated on your Permasert package instructions. The stab depth is the approximate distance from the edge of the fusion bead to the end of the fitting body | |
| 5 | Stab the PE piping into the Permasert fitting so that the stab depth mark is visible:<br>• Within 1/8" of moisture seal on 1/2" CTS and 1" CTS sizes<br>• Within 1/4" on all other sizes through 1-1/4" CTS<br>• Approximately 3/8" on 1-1/4" IPS and 2" IPS sizes<br>The PE piping must bottom out in the fitting. The reference mark can move outward up to an additional 3/8" during pressure testing. | |
| 6 | Pressure test the joint to a minimum of 50 psi or 150% of the intended MAOP. | |

### 3.2.1 Cast Iron Pipe (192.275)(a), (b), (c), (d)

The City of Carencro has some cast iron pipe in its gas distribution system. However, this type gas piping is limited to low pressure and was used sparingly. The existing cast iron pipe is being replaced as it develops leaks and/or needs to be removed for new construction.

Each caulked bell and spigot joint of cast iron pipe must be sealed with mechanical leak clamps and each mechanical joint must have a gasket made of a resilient material as the sealing medium. In addition, each gasket must be suitably confined and retained under compression by a separate gland or follower ring. Threaded joints may not be used to join cast iron pipe nor may cast iron pipe be joined by brazing.

### 3.2.2 Plastic Pipe (192.281)(a)(c)

The City of Carencro Gas Maintenance Department has selected to use either Driscopipe 6500 polyethylene piping or Plexco Yellow pipe PE 2406. Plastic pipe may be used for the construction, repairs and additions to the gas distribution system and conform to ASTM D-2513 requirements. A plastic pipe joint that is joined by solvent cement, adhesive, or heat fusion may not be disturbed until it has properly set. Plastic pipe may not be joined by a threaded joint or miter joint. Each solvent cement joint on plastic pipe must comply with the following:

- The mating surfaces of the joint must be clean, dry, and free of material which might be detrimental to the joint
- If used, the solvent cement must conform to ASTM Designation: D 2513
- The joint may not be heated to accelerate the setting of the cement

**DESIGN FACTOR –** For PE Pipe produced after January 22, 2019 a Design Factor of 0.40 may be used in the design formula.

Each valve, fitting, length of pipe, and other component must be marked as prescribed in the specification or standard to which it was manufactured, except that thermoplastic fittings must be marked in accordance with ASTM D 2513; Pipeline Safety Regulation §192.63 or to indicate size, material, manufacturer, pressure rating, and temperature rating, and as appropriate, type, grade, and model.

Only qualified personnel may perform the process of heat fusion on the City of Carencro Gas Distribution System. Qualification means that an individual has successfully completed the MEA Operator Qualification Training and certified through the process of destructive testing of fused joints and fittings made for test purposes. See Qualification Procedures for Making Heat Fusion Joints in the Section.

Each heat-fusion joint on plastic pipe must comply with the following:

(1) A butt heat-fusion joint must be joined by a device that holds the heater element square to the ends of the piping, compresses the heated ends together, and holds the pipe in proper alignment while the plastic hardens.

(2) A socket heat-fusion joint must be joined by a device that heats the mating surfaces of the joint uniformly and simultaneously to essentially the same temperature.

(3) An electrofusion joint must be joined utilizing the equipment and techniques of the fittings manufacturer or equipment and techniques shown, by testing joints to the

requirements of §192.283(a)(1)(iii), to be at least equivalent to those of the fitting's manufacturer.

(4) Heat may not be applied with a torch or other open flame.

A butt heat-fusion joint must be joined by a device that holds the heater element square to the ends of the piping, compresses the heated ends together, an holds the pipe in proper alignment while the plastic hardens. The butt fusion process of joining polyethylene pipe is carried out making sure that both sides of the hot plate is clean and the temperature is maintained at a range between 400°F degrees and 450°F degrees for coated plates and 475°F degrees to 500°F degrees for uncoated plates. Heater plates should be checked with a tempilstik or pyrometer to verify correct surface temperature. The end of each pipe is to be wiped clean, inside and outside to remove dirt, water, grease and other foreign material. The ends of each pipe section should be square prior to fusion to ensure proper alignment. Insert the hot plate between the aligned ends of the pipe and hold firmly the pipe ends in contact with the hot plate to allow softening. Allow the pipe to soften and obtain the proper amount of melt; 1/16" melt for 2" pipe, 3/32" melt for 3" pipe, 1/8" melt for 4" pipe, etc. When melt is complete, carefully move the pipe ends away from the plate, discontinue the joint, clean the hot plate, resquare the pipe ends and begin the process over. Next, bring the heated ends together with enough pressure to form double rolled back bead and hold that position until the joint cools and solidifies or is comfortable to the touch. See additional instruction, drawings and specifications on following pages.

A device that heats the mating surfaces of the joint uniformly and simultaneously to essentially the same temperature must be used to join a socket heat-fusion joint. When making a socket heat-fusion joint, a device must be used that heats the mating surfaces of the joint uniformly and simultaneously to essentially the same temperature. Socket fusion procedures for joining polyethylene pipe requires that the heating tool temperature be maintained within a range of between 490°F degrees and 510°F degrees. The end of the polyethylene pipe to be inserted into the socket must be cut square and deburred using proper chamfering tools. Remove any soil or dirt from the surfaces to be jointed. Bring the heated joining tool faces into contact with the outside surfaces of the pipe end and with the inside surface of the socket fitting allowing the heating tool to remain in contact until the surfaces melt forming a bead. Simultaneously remove the polyethylene pipe and pipe fitting from the heated tool and immediately insert the pipe squarely and fully into the socket of the fitting. Hold the pipe squarely in place until the joint has become solidified. This should take approximately thirty (30) seconds. See additional instruction, drawings and specifications on following pages.

A socket heat-fusion joint must be joined by a device that heats the mating surfaces of the joint uniformly and simultaneously to essentially the same temperature. Socket fusion procedures for joining polyethylene pipe requires that the heating tool temperature be maintained within a range of between 490°F degrees and 510°F degrees. The end of the polyethylene pipe to be inserted into the socket must be cut square and deburred using proper chamfering tools. Remove any soil or dirt from the surfaces to be jointed. Bring the heated joining tool faces into contact with the outside surfaces of the pipe end and with the inside surface of the socket fitting allowing the heating tool to remain in contact until the surfaces melt forming a bead. Simultaneously remove the polyethylene pipe and pipe fitting from the heated tool and immediately insert the pipe squarely and fully into

the socket of the fitting. Hold the pipe squarely in place until the joint has become solidified. This should take approximately thirty (30) seconds. See additional instruction, drawings and specifications on following pages.

Sidewall fusion is one method used to fuse service line saddles onto polyethylene gas lines. This method of joining polyethylene pipe also requires heater plate temperature be maintained within a range of between 490°F degrees and 510°F degrees. Both surfaces of the heater plate and the matching surfaces of the required adapters must be cleaned before assembly so that there will be no air gap between the heater plate surface and the adapter. Place the installation device on clean pipe and clamp securely in place. Proper adapters must be installed in the movable jaws. Prepare the surface of the pipe where the fitting is to be installed by scoring or roughing up the surface with a coarse utility cloth. Prepare the surface of the fitting just as that of the pipe surface. Place the fitting on the pipe surface and move the clamping jaws into position for holding and fitting. Tighten and clamp onto the fitting. Pull the fitting away from the pipe by moving the clamping jaw and insert the heated plate. Apply pressure to obtain the proper melt. Proper melt will be obtained when there is first indication of melt bead raised up around the edge of the heater plate on the surface of the pipe. When visibility is poor, heat for approximately fifteen (15) seconds. Once melt has been obtained, pull the fitting off the heater plate, remove the plate and bring the melted surfaces together with enough pressure to make the fusion joint. Hold pressure until bead is hard and leave fitting clamped in fusion clamp until the joint has cooled to the temperature of the polyethylene pipe. See additional instruction, drawings and specifications on following pages. Personnel qualifications for plastic fusion/joining are included in Section 3.2.2 of this Operation and Maintenance Manual.

# Before You Start:

- Make sure all tools are clean and fit for the job.
- Inspect polyethylene pipe for cuts, gouges, and deep scratches, and remove these pipe sections before fusing the pipe.
- Remove tension* in the line before making any connections.
- Make sure the correct time and temperature are used.
- Square pipe ends to remove any damaged or "necked down" surface.
- Wipe pipe ends with CLEAN dry cotton rag to remove any foreign substance and cutting from I.D. (avoid rags of synthetic fiber that may melt and char against heater surface).
- See additional information on Page 18.

If direct burial, polyethylene pipe should be snaked in the ditch and the temperature of the pipe should be approximately the same as the soil at the installed depth before completing the tie-in. Fusion of coils should be done so that the joined coils form an "S" to reduce stress at the joint. If the polyethylene pipe has been inserted n an existing line, it should be allowed to cool to the casing pipe temperature prior to final tie-in. For each 10ºF temperature drop, 100 feet of polyethylene pipe shrinks approximately one (1) inch.

- Check heating iron fusion surface temperature with temperature indicating crayons or pyrometer.
- Clean heater faces after every joint with wooded implement (NEVER use metal tools).
- Do a trial fusion at the start of each day.
- To remove static electricity prior to cutting or tapping a pressurized gas line, spray polyethylene pipe with water/soap solution or water/glycol solution and ground with a solution wetted cloth.
- Fusion equipment may not be explosion proof – take safety precautions if fusing in a combustible atmosphere.
- Shield fusing equipment from inclement weather and winds.

## BUTT FUSION PROCEDURE

| | Action | Information |
|---|---|---|
| **Inspect Fusion Equipment** | | |
| **1.** | Inspect the fusion equipment for:<br>• Cleanliness<br>• Proper operation<br>If the fusion equipment is not in proper working order, stop the fusion process and report according to Company policy | You cannot fuse pipe if the fusion equipment is out of alignment or does not meet the manufacturer's specifications. |
| **2.** | Make sure the fusion equipment adapters are the proper size for the pipe to be fused. | |
| **Visually Inspect the Heater Plates** | | |
| **3** | Make sure the plates are clean.<br>• Clean, if necessary, using only approved paper towels or clean, 100% cotton cloths. | Polyester or other synthetic materials will leave a residue on the heater plate that will cause an improper fusion joint. |
| **Locate the Pipe** | | |
| **4** | Inspect the plates for wear, scratches, and gouges. Replace if necessary. | |
| **5** | Check the condition of the power cord.<br>• Do not use if frayed or loose. | |
| **Preheat the Heater Plate** | | |
| **6** | Check the manufacturer's directions to find the right temperature to fuse each kind of pipe. | Use the heater plate thermometer only as a reference. The thermometer measures only the internal coil temperature, not the surface temperature. |
| **7** | Check for proper surface temperature using a Tempilstik or pyrometer.<br>• Do not use the Tempilstik in the area where the fusion is to take place. | A pyrometer is preferable since the Tempilstik is approximate.<br>Butt fusion can be 400°F to 450°F for yellow pipe. |
| **Prepare Pipe** | | |
| **8.** | Ensure that the pipe is clean before clamping.<br>• If necessary, clean each pipe end with a clean cotton cloth and clean water.<br>• Remove all traces of dirt from the pipe.<br>• Do not touch clean areas. Oils in your skin will prevent a perfect bond. | In some areas, distilled water provides a cleaner surface for bonding.<br>• Alcohol cleans away oil and grease.<br>• Never use petroleum-based solvents or soap solutions. They prevent successful bonding. |
| **9.** | Clamp the pipe in the machine.<br>• Leave enough pipe extending through the clamps for proper facing. | |

| | Action | Information |
|---|---|---|
| 10 | Install the facing unit between the alignment clamps and lock it into position. | The facer squares the pipe ends. |
| 11 | Face each end to be fused. | Always use the facing tool, even on factory finished ends.<br>• Do not use power facers in a gaseous atmosphere. Remove the brushes from the power unit and use a hand crank. |
| 12 | Continue facing until the facer brushings bottom out against the clamps. | |
| 13 | After facing, remove any cuttings, shavings, or burrs from the pipe.<br>• Do not directly touch the face surface. | Human skin contains oils that, if are left on the pipe, will prevent proper fusion. |
| **14** | Bring the pipe ends together and check for proper alignment.<br>• If the ends do not meet squarely, tighten the clamp on the high end for high-low adjustment.<br>• If very much high-low adjustment is required, reface the pipe ends. | |
| **15** | Bring the ends together and apply pressure to check for pipe slippage.<br>If there is slippage while making a joint, the joint must be cut out, refaced, and fused again. | |
| **Fuse the Pipe** | | |
| 16 | Clean the heater plates using paper towels or clean, 100% cotton cloths. | |
| 17 | Verify the temperature at the reference gauge. | This is just a reference. You must still check the temperature at the face to start. |
| 18 | Insert the heater plate between the aligned pipe ends. | |
| 19 | If fusing pipe of dissimilar materials, place the compatibility insulator between the heater plate and side. | To ensure proper fusion, the insulator must be just as clean as the heater plates.<br>• Insulator is also called a fly swatter. |
| 20 | Bring the pipe ends firmly together against the heating iron faces.<br>• Melt the pipe according to manufacturer's specific instructions. | DO NOT APPLY PRESSURE. |
| 21 | If the pipe is made from dissimilar materials, remove the compatibility insulator at 50% of the normal melt pattern and bring the pipe back into contact with the heater plate. | 50% of melt may be:<br>• Half of required bead thickness<br>• Half of normal melting time (under normal weather conditions).<br>Follow manufacturer's instructions. |

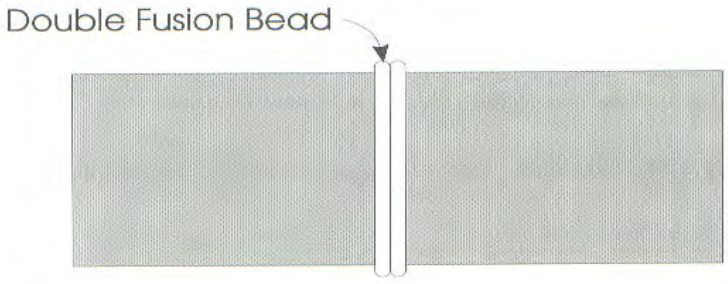
| | Action | Information |
|---|---|---|
| 22 | Verify the proper melt pattern, then move the pipe ends carefully and quickly away from the heater and remove the heater plate. | Remove the heater plate with a bump or quick snapping motion. This helps keep the plastic pipe from sticking to the heater plate. |
| 23 | If melted pipe sticks to the plate and pulls molten plastic:<br>• Stop the procedure.<br>• Clean the heater plate.<br>• Reface the pipe and start again. | |
| 24 | Make a quick visual check of the pipe end to assure uniform melt. | Do not let the pipe start to cool before bringing the ends together. |
| 25 | Bring the melted ends together quickly and firmly. | DO NOT SLAM END OF PIPE TOGETHER.<br>• Slamming the ends together displaces the melt. |
| **Inspect the Joint** | | |
| 26 | Let the fusion cool properly. | Follow manufacturer's specifications. |
| 27 | Check the joint for proper fusion.<br>• Visually inspect the joint for a uniform, non-porous appearance.<br>• Compare the joint to a sample or photograph of an acceptable joint. | |

A finished butt fused pipe joint should look like the double fusion bead pictured below. Melt patterns should be within the following guidelines:

| Pipe Size | Bead Width |
|---|---|
| 1-1/4" to 3" | About 1/16" |
| 3" to 6" | 1/16" to 1/8" |
| 6" to 8" | 1/8" to 3/16" |
| 8" & Larger | 3/16" to ¼" |

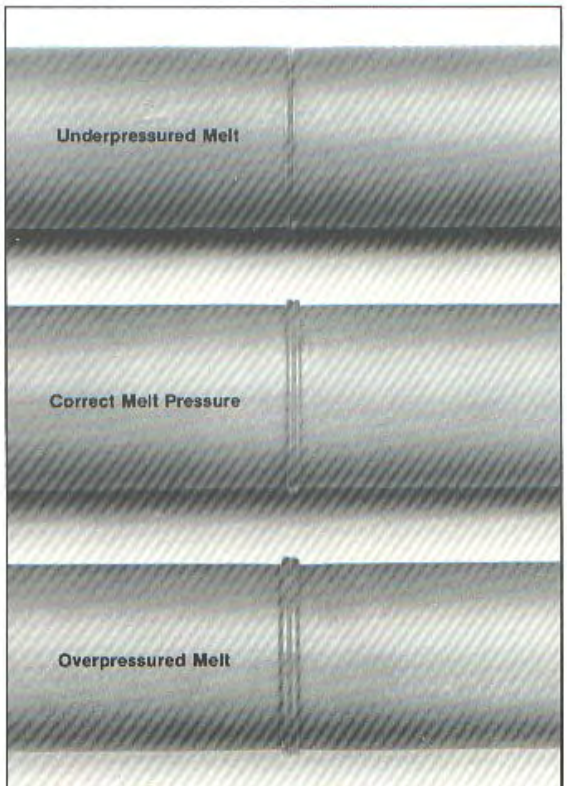
Heater face surface temperatures are acceptable provided they fall within the following temperatures:

| 475°F TO 525°F |
|---|




Typical Butt Fusion Melt Pattern

Below are examples of under-pressured melt, correct melt pressure and over-pressured melting during the butt fusion process. Too much or too little melt roll-back during the fusion process weakens the pipe joint.




It is important to apply the correct force during heating and cooling. Below is a chart that provides information on the proper Force to be Applied During Heating and Cooling.

**FORCE APPLIED DURING HEATING AND COOLING**

| Pipe Size | Tapping Tees and Service Saddles | | HVTT and Branching Saddles | |
|---|---|---|---|---|
| | Heating | Fusion/Cooling | Heating | Fusion/Coolin |
| 1 ¼" - 8" | 60-80 ftlb | 60-80 ftlb | 120-140 ftlb | 120-140 ftlb |

All attempts should be made to achieve the proper melt pressure. In the upper picture on the left is an example of under-applied pressure during the fusion process. The middle picture is an example of the correct force applied during the fusion process. The last or bottom picture is a typical example of too much pressure applied during the fusion process.

At the end of this section is a chart that indicates the correct heating and cooling times for different sizes of pipe.

**PICTURE OF ACCEPTABLE BUTT FUSION**

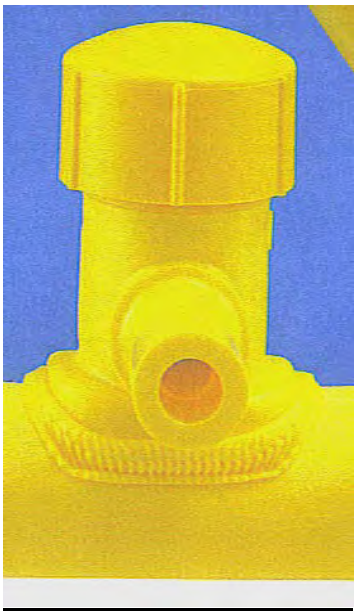
## SIDEWALL FUSION

Saddle or sidewall fusion joins a saddle fitting to the sidewall of a section of pipe. Later, another pipe is joined to the outlet of the saddle fitting to make a 90° connection to the original pipe. In saddle fusion, it is especially important to clean all pipe glaze off the sidewall surface to make a strong fusion joint. Saddle (or sidewall) joints are joints that tie a branching saddle or service saddle into the sidewall of another pipe at a 90° angle.

Saddle fusion requires:

- A saddle (sidewall) fusion jig.
- Saddle fusion heater faces.

Additionally, the City of Carencro uses Central or Plexco Fuse on T aps to run service to customers. These are also sidewall joints that tie the fuse on tap to the sidewall of the main at a 90° angle. Below are pictorials of typical self-tapping tees that use the sidewall fusion method for attachment to a polyethylene main to run new services. The one on the left is a Plexco Fuse-on Saddle Tapping Tee and on the right is a Central Fuse-on Saddle Tapping Tee.



**PLEXCO FUSE TAP**

**CENTRAL FUSE TAP**

# DRISCOPIPE 6500 PE2306 2406

## Sidewall Fusion Procedure

1. Install fusion machine on the pipe (main).
2. Clean the pipe with clean cotton cloth.* Prepare surface of pipe by roughing with 60 grit or coarser utility cloth.
3. Prepare saddle base of tee (side fitting) by cleaning and roughing with 60 grit or coarser utility cloth.
4. Align fitting on main and tighten clamp (insert adapter) on fitting stem while applying slight pressure on movable clamp handle.
5. Check saddle base for square alignment on main.
6. Clean face of heater adapters with clean cloth*. Raise movable clamp with fitting. Roll in and center heater plate with adapter between base of fitting and main.
7. For all sizes apply a strong firm continuous pressure . . . until a continuous melt bead can be seen on main . . . release pressure to light pressure . . . continue heat soak cycle on fitting and main . . . watch base of fitting for . . .

| Main Sizes | Heat Soak Cycle Fitting Base Bead Size |
|---|---|
| 1 ¼" | 1/16" Melt Bead |
| 2" | 1/8" Melt Bead |
| 3" & Larger | 1/8" – 1/16" Melt Bead |

8. Raise movable clamp and cleanly remove heater plate.
9. Bring melted surface together rapidly.

**DO NOT SLAM** . . . apply continuous progressive pressure until proper fusion bead is formed. Maintain pressure until joint has cooled (until finger can remain comfortably on bead).

**Remember**
Install proper sidewall and fitting inserts in fusion unit for the pipe and fittings being joined.
Be sure correct sidewall adapters re installed on heater plate.
A quality side fusion joint has a uniform well-aligned appearance all around.
Heater plate should be checked periodically with a tempilstik or pyrometer for correct **surface** temperature (500°F).
* Avoid polyester type materials that melt and stick to heater.

Typical Equipment for Sidewall Fusion of 2" & Smaller Diameter Pipe

## SIDEWALL FUSION PROCEDURE

| | Action | Information |
|---|---|---|
| **Inspect Fusion Equipment** | | |
| **1.** | Inspect the fusion equipment for:<br>• Cleanliness<br>• Proper operation<br>If the fusion equipment is not in proper working order, stop the fusion process and report according to Company policy | You cannot fuse pipe if the fusion equipment is out of alignment or does not meet the manufacturer's specifications. |
| **2.** | Make sure the fusion equipment adapters are the proper size for the pipe to be fused. | |
| **Visually Inspect the Heater Plates** | | |
| **3** | Make sure the plates are clean.<br>• Clean, if necessary, using only approved paper towels or clean, 100% cotton cloths. | Polyester or other synthetic materials will leave a residue on the heater plate that will cause an improper fusion joint. |
| **4** | Inspect the plates for wear, scratches, and gouges. Replace if necessary. | |
| **5** | Check the condition of the power cord.<br>• Do not use if frayed or loose. | |
| **Prepare Sidewall Adapters** | | |
| **6** | Attach the proper size sidewall adapters, if required, to the heater.<br>• Brace the bottom of the pipe to prevent bowing. | • Too small adapters will not give the full surface fusion necessary.<br>• Too large adapters will soften too much of the pipe wall. The pipe will give, preventing the proper fusion pressure. |
| **7** | Place the sidewall unit on the pipe.<br>• Clamp it securely into position according to manufacturer's instructions. | |
| **Preheat the Heater Plate** | | |
| **8.** | Check the manufacturer's directions to find the right temperature to fuse each kind of pipe. | Use the heater plate thermometer only as a reference. The thermometer measures only the internal coil temperature, not the surface temperature. |
| **9.** | Check for proper surface temperature using a Tempilstik or pyrometer.<br>• Do not use the Tempilstik in the area where the fusion is to take place. | A pyrometer is preferable since the Tempilstik is approximate.<br>Sidewall fusion can be 490°F to 510°F for yellow pipe. |

| | Action | Information |
|---|---|---|
| **Prepare Pipe** | | |
| **10** | Clean the pipe and fitting with a clean cotton cloth | |
| **11** | Prepare the pipe and fitting surface by roughing with 60 grit or coarser (smaller number) emery cloth.<br>• Be sure to remove all pipe glaze. | Anything less gritty would just polish the pipe.<br>• Do not use sandpaper, a file, or a knife to roughen the surface. |
| **12** | Wipe the surfaces with a clean, 100% cotton cloth.<br>• Do not touch clean areas. | Oils in your skin will cause imperfect bonding. |
| **Prepare Sidewall Adapters** | | |
| **13** | Align the fitting on the pipe. Lower the clamping unit into position around the fitting. | |
| **14** | Apply pressure to ensure that the fitting is sitting squarely on the pipe. | |
| **15** | Secure the fitting into the fusion holder. | |
| **16** | Raise and lower the fitting onto and off of the pipe to ensure that the fitting sets squarely on the pipe. | |
| **Fuse the Pipe** | | |
| **17** | Raise the clamping unit with the fitting to the most open position. | |
| **18** | Insert and align the heater plate per the manufacturer's instructions. | Use a compatibility insulator as appropriate to fuse dissimilar materials. |
| **19** | Check for proper melt pattern or proper timing according to Company or manufacturer's instructions. | Wind and cold weather increase heating time. |
| **20** | Verify the proper melt pattern. Then raise the movable clamp and carefully remove the heater plate. | |
| **21** | Quickly inspect the surface and complete the fusion. | Do not let the pipe start to cool before bringing the ends together. |
| **22** | Bring the melted surfaces together rapidly.<br>• Apply enough pressure to make the appropriate pattern. | Most fusion equipment has a torque gauge to measure the pressure. Apply enough pressure to meet the manufacturer's specifications and lock the joint in place for the required cooling time. |
| **Inspect the Joint** | | |
| **23** | Let the fusion cool properly per manufacturer's specifications. | Don't try to speed the process by putting water, ice, etc. on the joint. |

| | Action | Information |
|---|---|---|
| **24** | Check the joint for proper fusion.<br>• Visually inspect the joint for a uniform, non-porous appearance.<br>• Compare the joint to a sample or photograph of an acceptable joint. | |

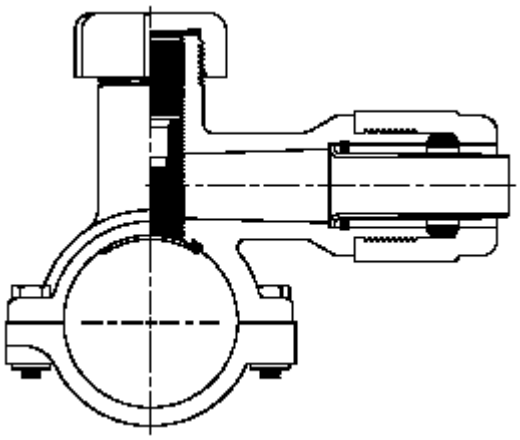
A finished sidewall fused pipe joint should look like the fusion bead pictured below. Melt patterns should be within the following guidelines:

| Main Sizes | Heat Soak Cycle Fitting Base Bead Size |
|---|---|
| 1 ¼" | 1/16" Melt Bead |
| 2" | 1/8" Melt Bead |
| 3" & Larger | 1/8" – 1/16" Melt Bead |

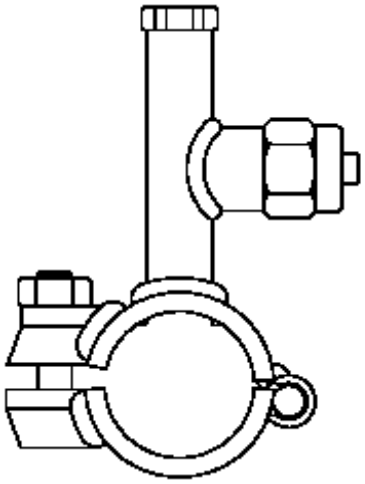
Heater face surface temperatures are acceptable provided they are as follows:

**PICTURE OF ACCEPTABLE SIDEWALL FUSION**

Additionally, the City of Carencro uses Continental Bolt-on Taps to run service to customers. These bolt-on self-tapping tees are mounted on the existing gas main at a 90° angle. Below is a typical picture of Continental Bolt-on Self Tapping Tees for both plastic and steel pipelines. Procedures for installation are in Section 7 of this O&M Manual.



**PVC COATED BOLT-ON SELF TAPPING TEE FOR PE PIPE**



**BOLT–ON SELF TAPPING TEE FOR STEEL PIPE**

See procedures for using the Continental Bolt-on Tapping in Section 7, "Tapping Pipelines Under Pressure" of this Operation and Maintenance Manual. On the following pages are procedures and pictorials of equipment needed to perform sidewall fusion.

## SOCKET FUSION

Socket joints join pipe inside a fitting such s a coupling, tee, or elbow. For this kind of joint, you must prepare the pipe ends by chamfering (beveling) them so they fit inside the fitting. Socket fusion type heater faces allow simultaneous heating of the pipe and fitting.

Socket fusion requires:

- A chamfering tool to taper the end of the pipe to fit into the fitting.
- A cold ring to keep the pipe round and limit the penetration of the pipe into the heater face.
- A depth gauge to place the cold ring on the pipe.

# Fusing Sockets

**You'll need these tools:**

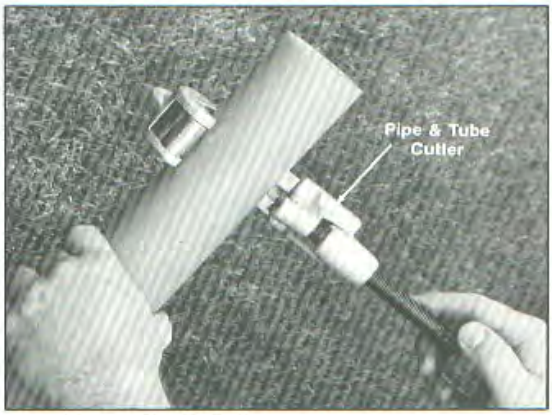
### Here's how to fuse Sockets

These socket fusion procedures should be followed carefully when joining PLEXCO pipe to socket type couplings, tees, ells, reducers, and end caps.

Pipe and fitting sizes 2" IPS and smaller are quickly joined by hand. When fusing pipe and fitting sizes 3" IPS and larger, *holding tools* are desirable.

To obtain quality fusions, a trial fusion should be made each day to check required heating times for prevailing ambient temperature and other weather conditions.

1. Square the ends of the pipe or tubing to be joined.




Use Pipe Cutter for cutting polyethylene pipe. (A hack saw may be used. Use particular care to produce a clean square cut end.)

2. Use Chamfering Tool on pipe ends to remove the sharp outer edge on the O.D. surface on all pipe sizes.

Remove any burrs from inside of pipe ends. Make sure both ends of pipe to be joined are clean, dry, and free of foreign substances. Wipe with clean, lint-free, dry rag.

3. To measure proper socket insertion depth, place Depth Gauge snugly over the chamfered end of the pipe.

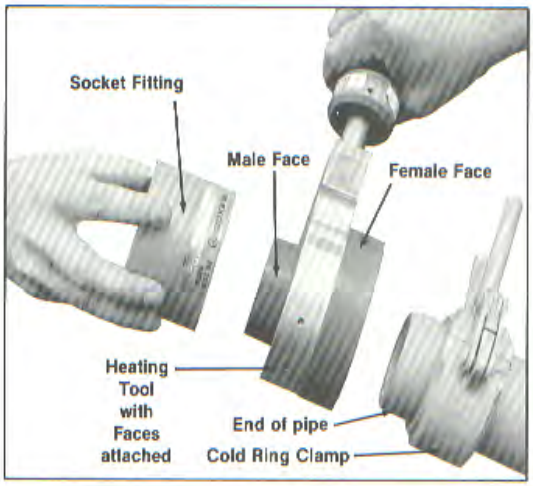
4. Install Cold Ring Clamp on pipe O.D. surface immediately behind Depth Gauge. After securing Cold Ring Clamp, remove Depth Gauge.

ALTERNATE:
4. In case where pipe joiner is being used, place the end of the laid pipe line in the fixed Cold Ring Clamp of the joiner and the free coil or joint in the movable Cold Ring Clamp. Use Depth Gauge as stated above.

5. Make sure fitting surfaces are clean and dry. Wipe again with lint-free, clean, dry rag if necessary. Avoid touching cleaned surface with your hands.

6. If you haven't already done so, heat Heating Tool with faces attached so that the faces are at 500°F ± 10°F. Make sure faces are clean. Use wooden tongue depressor (or comparable wooden implement) to remove any molten polyethylene from fusion faces. DO NOT use metal implements to clean non-stick, coated fusion faces as they will damage the surface.

7. When the Heating Tool fusion surfaces have reached a temperature of 500°F ± 10°F (as indicated by temperature crayon or pyrometer), you are ready for this step, not before.




Firmly seat the Socket Fitting on the male face of the Heating Tool. If pipe joiner is being used, this operation is accomplished in the same manner.

Place the female face of the Heating Tool on the end of the pipe firmly against the Cold Ring Clamp. If pipe joiner is being used, place the female face on the end of the pipe in the fixed Cold Ring Clamp of the joiner.

Heating time starts when the cold ring is bottomed out on the heater surface. Heat for prescribed period of time shown in Recommended Fusion Time Cycles chart on Page 19. **DO NOT TWIST PIPE, FITTING, OR HEATING TOOL.**

8. Snap the Heating Tool from the melted pipe and fitting by a sharp rap on the iron handle with free hand while holding upper part of tool handle in the opposite hand in such mannner that the melt will remain intact.

9. Quickly check melt pattern on pipe surface and fitting—heated surfaces on fitting and pipe should be 100% melted with no cold spots. If melt is not complete, cut off melted pipe end, use a new fitting and repeat fusion Steps 1 through 8.

10. Within 3 seconds after the Heating Tool has been removed, firmly push the melted fitting squarely onto the pipe end until it makes firm contact with the Cold Ring Clamp. **DO NOT TWIST PIPE OR FITTING.** Hold the fitting firmly in place for total cooling time (see Recommended Fusion Time Cycles on Page 19) to insure proper alignment. If pipe joiner is being used, this operation is performed in the same manner.

*NOTE: Misalignment will displace the melt and create a faulty fusion.*

After waiting an additional 3 minutes cooling time, remove the Cold Ring Clamp and inspect the joint. A good joint will have a flat, uniform melt ring and joining perpendicular to the pipe, with no gaps or voids between the fitting and the pipe.

ALTERNATE:
10. If the joiner is being used, repeat the fusion steps (from step 5) on the free coil or joint to be fused into the socket fitting. The handle is used to advance the pipe on and off the heater faces and finally into the melted socket fitting opening.

Hold the fused joint firmly in place the entire cooling time. Wait an additional 3 minutes cooling time. Remove the Cold Ring Clamp and inspect the joint. A good joint will have a flat, uniform melt ring joining perpendicular to the pipe, with no gaps or voids between the fitting and the pipe.

11. Wait an additional 10 minutes to complete cooling before the pipe joint is tested or stressed during burial. Be sure backfill is free of rocks and large clods of earth to prevent damage to pipe line. See PLEXCO Application Note No. 7–Pipe Embedment and Final Backfilling.

12. If the steps outlined in this fusion technique were followed carefully, an acceptable joint should have been made.

13. Consult PLEXCO Bulletin No. 105, "Qualification Procedures for Making PE 2406 Polyethylene Heat Fusion Joints," or PLEXCO Bulletin No. 106, "Qualification Procedures for Making PE 3408 Polyethylene Heat Fusion Joints" for techniques used to evaluate the quality of the joint.

14. Clean heater faces carefully after each fusion, with wooden tongue depressor or wooden stick. Do not use metal implements to clean heater faces.

*CAUTION:*
*The final tie-in of the line should not be made until the pipe has cooled to the temperature of the ditch bottom. On hot days, this allows pipe to shrink before the tie-in is made.*

*CAUTION:*
*In sections where a fitting is present, the bending radius should be limited to 120 to 125 times the pipe diameter. Polyethylene pipe without fittings can be permanently bent to a radius 20 to 25 times the pipe diameter without damage or effect on its physical properties.*

## PROCEDURE FOR SOCKET FUSION

| | Action | Information |
|---|---|---|
| **Inspect Fusion Equipment** | | |
| **1.** | Clean heater faces with a clean, 100% cotton cloth | |
| **2.** | Check heating tool temperature per manufacturer's instructions. | |
| **Prepare the Pipe** | | |
| **3** | Cut the pipe ends square | |
| **4** | Chamfer the pipe with the chamfering tool. | Pipe ends should be no less than ½ of the wall thickness. |
| **5** | Clean pipe ends and socket fitting with a clean cotton cloth.<br>• Do not touch the clean area. | Skin oils cause imperfect bonding. |
| **Set Up the Fusing Equipment** | | |
| **6** | Place the fitting holder on the fitting. | |
| **7** | Hold a depth gauge over the chamfered pipe end and install the cold ring clamp.<br>• Place the clamp against the depth gauge. | This prevents the pipe from penetrating too far into the fitting. |
| **8** | Position the male and female faces of the heating tool onto the socket fitting and pipe end. | Follow manufacturer's specifications. |
| **Preheat the Heater Plate** | | |
| **9.** | Check the manufacturer's directions to find the right temperature to fuse each kind of pipe. | Use the heater plate thermometer only as a reference. The thermometer measures only the internal coil temperature, not the surface temperature. |
| **10.** | Check for proper surface temperature using a Tempilstik or pyrometer.<br>• Do not use the Tempilstik in the area where the fusion is to take place. | A pyrometer is preferable since the Tempilstik is approximate.<br>Sidewall fusion can be 490°F to 510°F for yellow pipe. |
| **Fuse the Pipe** | | |
| **11.** | Time the heating cycle per manufacturer's specifications. | Wind and cold weather increase heating time. |
| **12** | Remove the tool from the fitting and pipe per manufacturer's specifications. | Use a snapping motion so the melt does not stick to the heater face. |
| **13** | Inspect the melt pattern on the pipe and fitting according to manufacturer's specifications. | |

| | | |
|---|---|---|
| **14** | Bring the fitting and pipe end firmly together until the face of the socket fitting hits the cold ring.<br>• Keep the socket square on the pipe. | |

| | | |
|---|---|---|
| **15** | Let the pipe cool according to manufacturer's standards. | |
| **16** | Remove the cold ring. | |
| **17** | Visually inspect the final melt. Remove and discard fitting if it does not pass visual inspection. | The fitting must be square on the pipe. |

A finished socket fused pipe joint should look like either of the two fusion pictured below. Melt patterns should be within the following guidelines:

| Main Sizes | Heating Time (seconds) | Cooling Time (seconds) |
|---|---|---|
| ½" IPS | 6-7 | 20 |
| ¾" IPS | 8-10 | 20 |
| 1" IPS | 10-12 | 30 |
| 1 1 ¼" IPS | 12-14 | 30 |
| 1 ½" IPS | 14-17 | 30 |
| 2" IPS | 16-19 | 30 |
| 3" IPS | 20-24 | 40 |
| 4" IPS | 24-28 | 40 |

Heater face surface temperatures are acceptable provided they are as follows:

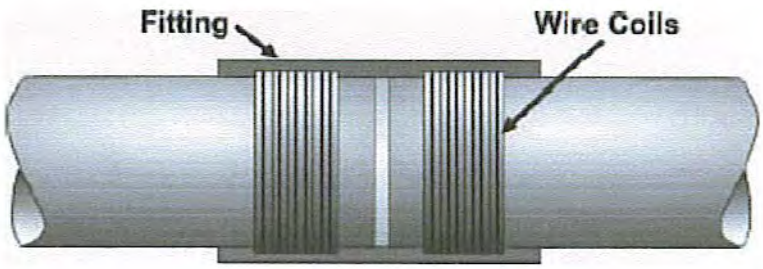
500°F ± 10°F

Melt is pressed against coupling

**PICTURE OF ACCEPTABLE SOCKET FUSION**

# ELECTROFUSION

Electrofusion is a technique of heat fusing polyethylene piping but is somewhat different from conventional fusing. The main difference between conventional heat fusion and electrofusion is the method by which the heat is applied. In conventional heat fusion joining, a heating tool is used to heat the pipe and fitting surfaces. The electrofusion joint is heated internally, either by a wire coil at the interface of the joint or, as in one design, by a conductive polymer. Heat is created as an electric current is applied to the conductive material in the fitting. Below is a pictorial of a typical electrofusion joint.




**Typical Electrofusion Joint**

General steps to be followed when performing electrofusion joining are:

1. Prepare the pipe
2. Clamp the fitting and pipe(s)
3. Apply the electric current
4. Cool and remove the clamps

## Prepare the Pipe

First clean the pipe surface in the joint area. Cut the end of the pipe square (omit this step for saddle-type electro fusion joints.) Mark on the pipe surface the proper positioning of the fitting to be installed. **Scrape** the surface of pipe area to be joined, removing all surface degradation and contamination. Do not use emery cloth. Exercise caution to avoid contamination of the scraped pipe surfaces. There are tools available to assist the operator in this procedure.

## Clamp the Fitting and Pipe(s)

Place the pipe(s) and fitting in the clamping fixture to prevent movement of the pipe or fitting. Give special attention to proper positioning of the fitting on the prepared pipe surfaces.

## Apply Electric Current

Connect the electrofusion control box to the fitting and to the power source. Apply electric current to the fitting as specified in the manufacturer's instructions. If the control does not do so automatically, turn off the current when the proper time has elapsed to heat the joint properly. The electrical cord between the generator and electrofusion processor should not be more than 50' in length

**Typical Electrofusion Control Box, Leads, Clamp and Fittings**

## Cool Joint and Remove Clamps

Allow the joint to cool for the recommended time and remove the clamping fixtures. Premature removal from the clamps and any strain on a joint that has not fully cooled can be detrimental to joint performance.

## Heat Fusion Joining Unlike Polyethylene Pipe and Fittings

Research has indicated that polyethylene pipe and fittings made from unlike resins can be heat-fused together to make satisfactory joints. Some gas companies have been heat-fusion joining unlike polyethylene for many years with success. Extra caution in training operators in conventional heat fusion methods (butt-socket-saddle) of unlike materials is recommended. Consult the pipe manufacturer and fittings for information. Electrofusion joining of dissimilar materials requires no special procedures.

On the following page is the procedure used by the City of Carencro Gas Department for electrofusion.

## PROCEDURE FOR ELECTROFUSION

### COUPLINGS AND REDUCERS

1. Set up the clamping device.
2. Cut pipe ends at square angles.
3. Using appropriate tools, scrape off oxidized surface of a surface greater that the area of the pipe to be fused.
4. Flash trim and slightly chamfer the pipe.
5. Insure that fusion areas of pipe and fitting are kept free of contaminants (grease, mud, humidity, etc.) proper to their fusion. Make sure that all areas of the pipe over which fittings will be slid on or positioned, are free of such contaminants. If contaminants are present or has occurred during the process, additional cleaning with a clean cloth impregnated with solvent will be necessary. Allow drying of pipe before fusion.
6. Mark the penetration depths on the pipe.
7. Set up the fitting and the clamping device. Check that the markings of the penetration depths are visible on both sides of the fitting.
8. Test proper functioning of micro-processor sensors.
9. Remove the protection caps, connect fusion control box leads to fitting. Insure leads are connected properly.
10. Activate fusion cycle. After the end of the fusion cycle, wait for 15 seconds before removing leads.
11. Allow proper cooling time, before removing clamp and before pressure testing. Refer to chart for cooling times.

### TAPPING TEES, BRANCH SADDLES, REPAIR SADDLES

1. Using appropriate tools, scrape off oxidized surface of a surface greater that the area of the pipe to be fused. Insure that fusion areas of pipe and fitting are kept free of contaminants (grease, mud, humidity, etc.) prior to their fusion. Make sure that all areas of the pope over which tapping tee, branch saddle of repair saddle will be positioned are free of such contaminants. If contaminants are present or has occurred during the process, additional cleaning with a clean cloth impregnated with solvent will be necessary. Allow drying of pipe before fusion.
2. Positioning
   - ❋ Tapping tees (Maximum 1.25” IPS outlet)

   Position the tapping tee thanks to the under saddle or thanks to the eccentric tool.
   - ❋ Tapping tees (2” IPS outlet) Branch Saddles, Repair Saddles.

   Position under the saddle with screws or thanks to the eccentric tool.
3. Position the coupler on t he reducer after having followed the above procedure.
4. Test proper functioning of micro processor sensors.

5. Remove the protection caps and connect fusion control box leads to fitting. Insure leads are connected properly.
6. Activate the fusion cycle. After the end of the fusion wait for 15 seconds before removing leads.
7. Allow proper cooling time before removing from clamping device and before pressure testing. Refer to chart for cooling times.
8. Tap mains after pressure test using, for the tapping tee, perforator tool through the security cap.
9. Make sure top of the perforator is flush with top of tapping tee.
10. Replace tapping tee cap (tighten by hand) for tapping tees with a maximum outlet of 1.25" IPS and with the strap tool for the 2" IPS outlet.
11. Check for leakage.

The following table provides heating and cooling times for the fusion process.

| PIPE SIZE | HEATING TIME | COOLING TIME |
|---|---|---|
| 1/2" CTS | 5 - 7 SEC | 20 SEC |
| 1" CTS | 8 - 12 SEC | 20 SEC |
| 1/2" IPS | 5 - 10 SEC | 20 SEC |
| 3/4" IPS | 8 - 12 SEC | 20 SEC |
| 1" IPS | 8 - 12 SEC | 20 SEC |
| 1 1/4" IPS | 12 - 16 SEC | 30 SEC |
| 2" IPS | 12 - 20 SEC | 30 SEC |
| 3" IPS | 15 - 25 SEC | 30 SEC |
| 4" IPS | 20 - 25 SEC | 30 SEC |

**NOTE**

**Reference Plexco Bulletin No. 101, "Fusion Procedure" for additional information. A copy of this bulletin is located in the Gas Operator's office**

**Cold Weather Fusion (Below 55ºF)**

First remove all frost, ice, or snow from O.D. and I.D. surfaces of areas to be fused. Lightly tapping or scraping the solids until they flake off the pipe ends should do this. Wipe dry with clean white paper towels or rags. Shield areas to be fused with wind break or cover. Ice or snow should also be removed from areas where cold ring clamps will be applied.

In cold weather, pipe diameters and socket fitting entrances will normally contract. Keep fittings in cab of truck, thus reducing exposure to extremely low temperatures. This will reduce contraction, making it easier to place socket fittings on heater faces.

When performing socket fusions, the Cold Ring Clamp will fit loosely on the pipe end. Place a backup Cold Ring Clamp behind the loose cold ring that is in the normal position behind the Depth Gauge. The backup clamp should be shimmed with tape to prevent slippage. The loose Cold Ring Clamp will allow the pipe to expand to the proper O.D. as it is heated.

It recommended that only electrically heated tools be used (plugged into their power source), since the surface temperature of gas-heated tools cannot be maintained long enough to produce the proper melt. If gas-fired tools are used, they should be near 525ºF when removed from the heat source to compensate for heat loss. TO OBTAIN PROPER MELT PATTERNS, INCREASE MELT TIME CYCLES – DO NOT INCREASE TEMPERATURE OR PRESSURE OF PIPE AND/OR FITTINGS ON HEATING TOOL FACES.

When fusing in cold weather conditions, the time required to form the proper melt will vary. For Socket and Saddle Fusions, a few trial melt patterns should be made on the pipe under field conditions to establish the required melt time. Increase the standard melt-time cycles by 5-second intervals until the proper time is established. Avoid time cycles in excess of that required to get a good melt pattern. After establishing the proper cold weather melt-time cycle, begin the fusion operation by placing the female face on the pipe, start counting the established cold-weather time cycle. The socket fitting should then be pushed on the male face.

Although it may take several seconds to fully engage the fitting on the male face, there should be no problem in obtaining a melt in the fitting since the fit will be snug at the outset. After removal of Heating Tool, melted surfaces should be quickly checked and immediately joined (within 3 seconds) to avoid cooling of the melted surfaces. Continue with the remaining steps in the procedure to complete the fusion.

When applying a saddle-type fitting, first place the heating tool on the main, then place the saddle base on the tool and apply the necessary pressure to obtain complete contact of the pipe and saddle with the heating tool surfaces. Heat for the previously determined cold-weather time cycles if the saddle fittings are stored inside the heated cab of the service vehicle; it may be necessary to briefly preheat the pipe with the heating iron before placing the fitting onto the iron.

BUTT FUSION: The time required to form the initial melt bead will automatically extend the total melt time cycle. After the melt forms, follow the standard butt fusion time cycle.

# DRISCOPLEX 6500
# MDPE Gas Distribution Pipe

Chevron Plexco®

# Fusing PLEXCO® Products with Other Types of Pipes:

Industry studies indicate that polyethylene of different trade names and/or different polyethylenes, such as 2306, 2406, 3406, and 3408 materials, can be successfully joined by heat fusion.

**MELT TIMES PRESCRIBED AT 500°F BY EACH MANUFACTURER FOR HIS PRODUCT SHOULD BE USED.** Apply the Heating Tool first to the material requiring the longest melt time. Then apply the product requiring the lesser melt time to the heater so the melt cycle for both products will be completed at the same time. All other fusion conditions and procedures remain the same as when joining PLEXCO products.

The Plastics Pipe Institute has established a set of "Criteria for Joining Various Polyethylene Materials to One Another by Heat Fusion Techniques," Statement E, April 3, 1974. Of particular importance applicable to the PLEXCO System would be the following:

**Section 1.** All pipes and fittings should meet the established applicable standards of the American Society for Testing and Materials.

**Section 2.** PE joints made by heat fusion techniques should only be made by properly trained personnel whose competency has been determined by adequate testing. The equipment used to make heat fusion joints should also be checked at intervals to assure that it is in proper operating condition.

**Section 3.** Polyethylene pipe and fittings made from the same commercial designation of polyethylene produced at different plants, and formed by different extrusion and injection molding machines, can be joined by the same procedure provided the products meet the current ASTM component standards.

**Section 4.** The polyethylene pipe materials presently on the market can be joined to one another provided the proper technique is used for the specific materials and the type of joint. The important parameters are time of heating and temperature of the fusion tool for butt and socket joints. The pressure used to join the fused parts is also important for butt fusion. Ambient conditions should also be taken into consideration.

PLEXCO recommends that the above criteria should be paramount considerations when joining different polyethylenes. However, **DIFFERENT POLYETHYLENES SHOULD NOT BE MIXED INDISCRIMINATELY**—optimum conditions will be achieved when joining pipe and fittings from the same manufacturer's system.

For more information regarding fusion of materials from different manufacturers, see PPI Technical Notes TN-13 1/81 "General Guidelines for the Heat Fusion of Unlike Polyethylene Pipes and Fittings."

On request, PLEXCO will provide additional information and technical assistance in proper fusion procedures for joining the PLEXCO system with polyethylene systems of other manufactures and material designations.

*CAUTION:*
*In sections where a fitting is present, the bending radius should be limited to 120 to 125 times the pipe diameter. Polyethylene pipe without fittings can be permanently bent to a radius 20 to 25 times the pipe diameter without damage or effect on its physical properties.*

# Fusion Time Cycles

Heating iron temperature and heating times are for ideal field conditions at temperatures ranging from 55°F to 85°F and no wind. As ambient temperatures and wind conditions change, heating times must be altered—see cold weather operating instructions.

A crayon temperature indicator or pyrometer should be used daily to check the tool surface temperature against the tool thermometer. **ALL HEATING TOOL TEMPERATURES ARE THE TEMPERATURES ON THE SURFACE OF THE TOOL FACE THAT ACTUALLY CONTACTS THE PIPE OR FITTING.** There will usually be a significant temperature difference between the tool faces and the tool thermometer, with the faces being cooler. Therefore, the thermometer reading will need to be higher than the recommended heating tool face temperatures. In some cases, especially saddle fusion, the surface temperature on one face may vary significantly from that on the other face. In this case, the lower temperature surface should be at the recommended temperature.

HEATING TIME CYCLES start as follows:

**Socket Fusions**—Time starts after fitting and pipe are fully inserted on heater faces.

**Saddle Fusions (Tapping Tee, Service Saddle, Branch Saddle)**—Time starts after fitting and pipe are tightly seated against heater faces.

**The following times apply when using smooth heater faces. If serrated heater faces are to be used, reduce heating time by approximately five (5) seconds.**

**Butt Fusion**—Time starts after a bead of molten material is first visible around the complete circumference of both pipe and/or fitting ends.

COOLING TIME CYCLES specified are the minimum times that the pipe and/or fitting must be held firmly in place. At least 3 minutes additional cooling time is required before removing the fused joint from the equipment. Light handling or making an additional fusion on the same fitting may be performed after this cooling period.

**CAUTION: An additional 10 to 60 minute cooling time (depending upon procedure and pipe size) is required after removing the joint from the fusion equipment before testing or subjecting the joint to bending, burying, pressure testing, or similar handling and backfill stresses.**

The heater iron temperature of 500°F ± 10°F is based on construction crews using the same fusion irons for socket, saddle and butt fusion. However, if the heater iron is used exclusively for butt fusion, then a temperature of 440°F ± 10°F can be used.

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# GUIDELINES

## PLEXCO PE 2406 POLYETHYLENE

| | Pipe Size | Heater Face Temp. 500°F Heating Time (seconds) | Cooling Time (seconds) |
|---|---|---|---|
| Socket | 1/2" CTS | 6-7 | 20 |
| | 3/4" CTS | 6-7 | 20 |
| | 1" CTS | 9-10 | 20 |
| | 1-1/4" CTS | 10-12 | 20 |
| | 1/2" IPS | 6-7 | 20 |
| | 3/4" IPS | 8-10 | 20 |
| | 1" IPS | 10-12 | 30 |
| | 1-1/4" IPS | 12-14 | 30 |
| | 1-1/2" IPS | 14-17 | 30 |
| | 2" IPS | 16-19 | 30 |
| | 3" IPS | 20-24 | 40 |
| | 4" IPS | 24-28 | 40 |
| Standard Tapping Tee & Service Saddle | 1-1/4"IPS | 40 (Fitting) 25 (pipe)* | 60 |
| | 2" IPS | 40 | 60 |
| | 3" IPS | 40 | 60 |
| | 4" IPS | 40 | 60 |
| | 6" IPS | 40 | 60 |
| | 8" IPS | 40 | 60 |
| HVTT & Branch Saddle | 2" IPS | 50-60 | 120 |
| | 3" IPS | 70-80 | 180 |
| | 4" IPS | 70-80 | 180 |
| | 6" IPS | 80-90 | 180 |
| | 8" IPS | 80-90 | 180 |

| | Pipe Size | 440°F Heating Time (sec.) | 500°F Heating Time (sec.) | Cooling Time (sec.) |
|---|---|---|---|---|
| Butt | † 1/2" CTS | 12-14 | 6-7 | 40 |
| | † 3/4" CTS | 14-17 | 8-10 | 40 |
| | † 1" CTS | 16-19 | 10-12 | 40 |
| | † 1-1/4" CTS | 18-22 | 12-14 | 40 |
| | † 1/2" IPS | 14-17 | 8-10 | 40 |
| | † 3/4" IPS | 16-19 | 10-12 | 40 |
| | † 1" IPS | 18-22 | 12-14 | 40 |
| | 1-1/4" IPS | 25-30 | 14-17 | 60 |
| | 1-1/2" IPS | 35-42 | 15-18 | 60 |
| | 2" IPS | 40-48 | 16-19 | 60 |
| | 3" IPS | 50-60 | 20-24 | 75 |
| | 4" IPS | 55-66 | 24-29 | 90 |
| | 6" IPS | 90-108 | 40-48 | 180 |
| | 8" IPS and Larger—Use Sight Fusion Procedure | | | |

*Use heat shield on pipe surface for first 15 seconds of this time cycle.

†Socket fusion recommended for these sizes.

## PLEXCO PE 3408 YELLOWSTRIPE® OR PLEXCO EHMW PE 3408 POLYETHYLENE

| | Pipe Size | Heater Face Temp. 500°F Heating Time (seconds) | Cooling Time (seconds) |
|---|---|---|---|
| Socket | 1/2" CTS | 9-10 | 30 |
| | 3/4" CTS | 9-10 | 30 |
| | 1" CTS | 14-16 | 30 |
| | 1-1/4" CTS | 14-16 | 30 |
| | 1/2" IPS | 9-10 | 30 |
| | 3/4" IPS | 12-14 | 30 |
| | 1" IPS | 15-17 | 40 |
| | 1-1/4" IPS | 18-21 | 40 |
| | 1-1/2" IPS | 20-23 | 40 |
| | 2" IPS | 24-28 | 40 |
| | 3" IPS | 28-32 | 50 |
| | 4" IPS | 32-37 | 50 |
| Standard Tapping Tee & Service Saddle | 1-1/4"IPS | 45 (Fitting) 30 (pipe)* | 70 |
| | 2" IPS | 50 | 70 |
| | 3" IPS | 50 | 70 |
| | 4" IPS | 50 | 70 |
| | 6" IPS | 50 | 70 |
| | 8" IPS | 50 | 70 |
| HVTT & Branch Saddle | 2" IPS | 55-65 | 150 |
| | 3" IPS | 75-90 | 180 |
| | 4" IPS | 75-90 | 180 |
| | 6" IPS | 85-100 | 180 |
| | 8" IPS | 85-100 | 180 |

| | Pipe Size | 440°F Heating Time (sec.) | 500°F Heating Time (sec.) | Cooling Time (sec.) |
|---|---|---|---|---|
| Butt | † 1/2" CTS | 15-18 | 6-7 | 50 |
| | † 3/4" CTS | 16-19 | 8-10 | 50 |
| | † 1" CTS | 18-22 | 14-17 | 50 |
| | † 1-1/4" CTS | 20-24 | 16-19 | 50 |
| | † 1/2" IPS | 16-19 | 8-10 | 50 |
| | † 3/4" IPS | 18-22 | 14-17 | 50 |
| | † 1" IPS | 20-24 | 16-19 | 50 |
| | 1-1/4" IPS | 35-42 | 18-22 | 70 |
| | 1-1/2" IPS | 50-60 | 26-31 | 90 |
| | 2" IPS | 55-66 | 28-34 | 90 |
| | 3" IPS | 65-78 | 30-36 | 120 |
| | 4" IPS | 75-90 | 35-42 | 120 |
| | 6" IPS | 105-126 | 55-66 | 180 |
| | 8" IPS and Larger—Use Sight Fusion Procedure | | | |

*Use heat shield on pipe surface for first 15 seconds of this time cycle.

†Socket fusion recommended for these sizes.

### 3.2.3 POLYTHYLENE PIPE–QUALIFYING JOINING PROCEDURES (192.283)(a)(b)(c)(d)

Before any written procedure established under §192.273(b) is used for making plastic pipe joints by heat fusion, the procedure must be qualified by subjecting specimen joints to burst test requirements of ASTM D2513-09a (incorporated by reference, see §192.7) for polyethylene plastic materials. Electrofusion fittings for polyethylene pipe and tubing: paragraph 9.1 (Minimum Hydraulic Burst Pressure Test), paragraph 9.2 ( Sustained Pressure Test), paragraph 9.3 ( Tensile Strength Test), or paragraph 9.4 (Joint Integrity Tests) of ASTM F1055 (incorporated by reference, see § 192.7) . A copy of each written procedure being used for joining plastic pipe must be available to the persons making and inspecting joints.

For procedures intended for lateral pipe connections, subject a specimen joint made from pipe sections joined at right angles according to the procedure to a force on the lateral pipe until failure occurs in the specimen. If failure initiates outside the joint area, the procedure qualifies for use.

For procedures intended for non-lateral pipe connections, perform testing in accordance with a listed specification. If the test specimen elongates no more than 25% or failure initiates outside the joint area, the procedure qualifies for use.

#### MECHANICAL JOINTS

When joining polyethylene piping with mechanical fittings, the City of Carencro will utilize mechanical couplings with a built-in rigid internal tubular stiffener, other than a split tubular stiffener, or a bolt on coupling with a tubular stiffener inserted into each end of the polyethylene piping to be coupled. The gasket material in the coupling must be compatible with the plastic piping.

Before any written procedure established under §192.273(b) is used for making mechanical plastic pipe joints that are designed to withstand tensile forces, the procedure must be qualified by subjecting 5 specimen joints made according to the procedure to the following tensile test:

(1) Use an apparatus for the test as specified in ASTM D 638 (except for conditioning).
(2) The specimen must be of such length that the distance between the grips of the apparatus and the end of the stiffener does not affect the joint strength.
(3) The speed of testing is 0.20 in (5.0 mm) per minute, plus or minus 25 percent.
(4) Pipe specimens less than 4 inches (102 mm) in diameter are qualified if the pipe yields to an elongation of no less than 25 percent or failure initiates outside the joint area.
(5) Pipe specimens 4 inches (102 mm) and larger in diameter shall be pulled until the pipe is subjected to a tensile stress equal to or greater than the maximum thermal stress that would be produced by a temperature change of 100°F (38°C) or until the pipe is pulled from the fitting. If the pipe pulls from the fitting, the lowest value of the five test results or the manufacturer's rating, whichever is lower must be used in the design calculations for stress.
(6) Each specimen that fails at the grips must be retested using new pipe.
(7) Results obtained pertain only to the specific outside diameter, and material of the pipe tested, except that testing of a heavier wall pipe may be used to qualify pipe of the

Pipe or fittings manufactured before July 1, 1 980 may be used in accordance with procedures that the manufacturer certifies will produce a joint as strong as the pipe.
A copy of each written procedure being used for joining plastic pipe must be available to the persons making and inspecting joints. Pipe or fittings manufactured before July 1, 1980, may be used in accordance with procedures that the manufacturer certifies will produce a joint as strong as the pipe.

### 3.2.4 POLYETHYLENE PIPE JOINTER PERSONNEL QUALIFICATION (192.285)(a)(b)(c)(d)

Personnel employed by the City of Carencro Gas Department, including contractor personnel, qualified in this process by these procedures, conduct the joining of Driscopipe 6500 and Plexco polyethylene pipe. P ersonnel **not** qualified under these procedures are prohibited from joining pipe using the fusion method. Presently, there are two employees employed by the City of Carencro qualified to make plastic fusion joints. Fusion of plastic joints are made by personnel who have been qualified through MEA Training and certified by LMGA or other certified organizations to fuse plastic pipe.

No person may make a plastic pipe joint unless that person has been qualified under the applicable joining procedure by:

1. Appropriate training or experience in the use of the procedure and

2. Making a specimen joint from pipe sections joined according to the procedure that passes the inspection and test set forth in the following paragraph.

The specimen joint must be:

(1) Visually examined during and after assembly or joining and found to have the same appearance as a joint or photographs of a joint that is acceptable under the procedure; and

(2) In the case of a heat fusion, solvent cement, or adhesive joint

Tested under any one of the test methods listed in §192.283 (a) applicable to the type of joint and material being tested;

(3) Examined by ultrasonic inspection and found not to contain flaws that would cause failure; or cut into at least 3 longitudinal straps, each of which is:

(A) Visually examined and found not to contain voids or discontinuities on t he cut surfaces of the joint area; and

(B) Deformed by bending, torque, or impact, and if failure occurs, it must not initiate in the joint area.

(C) A person must be re-qualified under an applicable procedure, if during any 12 month period not exceeding 15 months, that person

- Has any production joint made under that applicable procedure that is found unacceptable by testing under 192.513:

(D) Each operator shall establish a method to determine that each person making joints in plastic pipelines in the operator's system is qualified in accordance with this section

This is the method used by the City of Carencro to verify that each person making joints in plastic pipelines in the gas distribution system is qualified in accordance with this section. Testing will be conducted on each type of plastic joint as applicable including Butt Fusion, Socket Fusion, Saddle Fusion and Electrofusion. This requires the individual to make a fusion of each type for which he/she is qualifying for annually and to have that fusion(s) destructively tested.

This is the method used by the City of Carencro Gas Department to verify that each person making joints in plastic pipelines in the gas distribution system is qualified in accordance with this section. Testing will be conducted on each type of plastic joint as applicable including Butt Fusion, Socket Fusion, Saddle Fusion and Electrofusion. This requires the individual to make a fusion of each type for which he/she is qualifying for annually and to have that fusion(s) destructively tested.

## PERSONNEL QUALIFIED TO JOIN POLYETHYLENE PIPE

| EMPLOYEE | QUALIFYING AGENCY |
|---|---|
| | |
| | |
| | |
| | |

The City of Carencro attended and passed written examinations including hands-on testing associated with Operator Qualification Training supplied by Midwest Gas Association, Inc. or Security and Integrity Foundation (SIF) and presented by R&R Consultants. Re-qualification is presently scheduled for every 36 months.

Approved, written procedures describing the method(s) to which the joiner/inspector was qualified to make and inspect joints are available. Individual is qualified through LMGA or other entities/organizations whose evaluators are certified in the fusion process. To remain qualified to perform fusion of polyethylene piping, a person be requalified under an applicable procedure once each calendar year at intervals not exceeding 15 months and that fusion destructively tested, or after any production joint is found unacceptable by testing under §192.513. Both continuous qualification and annual re-qualification shall be documented. Qualification records are maintained by the Operator and are located in the Maintenance Facility on Andre Street in Carencro, La.

Testing of heat fusion coupons used to qualify person in the processes of heat fusion will be conducted in accordance with the instructions on the following pages. These instructions are provided by Plexco Pipe in Bulletin 105Y.

# YELLOWPIPE™ PE 2406 Polyethylene Pipe

## Qualification Procedures for making heat fusion joints

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BULLETIN NO. 105Y

# Socket Fusion Joints

## Procedure for Making Socket Fusion Joints

### PREPARE PIPE ENDS

1. Using a pipe cutter, squarely cut off damaged or oval ends of pipe.

2. Use chamfering tool to remove the sharp corner at the pipe end. Remove burrs and chips inside pipe ends.

3. To prepare pipe for correct penetration into socket, place depth gauge down flush on end of pipe.

4. Place cold ring clamp around pipe, adjacent to depth gauge.

After securing cold ring clamp, remove depth gauge.

5. Fitting surfaces should be clean and dry — wipe with cloth — do not touch with hands.

6. The socket faces of the heating tool should be at $500^0 \pm 10^0$ F and clean.

7. First, firmly seat the socket fitting on the male face of the heating tool.

Then place the female face on the end of the pipe firmly against the cold ring clamp.

Heating time starts when the cold ring is bottomed out on the heater surface.

### HEATING

While holding the fitting firmly in a fixed position, rotate heating tool slightly to feel the melt, and promote uniform heating of pipe and fitting.

**TABLE 1 — SOCKET FUSION TIME CYCLES**

| PIPE SIZE, IN. | *HEATING TIME CYCLE, SEC | COOLING TIME CYCLE, SEC |
|---|---|---|
| ½ CTS | 6- 7 | 20 |
| 1 CTS | 9-10 | 20 |
| ½ IPS | 6- 7 | 20 |
| ¾ IPS | 8-10 | 20 |
| 1 IPS | 10-12 | 20 |
| 1¼ IPS | 12-14 | 30 |
| 2 IPS | 16-19 | 30 |
| 3 IPS | 20-24 | 40 |
| 4 IPS | 24-28 | 40 |

**Guidelines only, exact time depends upon environmental conditions and condition of fusion equipment.*

8. Snap the heating tool and fitting from the melted pipe by holding upper part of tool handle with one hand and rapping sharply on the handle with the free hand.

Immediately remove fitting from heating tool.

9. Inspect the heated parts quickly to make sure all surfaces have been melted.

If melt is not complete, cut off melted pipe end, use a new fitting, and repeat fusion steps 1 through 8.

### FUSION AND COOLING

10. Within 3 seconds after the heating tool has been removed, firmly push the melted fitting squarely onto the pipe until it makes firm contact with the cold ring clamp.

DO NOT TWIST OR ROTATE THE FITTING.

Hold the fitting firmly in place for total cooling time shown in Table 1 to insure proper alignment.

After waiting 3 additional minutes cooling time, remove the cold ring clamp and inspect the joint.

A good joint will have a uniform melt ring that is flat against the socket and perpendicular to the pipe.

There should be no gaps or voids between the fitting and the pipe.

11. Wait an additional 10 minutes to complete cooling before the pipe joint is tested or stressed during burial.

12. See Figure 1 for visual parameters of a proper fusion.

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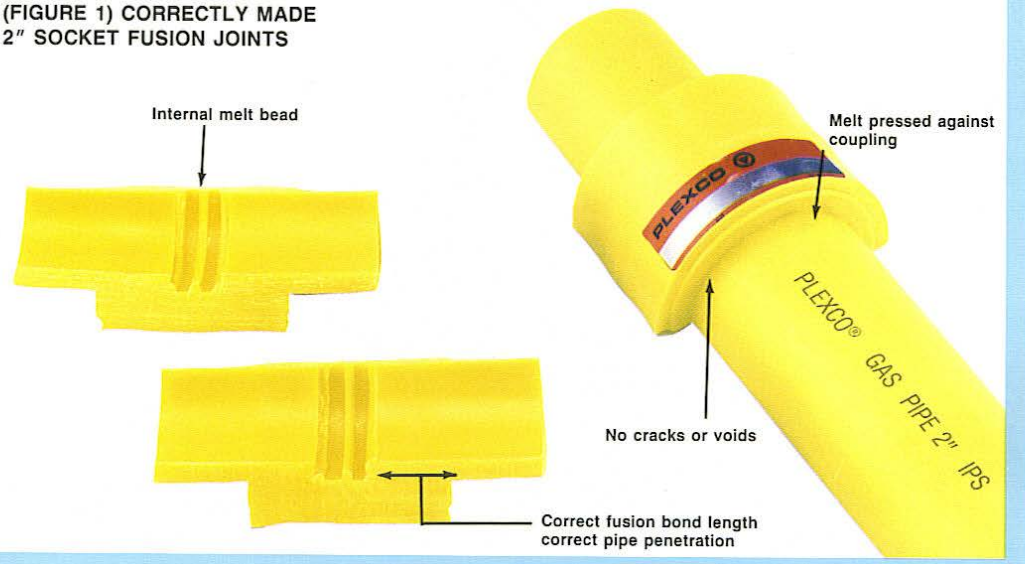
(FIGURE 1) CORRECTLY MADE
2″ SOCKET FUSION JOINTS




(FIGURE 2) CORRECT
BEND TEST FOR SOCKET FUSION JOINT

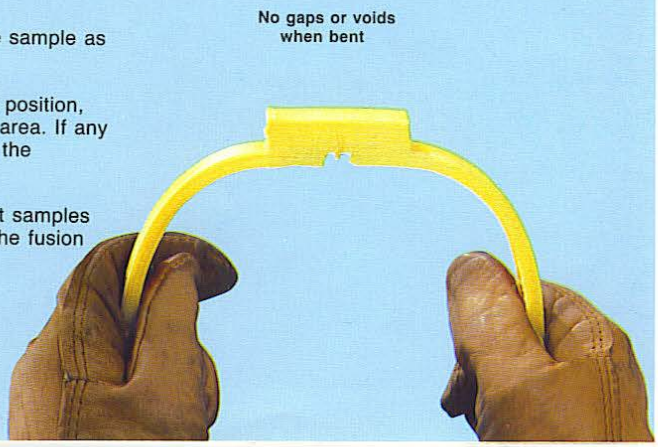
Allow the joint to cool for at least one hour before subjecting it to a bend test.

Cut at least 3 strips 1″ wide lengthwise through the socket so that about 8″ of pipe remains on each side of the fitting.

Hold each strip at the ends, and bend the sample as shown in Figure 2.

Continue to hold each sample in the bent position, and thoroughly examine the entire fusion area. If any separation, cracks or voids are observed, the fusion is not satisfactory.

A joint is considered satisfactory if all bent samples are completely free of cracks or voids in the fusion area, as shown in Figure 2.

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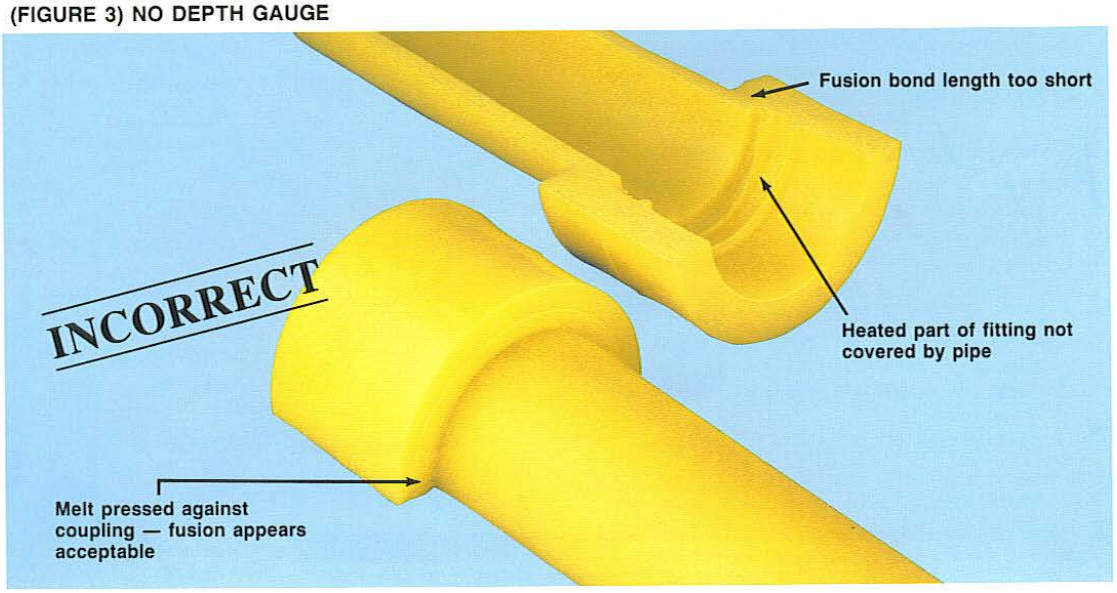
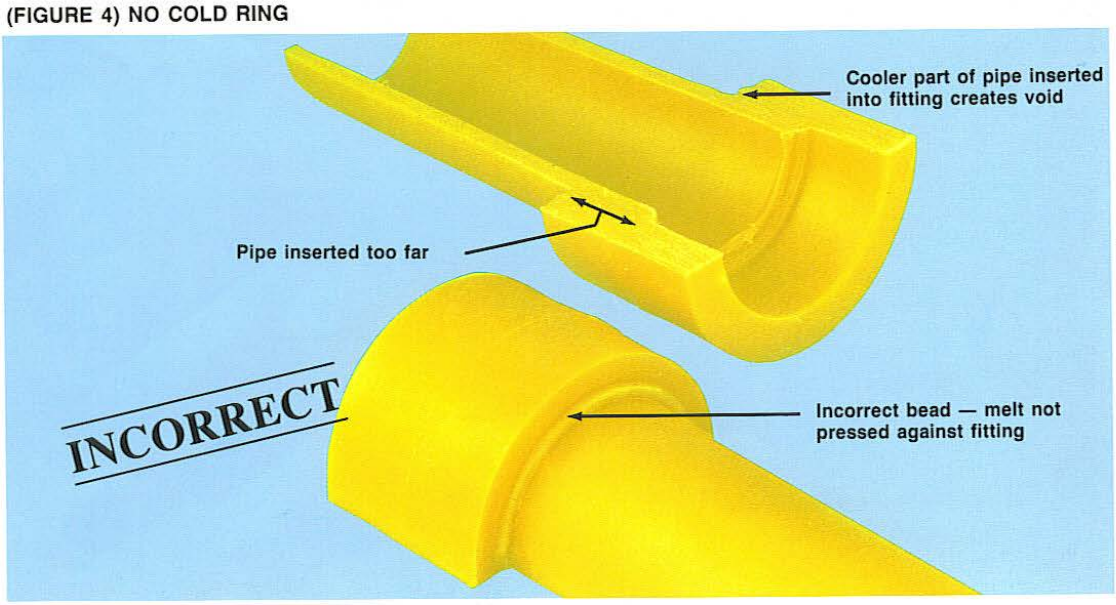
# Socket Fusion Joints—Incorrectly made

(FIGURE 3) NO DEPTH GAUGE




(FIGURE 4) NO COLD RING

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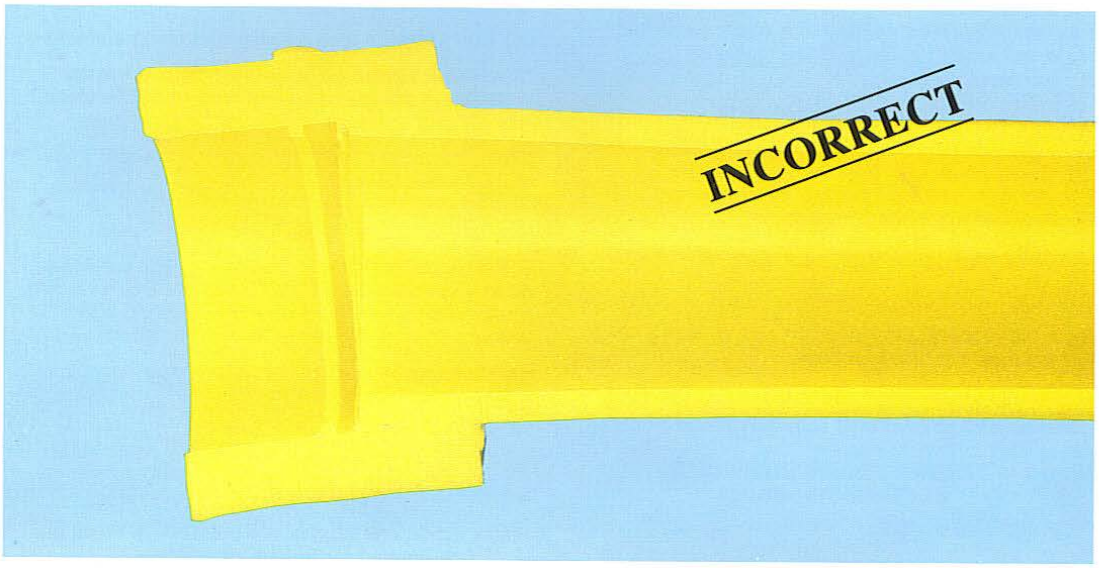
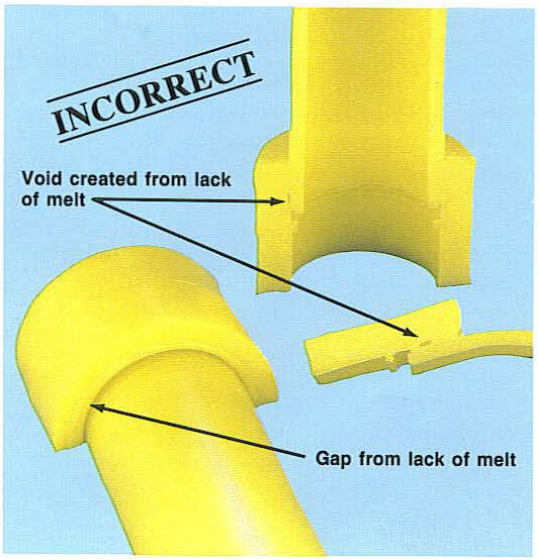
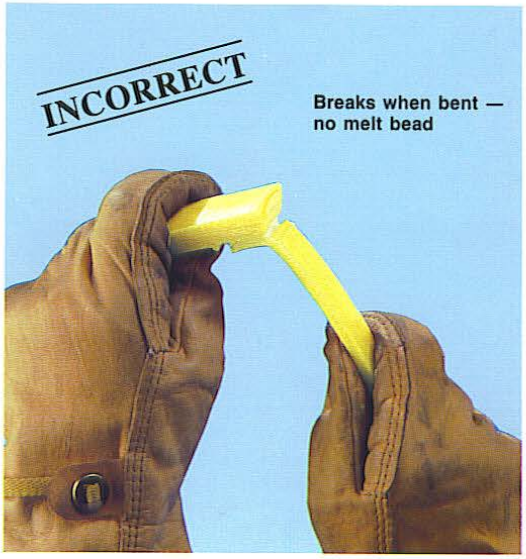
(FIGURE 5) POOR ALIGNMENT (INCORRECT)




(FIGURE 6) MELT RUBBED OFF WHEN REMOVING HEATER




(FIGURE 7) MELT RUBBED OFF WHEN REMOVING HEATER

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# Saddle Fusion Joints

## Procedure for Making Saddle Fusion Joints

It is recommended that an application tool be used when making saddle fusion joints. Variables in the installation procedure are more easily controlled when a tool is used than when the fusion is made manually.

1. Assemble application unit according to manufacturer's instructions and position on pipe.

2. Remove surface skin from the melt areas of the clean, dry pipe and saddle fitting by roughening with medium grit emery or garnet cloth.

Brush away residue with dry rag after roughening.

3. With the heating surfaces of the tool at $500^0 \pm 10^0$ F place the tool in position on pipe.

Place fitting against heater faces and apply pressure.

Heat under pressure for time shown in Table 2 or 3.

**TABLE 2 — TAPPING TEE AND SERVICE SADDLE FUSION TIME CYCLES**

| IPS PIPE SIZE, IN. | *HEATING TIME CYCLE, SEC | COOLING TIME CYCLE, SEC |
|---|---|---|
| 1¼ | **40-Saddle<br>25-Pipe | 60 |
| 2 | 40 | 60 |
| 3 | 40 | 60 |
| 4 | 40 | 60 |
| 6 | 40 | 60 |

***Use heat shield on pipe surface for first 15 seconds of this time cycle.*

**TABLE 3 —HVTT AND BRANCH SADDLE FUSION TIME CYCLES**

| IPS PIPE SIZE, IN. | *HEATING TIME CYCLE, SEC | COOLING TIME CYCLY, SEC |
|---|---|---|
| 2 | 50-60 | 120 |
| 3 | 70-80 | 120 |
| 4 | 70-80 | 180 |
| 6 | 80-90 | 180 |

**Guidelines only, exact time depends upon environmental conditions and condition of fusion equipment.*

With experience, the iron can be rocked slightly and slowly as the melt forms—do not rock excessively as this will enlarge the melt pattern on the pipe.

4. After proper melt time, raise fitting and remove heater from pipe.

DO NOT displace melt on pipe and fitting surfaces.

Check melt pattern on pipe and fitting — heated surfaces on fitting and pipe should be 100% melted with no cold spots.

(Use a mirror to check the melt on the under surface of the saddle base.)

5. If melt patterns are satisfactory, press the fitting on the pipe very quickly (within 3 seconds) with firm pressure until a melt bead of the following size appears around the entire base of the fitting:

| PIPE SIZE | BEAD THICKNESS |
|---|---|
| 1-1/4″ | 1/16″ |
| 2″ | 1/8″ |
| 3″ & *larger* | larger than 1/8″ |

Adjust fusion unit to maintain pressure of fitting on pipe. See tip card for further information.

Allow fusion joint to cool for at least the times indicated in Table 2 or 3 before releasing pressure.

If melt pattern on fitting or pipe is unsatisfactory after heating, apply fitting to pipe and let cool. Remove cutter from tapping tee and cut off fitting top to avoid misuse later. Repeat procedure from Step 1.

6. After letting joint cool 3 minutes beyond that shown in the tables, remove application unit from pipe.

Visually check fitting for fusion melt bead around entire fitting base.

If fusion joint quality is unacceptable or doubtful, cut off fitting top and apply a new fitting to a new section of pipe.

7. For standard tapping tees and service saddles, let fusion cool an additional 10 minutes prior to pressure testing and tapping the main. For high volume tapping, tee and branch saddles, allow an additional 30 minutes.

8. See Figures 8 and 9 for visual parameters of a proper fusion.

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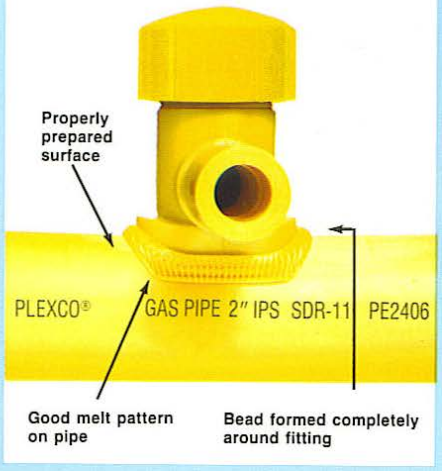
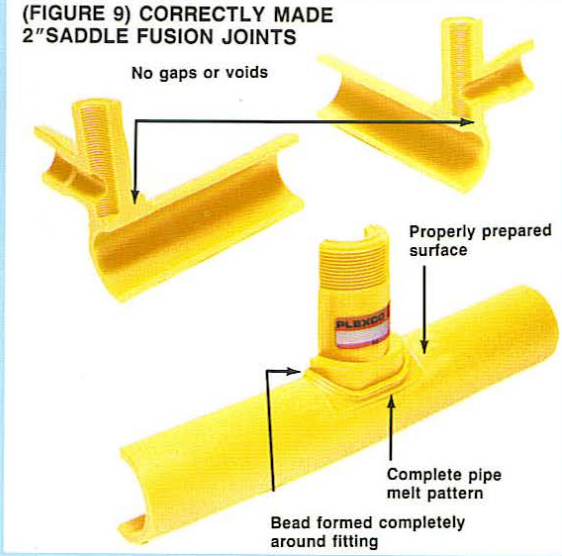
Chevron

(FIGURE 8) CORRECTLY MADE
2″ SADDLE FUSION JOINT




(FIGURE 9) CORRECTLY MADE
2″SADDLE FUSION JOINTS



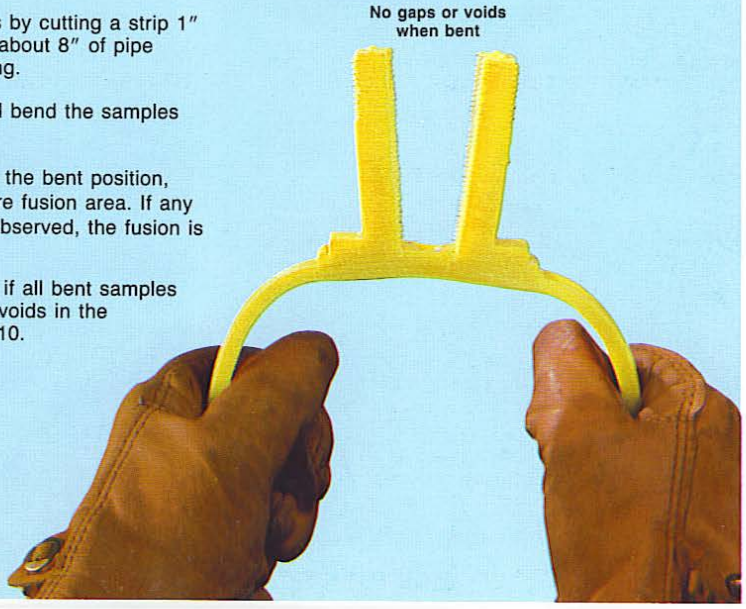

(FIGURE 10) CORRECT
BEND TEST FOR SADDLE FUSION JOINT

Cut the joint into at least 3 strips by cutting a strip 1″ wide through the saddle so that about 8″ of pipe remains on each side of the fitting.

Hold each strip at each end, and bend the samples as shown in Figure 10.

Continue to hold each sample in the bent position, and thoroughly examine the entire fusion area. If any separation, cracks or voids are observed, the fusion is not satisfactory.

A joint is considered satisfactory if all bent samples are completely free of cracks or voids in the fusion area, as shown in Figure 10.

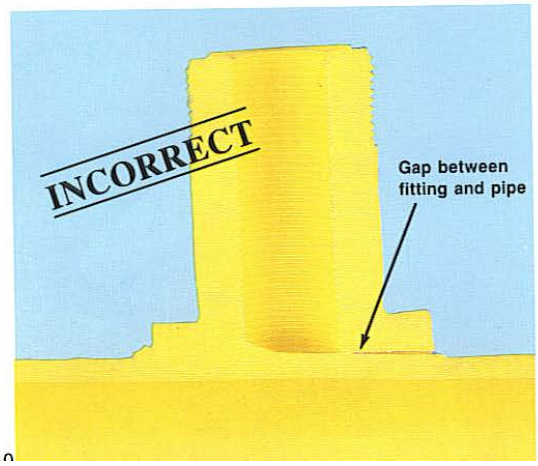



9

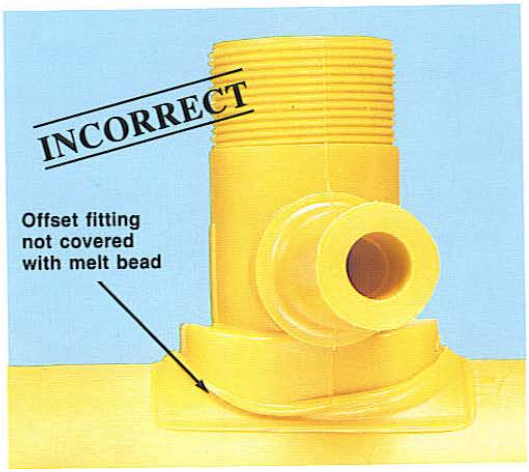
# Saddle Fusion Joints—Incorrectly made

(FIGURE 11) COLD FUSION —
EXCESSIVE COOLING BEFORE JOINING

(FIGURE 12) POOR ALIGNMENT —
FITTING NOT FLAT ON PIPE




(FIGURE 13) POOR ALIGNMENT —
FITTING NOT SQUARE ON PIPE



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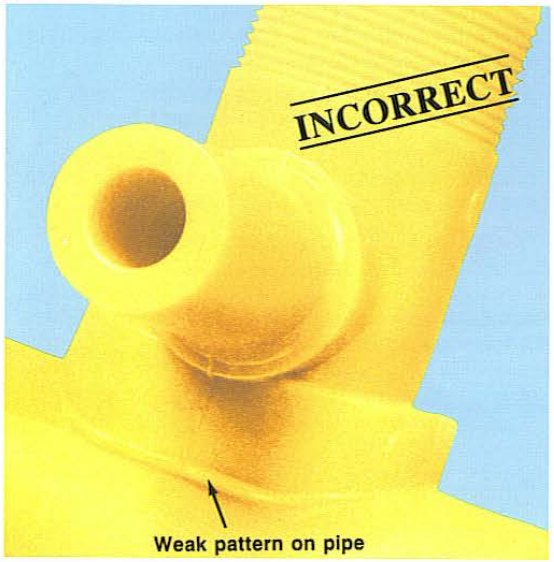
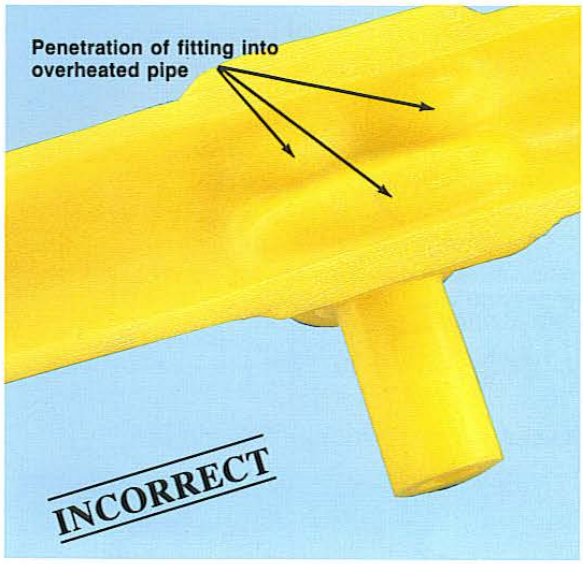
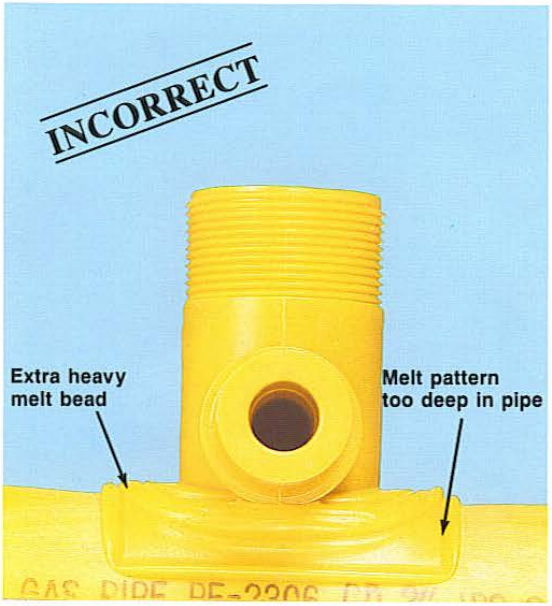
(FIGURE 14) INCOMPLETE PIPE MELT PATTERN

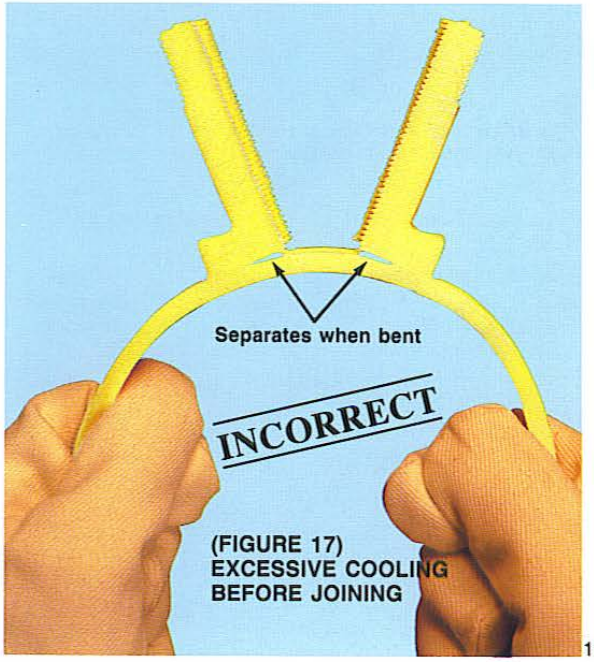



(FIGURE 15) OVERMELTING — INSIDE PIPE




(FIGURE 16) OVERMELTING — HEAT CYCLE TOO LONG




(FIGURE 17) EXCESSIVE COOLING BEFORE JOINING

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# Butt Fusion Joints

## Procedure for Making Butt Fusion Joints

1. Clean each pipe end with a clean cloth.

2. Insert facing unit between pipe ends and lock onto guide rods. Face pipe ends to the stops.

3. Check alignment of pipe ends. Adjust high-low if necessary. If adjustment is made, reinsert facing unit and reface to the stops.

4. Check heater plate for temperature and wipe surface clean.

5. Insert heater plate between aligned ends and bring ends firmly in contact with plate, but DO NOT APPLY PRESSURE.

6. Heat for times shown below.

**TABLE 4 — BUTT FUSION TIME CYCLES**

| IPS PIPE SIZE, IN. | *Heating Time Cycle, sec** HEATER AT 500° ± 10° F | HEATER AT 440° ± 10°F | COOLING TIME CYCLE, SEC |
|---|---|---|---|
| 1¼ | 14-17 | 25-30 | 60 |
| 2 | 16-19 | 40-48 | 60 |
| 3 | 20-24 | 50-60 | 75 |
| 4 | 24-29 | 55-66 | 90 |
| 6, SDR-11.5 | 40-48 | 90-108 | 180 |

**Guidelines only, exact time depends upon environmental conditions and condition of fusion equipment.*

7. Remove heater plate after achieving proper melt bead.

8. Bring melted ends together rapidly. DO NOT SLAM. Apply enough force to achieve a double roll back of each bead onto the pipe. Hold this pressure during cooling.

9. Allow the butt fusion to cool, under pressure, for the time shown in Table 4.

10. DO NOT remove the fused joint from the equipment for an additional 3 minutes after cooling time.

DO NOT test, stress, pull or lay in ground for 10 to 60 minutes after removal from fusion unit.

11. See Figure 18 for visual parameters of a proper fusion.

Each bead after fusion should have approximately the following diameters:

| PIPE SIZE | SDR NO. | BEAD THICKNESS |
|---|---|---|
| 1¼" IPS | 10 | 1/16" |
| 2" IPS | 11 | 1/16" to 1/8" |
| 3" IPS | 11-11.5 | 1/8" |
| 4" IPS | 11-11.5 | 1/8" |
| 6" IPS | 11-11.5 | 3/16" |
| 8" IPS and Larger | All | 3/16" to ¼" |

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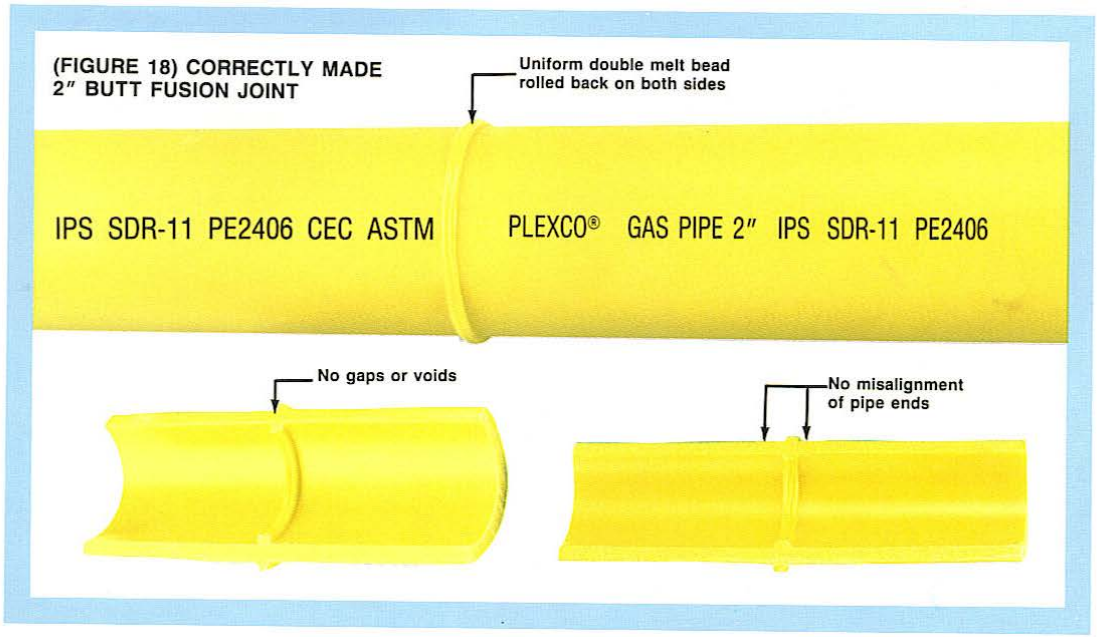



(FIGURE 18) CORRECTLY MADE 2″ BUTT FUSION JOINT

(FIGURE 19) CORRECT BUTT FUSION BEND TEST

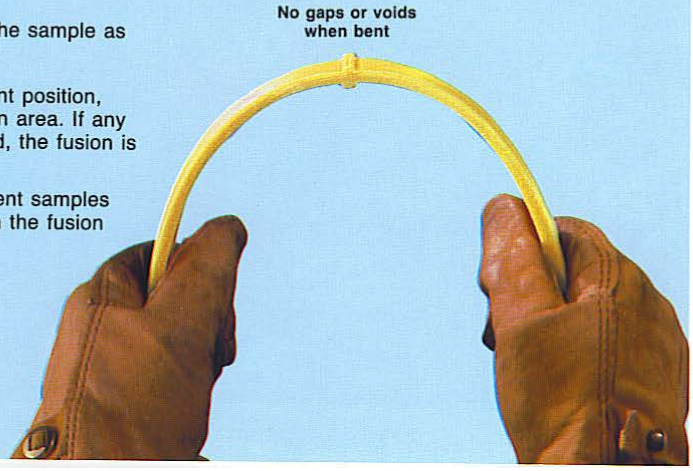
Allow the joint to cool for at least one hour before subjecting to a bend test.

Cut at least 3 strips 1″ wide lengthwise through the butt fusion so that about 8″ of pipe remains on each side of the joint.

Hold each strip at the ends, and bend the sample as shown in Figure 19.

Continue to hold each sample in the bent position, and thoroughly examine the entire fusion area. If any separation, cracks or voids are observed, the fusion is not satisfactory.

A joint is considered satisfactory if all bent samples are completely free of cracks or voids in the fusion area, as shown in Figure 19.

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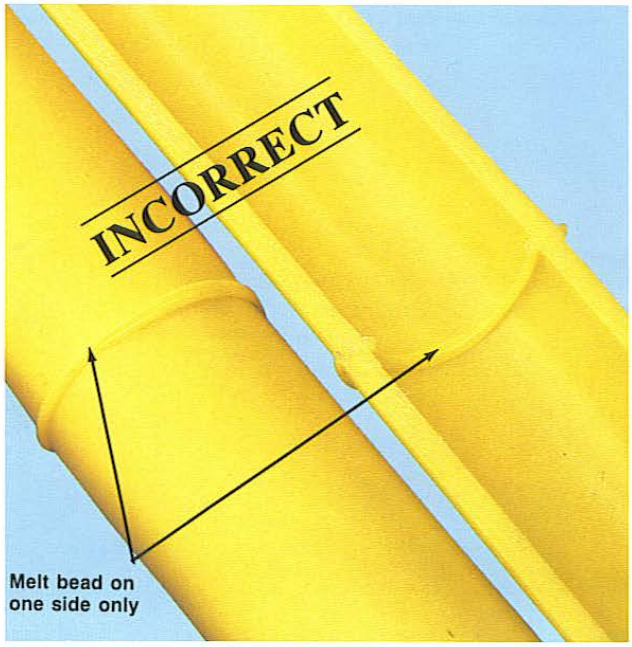
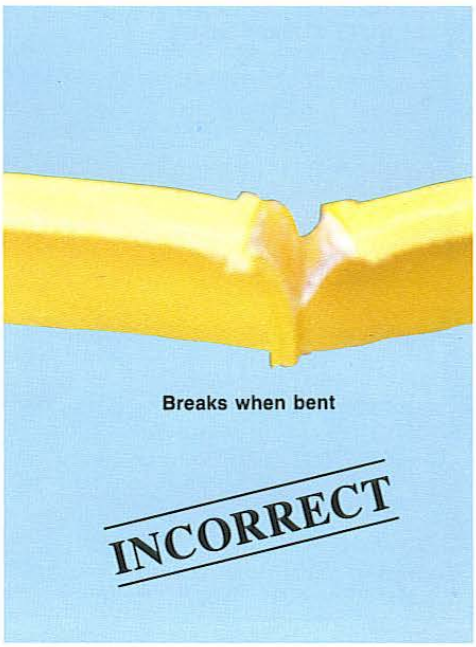
# Butt Fusion Joints–Incorrectly made

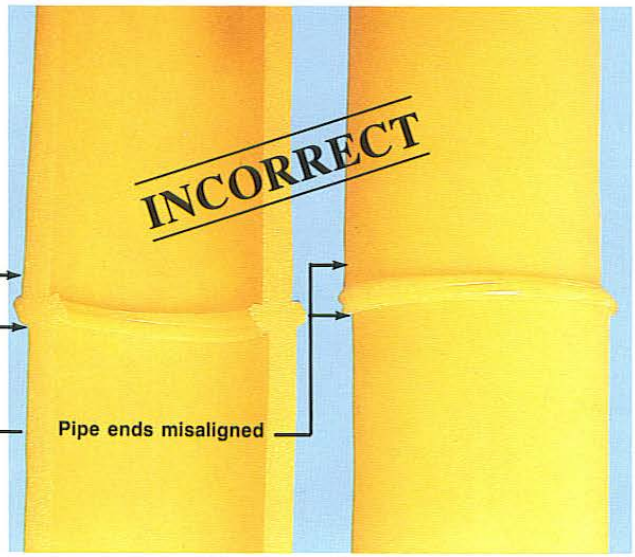
(FIGURE 20) INCOMPLETE FACING



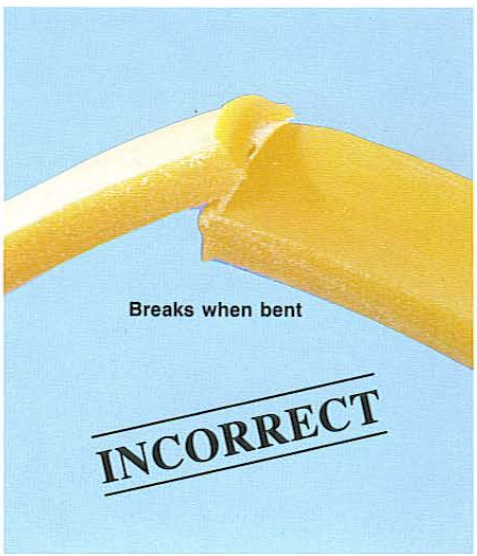

(FIGURE 21)
INCOMPLETE FACING BEND TEST




(FIGURE 22) POOR ALIGNMENT




(FIGURE 23)
POOR ALIGNMENT BEND TEST

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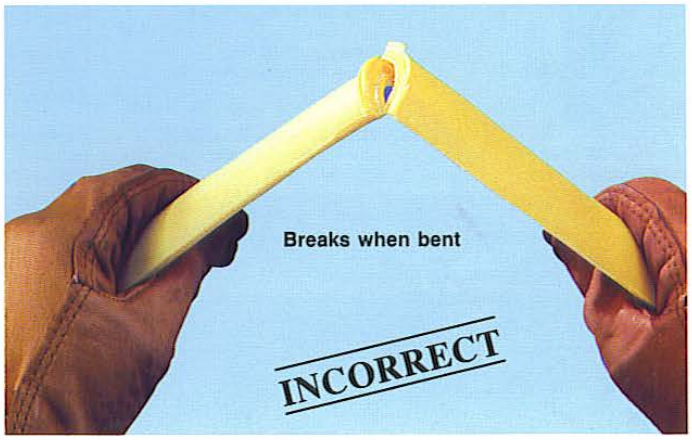
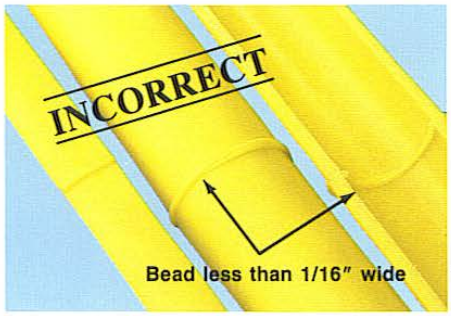
(FIGURE 24) ''COLD JOINT'' — EXCESSIVE PRESSURE DURING HEAT CYCLE

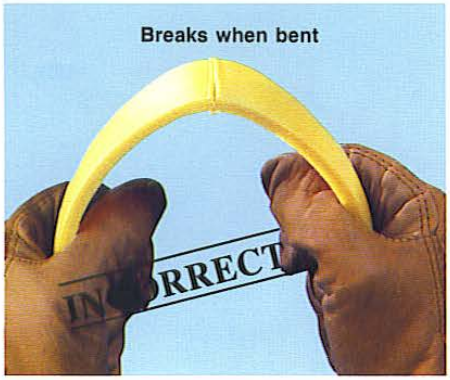
(FIGURE 25) COLD JOINT BEND TEST



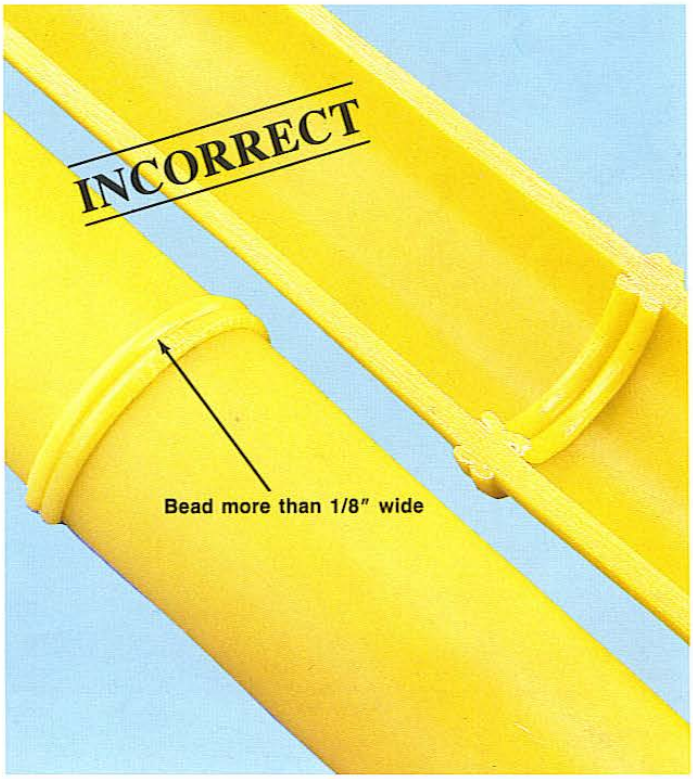

(FIGURE 26) MELT BEAD TOO SMALL




(FIGURE 27) SMALL BEAD BEND TEST




(FIGURE 28) MELT BEAD TOO LARGE

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### 3.2.5 INSPECTION OF POLYETHYLENE PIPE JOINTS (192.287)

When polyethylene piping is used, the City of Carencro is required by this part to inspect polyethylene pipe joints prior to those joints being buried. Appropriate training or experience in evaluating the acceptability of plastic pipe joints made under the City of Carencro polyethylene joining procedures must be conducted by qualify employees and/or contract personnel. No person may carry out the inspection of joints in plastic pipes required by §192.273(c) or §192.285(b) unless that person has been qualified by appropriate training or experience in evaluating the acceptability of plastic joints made under the acceptable joining procedure.

# SECTION 4 - GENERAL CONSTRUCTION REQUIREMENTS FOR GAS DISTRIBUTION MAINS AND SERVICES (SUBPART G)

## 4.1 INSPECTION OF GAS DISTRIBUTION MAINS AND SERVICES (192.305)

All gas distribution mains and services installed by of for City of Carencro shall be inspected to ensure that the piping has not been damaged during shipping. T his inspection should be conducted or carried out prior to the gas piping being installed in a trench. Each length of pipe and each other component must be visually inspected at the site of installation to ensure that it has not sustained any visually determinable damage that could impair its serviceability. P ipeline Safety will be notified when City of Carencro installs any new piping in the gas distribution system that is at least one (1) mile of piping or more at least 48 hours prior to commencement of construction. The operator must not use operator personnel to perform a required inspection if the operator personnel performed the construction task requiring inspection. This does not prohibit the operator from inspecting construction tasks with operator personnel who are involved in other construction tasks.

The Town of Carencro should have a pre-construction meeting with the contractor prior to commencement of the project. At that pre-construction meeting the Gas Operator will gather the following documentation from the contractor:

- Operator Qualification Records
- Fusion Certification for Butt and Sidewall (if applicable)
- Welder Certifications (if applicable)
- Drug and Alcohol Testing Records
- Copies of Liability Insurance
- State of Louisiana Contractor License
- Any other documentation required by Pipeline Safety

At the pre-construction meeting with the contractor the Gas Operator should provide the contractor with all Operation and Maintenance Procedures applicable to the covered tasks associated with the proposed construction activities. The pre-construction meeting should be documented. Documentation can be signatures on the La. One-Call Ticket.

See form to be completed for notification purposes on next page.

**Department of Natural Resources**
**Office of Conservation**
**Pipeline Safety**
**P.O. Box 94275**
**Baton Rouge, LA 70804-9275**

**Phone: (225) 342-5505**
**Fax: (225) 342-5529**

## NOTICE OF CONSTRUCTION

COMPANY NAME: _____ DATE: _____

SUBMITTED BY: _____ TITLE: _____ PHONE: _____

TYPE OF CONSTRUCTION: _____

LOCATION AREA OF CONSTRUCTION: _____

PARISH/S: _____ NO. OF NAVAGABLE WATERWAY X-INGS: _____

NEAREST TOWN/S – CITY/S: _____

CONSTRUCTION DATE/S: Commencement Date _____ Completion Da _____

***(Gas 48 hrs notice - Hazardous Liquids 7 days notice)*** ***(estimated)***

LENGTH OF CONSTRUCTION: Feet _____ Miles _____

PIPE SIZE(S): _____ PIPE MATERIAL TYPE: _____

PIPE LENGTH, EACH SIZE _____

***(If more than one pipe size)***

Product to be transported: Gas Liquids Name of Product: _____

***(Circle either Gas or Liquids and identify product name)***

Class Location (Gas Only): Class-1 _____ Miles Class-2 _____ Miles

Class-3 _____ Miles Class-4 _____ Miles

PIPELINE ROUTE POPULATION DENSITY, (Liquids Only): Rural _____ Miles Non-Rural _____ Miles

ANTICIPATED MAXIMUM ALLOWABLE OPERATING PRESSURE - MAOP: (Gas Only) _____ psig

ANTICIPATED MAXIMUM OPERATING PRESSURE - MOP: (Liquids Only) _____ psig

CONTACT PERSON: _____ TITLE: _____ PHONE: _____

**********FOR OFFICE USE ONLY**********

INFORMATION RECEIVED BY: _____ TITLE: _____

DATE: _____ TIME: _____

### 4.1.1 REPAIR OF STEEL PIPE (192.309)(a)(d)(e)

Imperfection or damage that impairs the serviceability of a length of steel pipe must be repaired or removed. If a repair is made by grinding, the remaining wall thickness must at least be equal to either:

(1) The minimum thickness required by the tolerances in the specification to which the pipe was manufactured; or

(2) The nominal wall thickness required for the design pressure of the pipeline.

A gouge, groove, arc burn, or dent may not be repaired by insert patching or by pounding out. Each gouge, groove, arc burn, or dent that is removed from a length of pipe must be removed by cutting out the damaged portion as a cylinder.

### 4.1.2 REPAIR OF PLASTIC PIPE (192.311)

Imperfection or damage that would impair the serviceability of plastic pipe must be repaired by a patching saddle or removed and replaced. Any damage to polyethylene pipe being installed or inspected by the City of Carencro or contractors that may impair the reliability of that polyethylene piping or fittings will be repaired or removed and replaced.

### 4.1.3 PROTECTION FROM HAZARDS (192.317)(a)

Mains and service lines must be protected from washouts, floods, unstable soil, landslides, or other hazards that may cause the pipeline to move or sustain abnormal loads. The City of Carencro will take precautions to protect its facilities from damage by vehicular traffic or other similar causes either by placing them a safe distance from traffic or by installing barriers.

## 4.2 INSTALLATION OF STEEL PIPE (192.319)

The City of Carencro installs and extends its existing gas distribution system using steel pipe. When installed in a ditch, each main or service line that is to be operated at a pressure producing a hoop stress of 20 percent or more of SMYS must be installed so that the pipe fits the ditch so as to minimize stresses and protect the pipe coating from damage.

When the service line or main is backfilled, it must be backfilled in a manner that:

(1) Provides firm support under the pipe; and

(2) Prevents damage to the pipe and pipe coating from equipment or from the backfill material.

Should the need arise for steel pipe to be installed such as during repair process, the installation of steel pipe will be in accordance with the following procedure.

## PROCEDURE FOR INSTALLING STEEL PIPE

| | Action | Information |
|---|---|---|
| **Inspecting the Pipe** | | |
| **1.** | Visually inspect the pipe coating. | Look for major decay, damage, voids, dents, gouges, and bubbles. |
| **Jeeping the Pipe** | | |
| **2.** | Check and calibrate the jeeping equipment. | Follow the manufacturer's instructions. |
| **3** | Set the inspection voltage according to manufacturer's recommendations. | Improper voltage setting will damage the pipe coating. |
| **4** | Ground the pipe to be inspected from the bare end of the pipe to the earth. | When individual joints of pipe are being tested, ground each joint individually. |
| **5** | If there is any moisture, either remove it or let surface dry prior to jeeping. | Moisture on the coating surface can cause false indications of defects. |
| **6** | Make contact with the detector electrode on the bare pipe end to verify that the jeep is properly grounded.<br>• Do not touch the ground while jeep is in operation | Do this each time you test a new section of coated piping. |
| **7** | In a single pass, move the electrode over the surface of the dry coating. | The correct rate for jeeping is approximately 1 foot per second. |
| **8** | As defects are identified, mark the locations for repair. | Repairs should be made after the jeeping is done and **before** the pipe is installed. |
| **9** | Retest the repaired areas after repairs are made. | The repair material needs time to cool, dry, and cure. |
| **Lowering the Pipe** | | |
| **10** | When lowering the pipe into the trench, take care to prevent the pipe from swinging against or rubbing on the sides of the trench.<br>• If necessary, use sheets of plywood or felt pads to prevent damaging the coating against the rough sides of the trench. | The pipe should lie without strain on the debris free floor of the trench. |
| **11.** | Close all sections of joined pipe water tight when not working on the line. Never stuff rags, burlap, or other material into the ends of pipe. | This keeps water, foreign matter, or animals out of the main or joined pipe sections.<br>• Plastic taped over the pipe ends is not sufficient for closing the ends. |

| | Action | Information |
|---|---|---|
| **12** | Maintain a 12" separation between gas piping and other underground objects. | If pipe must run next to other underground piping or other foreign objects, it is necessary to insulate between them. Use a split plastic pipe or plastic sheet to prevent the gas pipe from physically touching foreign objects. |
| **Backfilling** | | |
| **13** | Backfill the trench as soon as possible after the pipe is lowered in.<br>• Provide as much fill support along the sides and under the pipe as is practical. | You may also lay a warning tape into the trench about 12" below the surface (18-20" in cultivated ground).<br>• This will alert anyone digging in the area. |
| **14** | Before backfilling, screen out any rock fragments, large stones, or hard clods of earth which may damage the coating. | After minimum cover of 6" of loose soil is established, these hard objects can be returned to the backfill. |
| **15** | Take care in placing the remaining backfill.<br>• When backfilling across farmland, whether under cultivation or tillable, be sure to replace all excavated soil Keep the top 12" of soil rock free.<br>• Leave the surface of parkways, boulevards, yards, etc. flush and always free of rock. | Be careful of sand and gravel used as padding or fill:<br>• Gravel creates problems of permeability in the fill around the pipe and may allow leakage to travel considerable distances.<br>• Gravel can also create corrosion problems due to a high alkaline content**. It is not permitted for use as padding.** |

## 4.3 INSTALLATION OF PLASTIC PIPE (192.321)(a)(b)(c)(d)(e)(f)(g)

The City of Carencro installs all plastic pipe below ground level. Should plastic pipe be installed in a vault or any other below grade enclosure the piping must be completely encased in gas-tight metal pipe and fittings that are adequately protected from corrosion. All plastic pipe will be installed so as to minimize shear or tensile stresses.

Thermoplastic pipe that is not encased must have a minimum wall thickness of 0.090 inch (2.29 millimeters), except that pipe with an outside diameter of 0.875 inch (22.3 millimeters) or less may have a minimum wall thickness of 0.062 inch (1.58 millimeters).

Plastic pipe that is not encased must have an electrically conducting wire or other means of locating the pipe while it is underground. Tracer wire may not be wrapped around the pipe and contact with the pipe must be minimized but is not prohibited. Tracer wire or other metallic elements installed for pipe locating purposes must be resistant to corrosion damage, either by use of coated copper wire or by other means.

Plastic pipe that is being encased must be inserted into the casing pipe in a manner that will protect the plastic. The leading end of the plastic must be closed before insertion.

Uncased plastic pipe may be temporarily installed above ground level under the following conditions:

(1) The operator must be able to demonstrate that the cumulative aboveground exposure of the pipe does not exceed the manufacturer's recommended maximum period of exposure or 2 years, whichever is less.

(2) The pipe either is located where damage by external forces is unlikely or is otherwise protected against such damage.

(3) The pipe adequately resists exposure to ultraviolet light and high and low temperatures.

The City of Carencro uses Driscopipe 6500 polyethylene piping or Plexco Yellow pipe for all new buried gas distribution main installation. Gas mains installed in the City of Carencro Gas System will be installed with a minimum of 30” cover. In the event that it is impossible to achieve 30” cover because of culverts, drainage or other obstructions, some type of protection will be provided. The City of Carencro uses the following procedure for installing plastic mains.

## PROCEDURE FOR INSTALLING PLASTIC PIPE

| | Action | Information |
|---|---|---|
| **Inspecting the Pipe** | | |
| **1.** | Visually inspect the pipe prior to installation for gouges, scratches or other visible signs of damage that may have occurred during shipment. | |
| **Lowering the Pipe** | | |
| **2.** | After the pipe has been inspected, the pipe can be lowered into the trench. | Avoid allowing rocks, bricks, shells or other hard foreign objects to come into contact with the polyethylene pipe. |
| **3** | Allow the pipe to "snake" into the bottom of the trench to allow for expansion and contraction. | |
| **4** | Cover the installed polyethylene pipe with approximately three (3) to four (4) inches of loose soil. | Leave the ends of the pipe where the tie-in(s) is/are to be made uncovered. |
| **Install the Tracer Wire** | | |
| **5** | Once the pipe is covered with loose soil, install the tracer wire. | Tracer wire should be at least 14 gauge insulated wire to protect against corrosion. |
| **6** | The tracer wire should be installed above the piping making sure that the tracer wire is not in contact with the plastic pipe. | Never allow the tracer wire to make contact with the polyethylene piping. Lightening charges could cause the wire to burn the pipe should lightening strike nearby. |
| **7** | When connecting or joining tracer wires always use a split bolt connector or other mechanical connectors and tape and coat the exposed metal connecter. | Failure to use proper connectors will likely lead to corrosion and prevent the plastic pipe from the ability to be located. |
| **8** | Once the pipe has been installed into the trench and the tracer wire installed above the pipe, begin the backfill process. | |
| **Backfilling** | | |
| **9** | Before backfilling, screen out any rock fragments, large stones, or hard clods of earth, which may damage the coating. | |

| | Action | Information |
|---|---|---|
| **10** | Backfill the trench as soon as possible after the pipe has been lowered into the trench and the tracer wire installed.<br>• Provide as much fill support along the sides and under the pipe as is practical. | This provides protection for the pipe and reduces the amount of expansion and contraction due to sun and temperature. |
| **11** | When backfilling the trench, avoid allowing rocks, bricks, shells or other hard foreign objects to come into contact with the polyethylene pipe | This could damage the plastic pipe and lead to leakage. |
| **12** | After the backfill is completed, allow a reasonable time for the pipe to approach the ambient ground temperature before making the final cut and tie-in. | Be aware that expansion and contraction affect not just the final tie-in, but also each individual butt fusion weld along the entire length of the pipeline. |
| **Pressure Test** | | |
| **12** | Pressure test the newly installed plastic according to procedural requirements based on the system MAOP. | Pressure tests are generally 1 ½ or 150% of the MAOP or 50 PSI which ever is greater. |
| **13** | Any tie-ins or connections that can not be pressure tested must be soap tested prior to the placing the new main or service into service. | |

## POLYETHYLENE VALVES

When needed to control gas distribution flow, Poly Valves may be installed in the system to allow gas to be cut off to certain parts of the gas distribution system. All Poly Plug Valves used on the City of Carencro gas distribution system are tested and qualified per ANSI B16.40-85. The City of Carencro Gas Distribution System uses Nordstrom Polyethylene Valves and/or Kerotest Polyethylene Ball Valves for controlling the flow of gas on the segments of the system constructed of polyethylene. (See pictorials of typical polyethylene valves used below).

NORDSTROM POLYETHYLENE VALVE

NORDSTROM POLYETHYLENE GAS VALVES

KEROTEST POLYETHYLENE GAS VALVE

**Polyethylene Valves**

NEW

## KEROTEST Polytec Polyethylene Ball Valve

### 2" Standard Port Valve (SP)

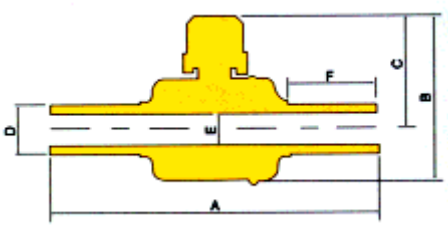
Introducing the newest addition to the Kerotest Polytec family of polyethylene ball valves . . . the new Standard Port (SP) 2" Valve. Like the complete line of Kerotest Polytec valves, the SP valve provides cost-effective, durable solutions to your polyethylene ball valve requirements. This valve is also available in the 1 - 1/4" and 1 - 1/2" sizes.

FEATURES

- Generous Flow Bores
- Fully Qualified to ASME B16.40, ASTM D-2513 and CFR, Part 192
- Available in various SDR and PE materials - SDR-11 standard
- Easy Installation - Low Operating Torque
- Maintenance Free
- Robust Design - Reliable Construction
- ISO 9001 Certified Manufacturer
- Available from Stock
- Dual Style Actuator (street key or 2" operating square)

Materials of Construction

| Component | Material | Features and Benefits |
|---|---|---|
| Body | Polyethylene | PE 2406; PE 3408 |
| Ends | Polyethylene | PE 2406; PE 3408 |
| Ball | Polypropylene | High strength, long life and low operating torque |
| Retainer | Polypropylene | Positive seal under any condition, retains seat under high differential pressure |
| Ball Seat | Nitrile | Reliable sealing from -20(F) to 140(F) |
| Stem | Acetal | Excellent durability & strength |

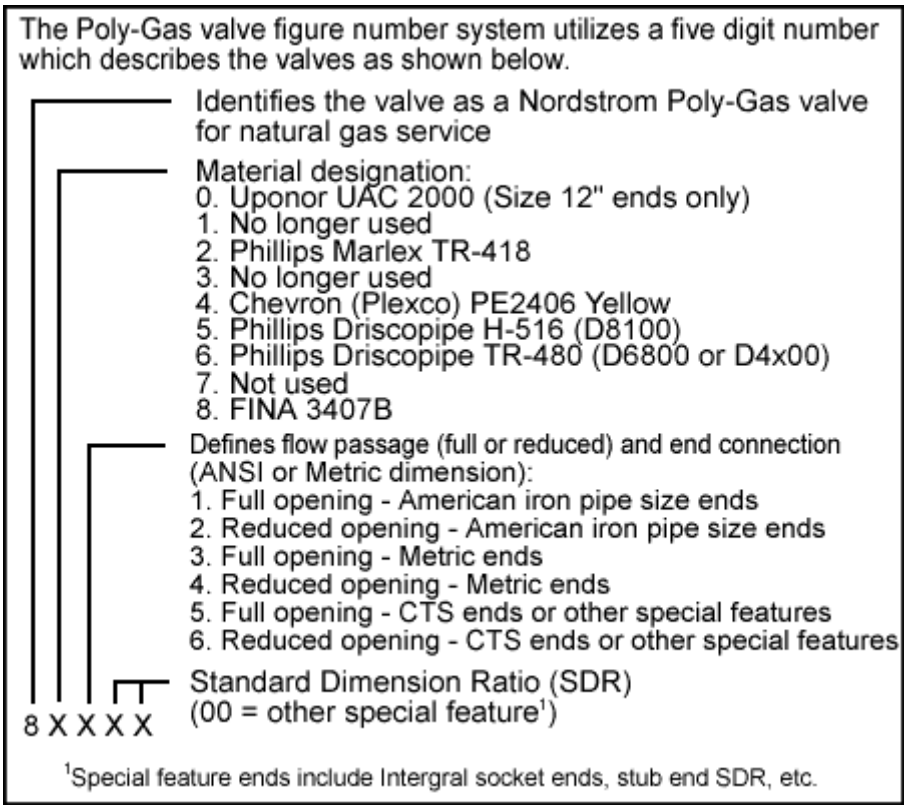



| | | |
|---|---|---|
| Stem Seal | Nitrile | Redundant sealing with dual o-rings |
| Weather Seal | Nitrile | Protects from ground water and dirt |
| Actuator | Polypropylene | Combination street key and 2" operating square |

| **Size** | **A** | **B** | **C** | **D** | **E** | **F** | **Cv** | **Weight** |
|---|---|---|---|---|---|---|---|---|
| 1-1/4" ips | 1.8" | 5.51" | 3.78" | 1.660' | 1.26" | 2.8" | 120 | 1.8 lb |
| 1-1/2" ips | 1.8" | 5.51" | 3.78" | 1.900" | 1.26" | 2.8" | 140 | 1.9 lb |
| 2" ips | 1.8" | 5.51" | 3.78" | 2.375" | 1.38" | 3.3" | 150 | 2.0 lb |

**Nordstrom Poly-Gas Ball Valves**

- Rugged and reliable Nordstrom poly-gas valves are the strongest part of a polyethylene piping system.
- Mechanical integrity (Due to our unique seat design and fusion process, there are no leak paths behind the seat.)
- Bubble-tight shutoff from dual elastomeric seats.
- Fused body shell eliminates all unnecessary potential leak paths to atmosphere.
- High-grade polymeric materials eliminate corrosion.
- Multiple elastomeric stem seals.
- No metal parts.
- Smooth bore gives excellent flow characteristics even in the reduced port designs.




From the ½" ball valve to the industry's first 12-inch polyethylene ball valve, Nordstrom Poly-Gas valves come in the widest range of sizes on the market. They are shipped in cartons, not plastic bags, to shield them from ultraviolet light and protect the valve ends from damage.

**Codes & Standards**

- Nordstrom Poly-Gas valves meet or exceed the requirements of:

  U.S. Department of Transportation 49CFR, Part 192

  ANSI B16.40

  ASTM D-2513

  Qualified to ISO 9001

- In addition, as required by customers, certain sizes and materials of valves meet or exceed the requirements of CSA B137.0 and B137.4
- Nordstrom Poly-Gas valves have successfully passed 10,000-hour tests to ISO 4437

## POLYETHYLENE PIPE INSERTION

Plastic pipe insertion may be used to renew steel or cast iron mains by placing a smaller size plastic pipe into the existing metal pipe. This is possible if the new, smaller pipe can carry the required volume of gas and if the system pressure is within the plastic pipe's specifications. In this case, the old pipe becomes a casing for the new pipe, providing a route for the plastic and helping to protect it from damage. This process eliminates the need to cut or dig a trench to bury the new polyethylene pipe. The process also eliminates the requirement to cut or break concrete streets and/or driveways. The City of Carencro reserves the right to insert plastic pipe provided it is accomplished in accordance with the procedural guidelines on the following page.

### PROCEDURE FOR INSERTING PLASTIC PIPE

| | Action | Information |
|---|---|---|
| **Clear the Existing Pipe** | | |
| **1.** | If the insertion will be long or clearance between the plastic and the casing is minimal (e.g., 3" plastic inserted into 4´cast iron), you should pull a test piece of plastic pipe through the old main. | This will help prevent damage to the plastic pipe, when inserted, due to:<br>• Obstructions<br>• Partial withdrawals of the plastic pipe to locate or try to pass an obstruction. |
| **2.** | Use a plumber's tape followed by a small cable to install the pulling cable for the test piece. | Attach a small cable to the back of the test piece so you can pull it back out if you hit an obstruction in the casing. |
| **3** | Before inserting the replacement pipe, locate and clear all obstructions. | These include places that the test piece cannot clear or that damage it unduly. |
| **4** | When steel main is replaced by plastic, avoid destroying cathodic protection to the rest of the steel system.<br>• Check the steel side of the tie-in for protection before and after the work. | This would be more likely to occur on a system protected by a rectifier. |
| **Insert the Pipe** | | |
| **5.** | Take extra precautions to protect the pipe at likely points.<br>• Make sure tie-in excavations are large enough to insert the plastic into the casing without excessive bending.<br>• Do not let the plastic bear against the inside of the casing end or against the edge of the excavation.<br>• Ream casing ends and check carefully to be sure the reamer has not left a rough or sharp edge. | Sharp edges at casing ends can cause extensive damage. |

| | Action | Information |
|---|---|---|
| **6.** | Inspect the pipe for cuts, gouges, grooves, or other harmful imperfections. | |
| **7** | Fuse a straight section of pipe onto the end of the insert.<br>• Plug or cap the pipe end before insertion. | The plug must be secured so soil or moisture cannot enter the plastic and so that the plug cannot be dislodged inside the casing. |
| **8** | Hold a strip or strips of plastic pipe inside the casing at the insertion end.<br>• Insert the pipe into the casing.<br>• Do not force the plastic pipe through the casing. | The replacement plastic pipe rides against the plastic strip rather than on the edge of the casing. |
| **9** | As the plastic is pulled from the casing, watch the exposed portion of the pipe for any serious cuts or grooves.<br>• If 10% or more of the wall thickness is scraped in the gouge area, replace the pipe. | Cuts or gouges indicate a potential trouble spot in the casing, against which the pipe may continue to rub and incur additional future damage.<br>• In such cases, the problem area in the casing must be removed. |
| **10** | After the insertion is complete and the pipe is in its final place, place a plastic donut centering device or a permanent 4" or 5" length of split polyethylene pipe around the replacement pipe at all casing ends or openings:<br>• Secure the split tubing firmly in position with several wraps of plastic tape, or other commercially available products. | This split piece may be of the same diameter as the carrier, or larger, depending on casing size and centered at the casing edge.<br>• This will help protect the replacement pipe, if it should bear hard against the metal casing edge. |
| **11** | If the replacement pipe fits the casing too snugly for split pipe, install a thinner piece of sheet plastic and tape it into place. | For example, 3" plastic to be inserted into a 4" cast iron. |
| **Insert the Pipe** | | |
| **12.** | Install bridging where the casing has been removed or separated (such as tie-in connections, etc.) and at places where abnormal loads may occur. Use either of these:<br>• Full encirclement bridge (4" plastic encircling 3" plastic, for example)<br>• Half sleeve bridging. | Bridging provides support for plastic pipe.<br>• Bridging should be PVC electrical conduit or equivalent, non-conductive material.<br>Bridge is not usually needed if the main will not be subjected to excessive loads. In this case, it is normally sufficient to:<br>• Compact the backfill carefully up to the bottom of the plastic pipe.<br>• Protect the pipe with split plastic selves at the casing entry/exit points. |

| | Action | Information |
|---|---|---|
| **13** | Support the bridging.<br>• Full encirclement – carefully compact the fill up to the bottom of the bridging.<br>• Half-sleeve – carefully compact the fill up to the bottom of the replacement pipe.<br>Do not insert any supporting material other than plastic sheeting or split plastic pipe at the casing ends. | Do not block under any other locations along the plastic carrier pipe with anything other than rock free compacted soil.<br>Do not support bridging by the transition side of a compression coupling.<br>Bridging must be supported from the solid (old main) side of the compression fitting. |
| **Allow for Expansion and Contraction** | | |
| **14** | After the pipe is installed, give it time to approach the ambient ground temperature before making the final cut and tie-in.<br>• If pipe or tubing is exposed to direct summer sunlight, backfill part of the trench and let the pipe cool before cutting it to the proper length or tying it in. | Due to the difference in elasticity, plastic pipe expands and contract with changes in temperature more than steel pipe does. This is even more critical when the pipe does not have any excess slack, such as when inserting it casing, and especially when the plastic pipe fits the casing snugly. |
| **Backfill, Pressure Test, and Tie-in** | | |
| **15** | Backfill as required. | Because of the nature of insertion there is a great deal less to backfill. Where backfilling is need, use the same procedure as for coated steel pipe. |
| **16** | Pressure test the pipe as required | See Module 421: Pressure Testing Steel and Plastic Pipelines. |
| **17** | Tie the pipe in according to approved procedures. | See Training Module 411: Plastic Pipe Fusion. |

## 4.4 CASINGS (192.323)(a)(b)(c)(d)

All casing used on a or main under a railroad or highway will be designed and installed as follows:

(a) The casing must be designed to withstand the superimposed loads.

(b) If there is a possibility of water entering the casing, the ends must be sealed.

(c) If the ends of an un-vented casing are sealed and the sealing is strong enough to retain the maximum allowable operating pressure of the pipe, the casing must be designed to hold this pressure at a stress level of not more than 72 percent of SMYS.

(d) If vents are installed on a casing, the vents must be protected from the weather to prevent water from entering the casing.

The bore hole for the casing or carrier pipe should not be more than 2" larger than the outside diameter of the piping and should be made as close as possible to a 90° angle with the road bed or railroad track

## CUSTOMER METERS AND REGULATORS; SUBPART H

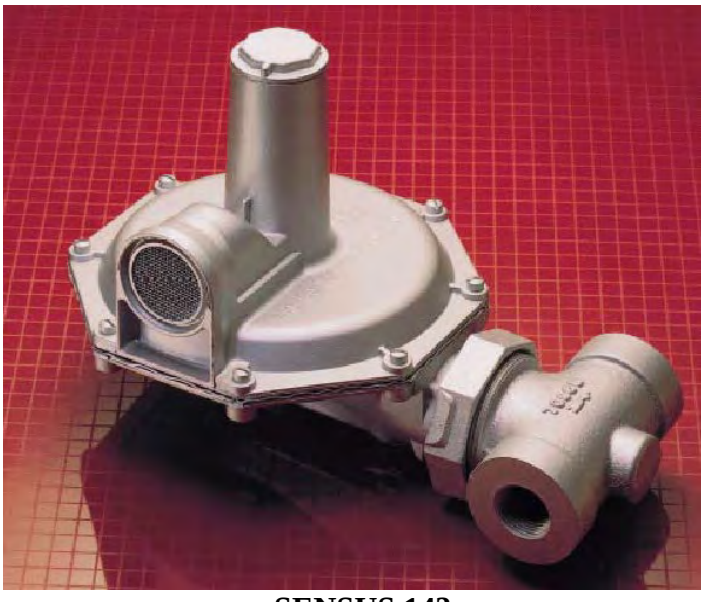
### 4.5 CUSTOMER METERS AND REGULATORS; LOCATION (192.353)(a)

Each meter and service regulator, whether inside or outside a building, must be installed in a readily accessible location and be protected from corrosion and other damage, including, if installed outside a building, vehicular damage that may be anticipated. City of Carencro provides gas service to both residential and commercial customers. Presently, most gas meters and regulators are located at the property line. This practice provides protection for the gas meter installation and enables the gas maintenance crew access to all meters and cut-off valves. Customer cut-off valves are installed below the customer regulator in a manner that makes for easy accessibility.

Outdoor meters are protected from potential damage and sheltered from water runoff, falling ice, vehicles, or other conditions that can cause corrosion or damage. They should be at least three feet from any possible ignition sources, and must also be a safe distance from building openings or air intakes.

### 4.6 CUSTOMER METERS AND REGULATORS; PROTECTION FROM DAMAGE (192.355)(a)(b)

City of Carencro gas distribution systems use the Sensus 143 service regulator for providing low pressure to customer residence and commercial structures. There is no customer equipment provided natural gas by the City of Carencro that could cause or create either a vacuum or back pressure on the gas distribution system. Regulator vents and relief vents terminate outdoors. The vents are installed in such a way that they prevent rainwater and/or insects from entering and are located in areas where gas from the vent can escape freely into the atmosphere and away from any opening into the structure. Care is taken to prevent installation of service regulator vents in areas where submergence or flooding may occur. The following pages provide detailed drawings and specifications for the Sensus 143 service regulator used by City of Carencro. Below is a pictorial of the Sensus 143 service regulator.



**SENSUS 143**

THE GAS INDUSTRY

R-1307 R1

# Sensus Metering Systems

## Residential Service Regulators
### Models 143-B and 043-B

## Rugged and reliable 125 psig working pressure regulators.

The Model 143-B and its compact companion 043-B are designed to deliver reliable and safe regulation of natural gas, air, nitrogen, carbon dioxide, propane and other non-corrosive gases for residential, light commercial and light industrial applications. Outlet pressures between 3-1/2" w.c. and 2 psi are available. The operating temperature range is –20°F to 150°F (-28.9°C to 65.5°C).

Both models are equipped with an internal relief valve with passages designed to maximize the release of gas as quickly and efficiently as possible. The IRV is set to relieve at 7" to 10" w.c. above normal outlet pressure settings.

These regulators are also equipped with an extra large, removable, insect-proof, stainless steel screened vent to resist freeze-up and exclude foreign matter. The vent is threaded 3/4" or 1" NPT.

Made in USA

SENSUS METERING SYSTEMS

# Residential Service Regulators

Model 143-B Model 043-B

## Construction

**Valve Body** – Cast Iron, 125 psig working pressure
**Spring and Lower Case** – Die-Cast Aluminum
**Spring – 5 spring ranges**, 3-1/2" w.c. – 2 psi
**Orifice – Brass** – 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2"
**Valve Seat** – One-piece molded Buna-N
**Fulcrum Pin** – Brass
**Throat/Support/Stem Guide** – Cast Aluminum, integral to lower case
**Diaphragm Plate** – Plated Steel
**Diaphragm** – Polyester fabric reinforced Buna-N with integral relief seat and case flange seal
Model 143-B – 6" cut
Model 043-B – 4" molded, roll-out
**Vent Valve** – Precision-fit Polypropylene valve and seat
**Adjustment Screw** – ABS Cycolac
**Closing Cap** – ABS Cycolac with integral relief valve stop and a hole for tamper seal wire

## Corrosion Protection

Each precision die-cast aluminum casing is treated inside and out and is dipped in a chromate-base primer. This greatly inhibits the oxidation of metal surfaces that may eventually compromise the integrity of the metal. A finish enamel topcoat further protects the regulator. Valve bodies may be coated with yellow zinc chromate, clear zinc, E-coat or hot dipped galvanizing.

## High Tensile Strength Valve Bodies

The Model 143-B has a high tensile strength cast iron body that rotates 360 degrees. The 043-B rotates in 90 degree increments. Available body sizes include:

- Both Models – 3/4" x 3/4", 3/4" x 1", 1" x 1"
- Model 143-B – 3/4" x 1-1/4", 1" x 1-1/4", 1-1/4" x 1-1/4"
- Model 043-B – 3/8" x 3/8", 1/2" x 1/2"

## Options

Regulator vent openings should face downward (6 o'clock) to minimize blockage from ice and snow. If this is not possible, a plastic elbow vent with a protective screen is available to screw into the vent. Other options:

- 2 psig Regulator
- Seal Wires
- Angle Body

SENSUS METERING SYSTEMS

805 Liberty Boulevard
DuBois, PA 15801
800-375-8875
Fax: (814) 375-8460
www.sensus.com
(open "North America Gas")

## 4.7 CUSTOMER METERS AND REGULATORS; INSTALLATION (192.357)(a)(b)(c)(d)

Customer meters and regulators installed by City of Carencro are installed so as to minimize anticipated stresses upon the connecting piping and the meter. Material used during the installation process is made of metal fittings with a wall thickness meeting the minimum wall thickness requirements of 192.357(c). Under no conditions will City of Carencro provide service to or set a gas meter at an installation where the customer has used above ground plastic piping, including PVC or Polyethylene for the customer house line. City of Carencro makes every attempt to avoid placing gas meters in areas that would allow venting gas to vent into the house or structure such as near windows, doors or breezeways. Each regulator that might release gas in its operation must be vented to the outside atmosphere.

Meters should be installed outside whenever it is practical to do so, but if they are indoors, they must be installed in a well-ventilated area. They must not be installed in any confined areas, or in living quarters, closets, bathrooms, or similar areas. Like outdoor meters, they must also be at least three feet from any potential ignition source or any source of heat that might damage the meter. In all cases, the upstream regulator in a series is located outside the building. Indoor meters must have a readily accessible shut off valve installed outdoors.

There are a number of conditions that can make a meter set unsafe. These include:

- Misalignment
- Damage
- Corrosion
- Burial and Overbuilding
- Improper Location

Any meter found to be unsafe or potentially unsafe is to be reported to the dispatcher or Superintendent for correction or repair.

When service to a customer has been discontinued and the meter and regulator removed, the valve below the meter on the service riser is turned off. Each service riser and valve is equipped with a place to lock-off the service valve when gas service is discontinued. When service is discontinued, the gas is turned off and a locking device is installed at the service valve until service is reinstated to the residence or commercial building. The locking device is designed to allow manipulation of the service valve by authorized personnel only. The customer's piping must be physically disconnected from the gas supply and the open pipe ends sealed

When service is discontinued and the meter and regulator are left in place, the gas is turned off, a locking device is installed at the service valve and a physical barrier should be place in either the inlet or outlet of the meter to prevent any gas from leaking by the valve until service is reinstated to the residence or commercial building. . (See typical Meter Installation, Service Valve and locking device on the following pages).

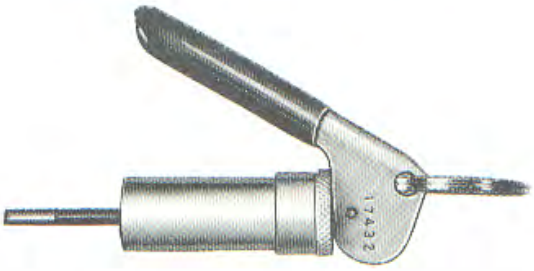
# BROOKS BARREL LOCK

Made of case hardened steel, this lock can be used alone or in conjunction with various clamping devices to effectively lock gas and electric meters and related devices to prevent power theft.

The barrel lock is operated by a special key that is made available only to utility companies. The Brooks barrel lock is also interchangeable with many locks of other manufacture so they can be added to an existing system without any new or different keys.

The locks are also available made from 100% stainless steel for use in areas where corrosion is a problem.

## Brooks Barrel Lock Key




Heavy duty key with vinyl dipped handle for ease of operation and protection. Supplied with number stamped in handle for record keeping and key ring so key may be kept on a chain or retainer to prevent loss or breakage.

Brooks keys are sold only to utility companies. All orders must be accompanied by the name of an individual responsible for receiving the keys.

Safeguarding Industry Internationally Since 1873

BROOKS

PRODUCT NUMBERS

With End Cap—8509910
Without End Cap—8509900
Stainless Steel
with End Cap—8504720
Stainless Steel
without End Cap—8504700
End Cap—8581000
Stainless Steel
End Cap—8582000
Barrel Lock Key—861

BROOKS

E.J. BROOKS COMPANY
164 North 13th Street
Newark, New Jersey 07107-1299
201/483-0335
1-800-458-SEAL
Cust. Svc. Fax: 201-483-4571
International: 201/483-1936

# BROOKS
# BARREL LOCK ACCESSORIES
## ENHANCE SECURITY

## BARREL LOCK ACCESSORIES
## F E A T U R E S

### 1. Portable Seal Adapter for Barrel Lock
Barrel lock is placed through this adapter, slotted to accept the Roto-Seal or other plastic or metal seal. When the barrel lock is in place, the seal is installed to deter unauthorized, undetected entry to the lock. For use with all standard barrel locks. Made of case-hardened, zinc-plated steel.

### 2. Out-of-Service Warning Tags
Made of pliable plastic, this tag reads: OUT-OF-SERVICE. DO NOT DISTURB OR CHANGE THE CONDITION OF THIS VALVE UNDER PENALTY OF LAW. Tag can be used in conjunction with any barrel lock that is exposed.

### 3. Plastic Cap for Seal Adapter
Made from sturdy plastic, cap is placed in the seal adapter of the hardware used with the barrel lock, preventing foreign matter from entering the lock. Cap is slotted so seal can be placed through the seal adapter and cap. Available plain or with logo or initials molded in plastic, in many colors, including a new clear version. Stock color is gold.

### 4. Weather Cap for Barrel Lock
The sturdy plastic weather cap fits over the head of the barrel lock to keep water, insects, dirt and other foreign matter from entering the lock.

### 5. Safety Plug for Barrel Lock
This plastic plug is inserted in the barrel lock key entry hole to prevent foreign matter from entering the lock. Great for use with a seal adapter when the weather cap cannot be used.

BROOKS
E.J. BROOKS COMPANY
164 North 13th Street • Newark, NJ 07107
Fax: (201) 483-4571
1 800 458-SEAL
*Safeguarding Industry Internationally Since 1873*

**Made in U.S.A.**

## 4.8 METER INSTALLATION; OPERATING PRESSURE (192.359)(a)(b)

City of Carencro provides service to customers at different pressures. Generally, the pressure ranges from 4 ounces for residential customers to ten (10) pounds for commercial or industrial customers. H owever, City of Carencro shall not provide pressure on any gas meter installation that exceeds 67% Percent of the manufacture's shell test pressure. New meters purchased from manufacturers must be tested to a minimum go 10 PSIG and rebuilt or repaired tinned steel case meters may not be used at a pressure that is more than 50% percent of the pressure used to test the meter after rebuilding or repairing. T he City of Carencro makes every effort to operate and maintain its gas distribution system including gas mains and services with public safety as its main goal. To accomplish this goal, the City of Carencro personnel makes every effort install and to maintain its gas facilities at the highest safety level possible for its natural gas customers.

Gas meters set at residential customers are set at the property line. Gas meters set at commercial customer locations are set at the building or structure. Below are pictorials of two (2) meter sets. The meter set on the left is an example of a typical property line meter and the meter set on the right is an example of a typical meter set at the building or structure.

**CITY OF CARENCRO**
**TYPICAL METER AND REGULATOR INSTALLATION**

The City of Carencro makes every effort to operate and maintain its gas distribution system including gas mains and services with public safety as its main goal. To accomplish this goal, the City of Carencro Gas Management makes every effort install and to maintain its gas facilities at the highest safety level possible for its natural gas customers.

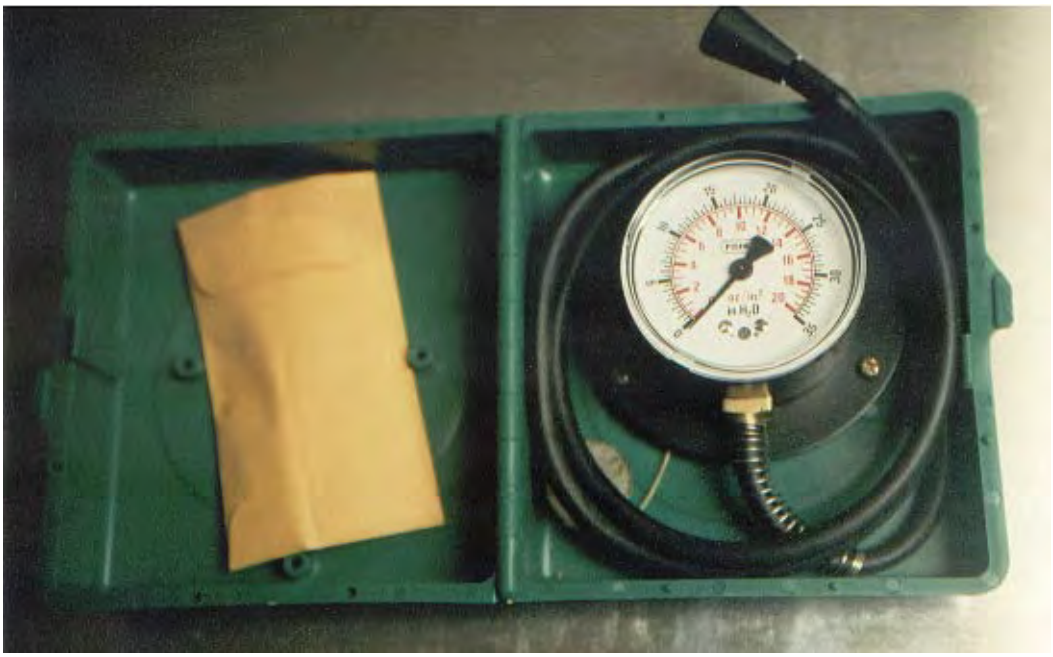
## PRESSURE CHECKS TO ESTABLISH GAS SERVICE

When establishing a new service or re-establishing a service that has been out of service or operation, the pressure must be checked to verify the regulator is controlling the outlet pressure properly. T he following procedure is used to conduct this regulator outlet pressure test.

## REGULATOR OUTLET PRESSURE TEST

1. Disconnect the outlet swivel from the meter. By testing at the outlet the meter is also tested.
2. Connect a pressure test gauge to a pressure testing adapter.
3. Open the shutoff valve slowly.
4. With the gas flowing, measure the pressure.
5. Adjust the regulator to the demand flow rate of 4 ounces if required. If the spring gauge indicates a pressure of four 4 ounces the regulator outlet pressure is correct. If the spring gauge indicates any other pressure either higher or lower than four (4) ounces adjustments are necessary.
    - To increase pressure turn clockwise
    - To decrease pressure turn counter-clockwise
6. If pressure cannot be adjusted to allow a four (4) ounce outlet pressure, replace the regulator.

The spring type pressure gauge pictured below is typical of the type pressure gauge used by City of Carencro when checking regulator outlet pressure prior to turning on gas service to customers.



**SPRING TYPE PRESSURE GAUGE**

## LOCKUP PRESSURE TEST

- After checking the regulator outlet pressure, stop the flow of gas. Regulator must lock up to prevent pressure buildup in the houseline piping when there is no gas demand.
- Measure the lockup pressure. For residential customers, the lock up pressure should be no more than 1" water column above the outlet pressure (6 to 7 inches outlet pressure + 1 inch = 8 inches lockup pressure). If the lockup pressure exceeds 8 inches lockup pressure, replace the regulator.

## ESTABLISHING AND DISCONNECTING GAS

Regardless of whether establishing a new service, re-establishing an old service, or disconnecting a service, always:

1. Verify that you are at the right location.
2. Verify the establishment or disconnection order.
3. Verify that the meter number matches the meter number on the service order.
4. Locate all gas appliances and any gas outlets.
5. Inspect appliances of unsafe conditions such as:
   - Improper connection i.e. Rubber hose connections
   - Missing access covers or compartment doors
   - Safety controls with signs of tampering
   - Appliances requiring venting that are not vented to the outside.
   - Lack of air for complete combustion.
   - Heaters with broken or missing radiant
   - Appliances in a garage, or closet that opens into a garage, with the pilot light less than 18" above floor level.
6. Make sure all appliances are shut off at the valve farthest down stream.
7. Check all appliance connectors. Flexible connectors should have an identification ring with an American Gas Association seal of approval.
8. Make sure that any gas outlet not in use are properly capped and/or plugged.
9. Ensure that house piping is satisfactory. All piping and flex connectors are made from approved metallic materials that conform to NFPA 54.
10. Verify that the customer has no above ground plastic piping.
11. Check meter set for atmospheric corrosion
12. Verify that meter is set level, is in good condition, well supported and that the service valve is easily accessible.
13. Inspect to make sure the meter is isolated form electric currents sources such as TV grounds, telephone grounds and electrical grounds
14. Test the insulated swivel to verify that the gas service is isolated from the customer house line.
15. Inspect the regulator to verify that the regulator vent is facing down, has a screen cover and that the meter is protected from rain, ice, and insects.

## Conduct a Low Flow Test

A low flow test is conducted to verify that the meter is registering small amounts of gas flow through the meter such as require to burn a single pilot light. This is to make sure that the meter can detect very low gas flows. To conduct a low flow test use the following procedure:

1. Make a low flow test using a low flow adapter to check proper meter operation or Slightly open the outlet swivel to allow a small amount of gas to escape.
2. With the outlet swivel slightly opened, turn on gas slowly at the shut off valve.
3. Observe the quarter foot (1/4') or half foot (1/2') test hand on the meter dial. If the hand does not move, the meter is not operating properly and must be replaced.
4. Shut off gas at the gas shutoff valve.

## Conduct a Shut-In Test

A shut in test is required by the National Fire Protection Association (NFPA) Publication 54 any time you establish gas service to a customer. This test pressures the customer's house line piping to ensure it is gas tight. For the test to be effective, turn off the gas supply to all appliances and other outlets. Cap any gas lines that do not have isolation valves and an appliance connected. This test can be accomplished by two different methods, however, both require pressuring the customers house line. The test can be done using air or conducted using natural gas. Use one of the following procedures for conducting the shut-in test:

## Test Using Air

1. Pressure the customer's piping with air to a minimum of 5 psi.
2. Hold pressure in customer piping for a minimum of 15 minutes if re-establishing gas to a customer meter that has been discontinued.
3. Connect a spring test gauge or manometer to determine if the piping system is 100% gas tight.
4. If the piping is **not** 100% air tight, either locate and repair leaks until test holds air tight OR
5. Turn off and lock meter stop cock and advise customer to have a licensed plumber repair leaks.
6. If you are establishing service to a new customer (new house/building) customer must have a pressure test record from a licensed plumber.

## Test Using Gas

1. Open the outlet swivel on the gas meter slightly.
2. Open the gas shut off valve slowly until you observe the quarter foot (1/4') or the half foot (1/2') hand begin to move.
3. Stop the hand on the dial as it begins its upswing at a mark on the dial by re-tightening the outlet swivel.
4. Observe the quarter foot (1/4') or the half foot (1/2') hand to determine if there is movement. If there is movement, this indicates a gas leak. If the hand does not move, this indicates 100% gas tight. The hand should be observed for approximately 2 to 4 minutes.

## Purging Customers House Line

Once you have determined that the customers' house line is 100% gas tight, you may proceed to start lighting the appliances. However, it is important to purge the house line of all trapped air. To accomplish this follow this procedure:

1. Eliminate all potential ignition sources. Explain to the customer what you are doing.
2. Fully purge air form the line at each appliance to the farthest downstream valve on the appliance fuel line.
3. Purge air from all unused gas outlet and properly recap or plug gas piping. ( When purging air from the line there is usually a distinct difference in the sound of air escaping from the piping than gas escaping from the piping). Never use a match or candle to verify purge. Use the CGI on the LEL scale.

## Lighting Appliances

When lighting appliances after an outage, visually check for proper installation of piping and venting. Never re-light any appliance or gas burning equipment in service if an unsafe condition exists. After re-lighting the appliance and placing equipment in service, observe the appliance or equipment in operation. Do not leave an appliance in service if unsafe conditions are found. Any conditions found to be unsafe must be reported to the customer and must be repaired prior to turning on the gas. Turn off gas and lock valve until unsafe conditions are corrected. **Never** light a new appliance. The company that installed the new appliance should light the appliance. Below are procedures for lighting appliances:

### AUTOMATIC PILOT SYSTEMS

| | Action | Information |
|---|---|---|
| **1.** | Shut off all gas to the appliance. | This includes both pilot and main burner gas |
| **2.** | Turn the thermostat all the way down. | You also may need to turn off the electric power. |
| **3.** | Wait 5 minutes | This gives the supply time to vent out. **Caution:** make sure the gas is vented completely before lighting the pilot. |
| **4.** | Turn on the gas to the pilot. | |
| **5.** | Turn the control knob to the pilot position. | |
| **6.** | Press the pilot button and light the pilot using a lighter stick or match. | |
| **7.** | Wait 30 seconds, then release the pilot button | |
| **8** | Turn on the main gas valve. | |
| **9** | Turn up the thermostat. | Make sure the system heats up properly |
| **10** | Cycle the system on and off after relighting it to make sure:<br>• The thermostat is controlling properly<br>• The safety turns off the gas if the pilot goes out. | Your class leader will describe Company policy and procedures for testing automatic pilot systems. |

## APPLIANCE CHECKOUT AFTER LIGHTING PILOT

| | Action | Information |
|---|---|---|
| **All Appliances** | | |
| **1** | Check all wiring connections. | |
| **2** | Make sure that thermostat is at the lowest setting. | |
| **3** | Turn on the main gas supply and the manual valve on the gas valve. | |
| **4** | Turn on the electrical power. | |
| **5** | Set the thermostat to high, calling for heat. | Sparking should begin, and the pilot gas should ignite. When the pilot flame contacts the sensor, the main burner will come on. |
| **6** | With the main burner on, cycle the thermostat off, then on again.<br>• Ensure system shuts down properly. | This checks the thermostat's ability to control the system. |
| **7** | With the main burner on, turn the manual gas valve off.<br>• Wait until all flame is out, then turn the manual gas valve on again. | Sparking should begin as soon as the pilot flame is out.<br>• Pilot ignition takes place when the gas flow is restored. |
| **8** | If this is a lockout system, with the main burner on, turn the manual gas valve off. | On a lockout system sparking will begin when the pilot flame goes out. After 60 seconds, the system will lock out and sparking will cease. |
| **9** | Restart the system:<br>• Turn the thermostat to the lowest setting for up to a minute.<br>• Set it high again.<br>• Turn the main valve back on. | |
| **10** | Visually determine that the main burner is burning properly, as it was during the Pre-installation Safety Inspection.<br>• Adjust the primary air shutter(s) as required. | There should be no floating or lifting flames, and no flashback. |
| **11** | If necessary, check manifold pressure.<br>• Adjust the pressure regulator (if necessary) to match the original input. | Compare the readings with those in the Pre-installation Safety Inspection Procedures. |

## FURNACES AND BOILERS

| | Action | Information |
|---|---|---|
| **Furnaces Only** | | |
| **12** | Check the fan limit control for proper operation.<br>• To check the fan control, shut the fan off and let the furnace heat until it reaches its upper limit.<br>• Make sure that the limit control acts to shut off the main burner gas. | You will hear the limit control click and the burner will shut off. |
| **Boilers Only** | | |
| **13** | Determine that the circulating water pumps are in operating condition. Test all of the following:<br>• Low water cutoffs<br>• Automatic feed controls<br>• Pressure and temperature limit controls<br>• Relief valves. | Follow the manufacturer's recommended procedures. |
| **14** | If the system has functioned normally, return the thermostat to its normal setting. | |

**WARNING!**
**NEVER LIGHT A PILOT ON A WATER HEATER**
**WITHOUT THE WATER BEING TURNED ON**
**NEVER LIGHT A HEATING SYSTEM**
**WITHOUT THE ELECTRICTY BEING TURNED ON**

## 4.9 SERVICE LINE INSTALLATION (192.361)(a)(b)(d)

The City of Carencro has chosen either of the two following piping systems, which include, Driscopipe 6500 or Plexco polyethylene piping for all new gas services installed in the gas distribution system. Gas service lines installed in the City of Carencro gas distribution system will be installed as follows:

A. Depth: Each buried service line must be installed with at least 18 inches of cover in private property and at least 24 inches of cover in streets and roads. However where an underground structure prevents installation at those depths, the service line must be able to withstand any anticipated external load.

B. Support and backfill: Each service line must be properly supported on undisturbed or well compacted soil, and material used for backfill must be free of material that could damage the pipe or it's coating.

C. Grading for drainage: Where condensate in the gas might cause interruption in the gas supply to the customer, the service line must be graded so as to drain into the main or into drips at the low points in the service line.

D. Protecting against piping strain and external loading: Each service line must be installed so as to minimize anticipated piping strain and external loading.

E. Installation of service lines into buildings: Each underground service line installed below grade through the outer foundation wall of a building must:
   - In the case of a metal service line, be protected against corrosion.
   - In the case of plastic service line, be protected from shearing action and backfill settlement.
   - Be sealed at the foundation wall to prevent leakage into the building.

See procedure for installing polyethylene services on the following page.

## PROCEDURE FOR INSTALLING STEEL SERVICES

| | Action | Information |
|---|---|---|
| **Depth/Trenching** | | |
| **1.** | Dig the trench as straight as possible taking care to allow a minimum of 24" cover after backfilling. | |
| **2.** | The trench should be dug in such a manner that the bottom of the trench is level and free of hills and valleys. | The service line should be supported |
| **3** | If foreign objects make it impossible to achieve 12" cover some type of protection will be provided. | |
| **Installing the Service Line** | | |
| **4.** | Inspect the steel pipe prior to installing pipe in trench. | Pipe coating should be free of cuts, scratches or gouges. |
| **5.** | Lower the steel service into the trench and make every effort not to drag or allow pipe to rub against side of trench.. | This helps protect the coating from damage. |
| **6.** | Backfill with approximately 3 to 5 inches of loose rock free backfill dirt. | |
| **Installing the Service Riser and Service Cut Off Valve or Stop Cock** | | |
| **10.** | Using the pipe bending tool, bend pipe into service riser. | Inspect area of piping that was bent and apply shrink tape or mastic in area of bend. |
| **11.** | The top of the service riser should be above ground approximately 6 to 8 inches. | The service riser valve or stop cock is required to be accessible in the event of an emergency. |
| **12.** | Screw the service riser valve or stop cock onto the service riser. Valve must be set in a position that makes it easily accessible in the event of emergency. | See typical service risers and valves in this section. |
| **Backfilling** | | |
| **13.** | Complete the backfill process by filling the trench and packing the dirt into the trench. | |
| **14.** | Cadweld a seven strand insulated wire from the main to the service piping. | This is to make sure that the service line is in electrical continuity with the gas main for cathodic protection purposes. |
| **15** | Pressure test the service line based on the MAOP and soap test all fitting not pressure tested. | All piping above an MAOP of 1 psig requires a 90 psi pressure test. |

## PROCEDURE FOR INSTALLING PLASTIC SERVICE

| | Action | Information |
|---|---|---|
| **Depth/Trenching** | | |
| **1.** | Dig the trench as straight as possible taking care to allow a minimum of 24" cover after backfilling. | |
| **2.** | The trench should be dug in such a manner that the bottom of the trench is level and free of hills and valleys. | The service line should be supported |
| **3** | If foreign objects make it impossible to achieve 24" cover some type of protection will be provided. | |
| **Installing the Service Line** | | |
| **4.** | Inspect the polyethylene pipe prior to installing pipe in trench. | Pipe should be free of cuts, scratches or gouges. |
| **5.** | Lower the plastic pipe into the trench allowing it to "snake" and not be stretched tight. | This allows for expansion and contraction. |
| **6.** | Backfill with approximately 3 to 5 inches of loose rock free backfill dirt. | |
| **Installing the Tracer Wire** | | |
| **7.** | Install a minimum of number 12 gage insulated wire above the plastic pipe. | Take care **not** to allow the wire to come in contact with the plastic pipe. |
| **8.** | Tracer wire connections made under ground should be made with split bolt connectors and wrapped or coated to prevent corrosion. | |
| **9.** | Tracer wire should be either bonded to the steel main or attached to the tracer wire over the PE main and bonded or mechanically attached to the service riser. | |
| **Installing the Service Riser and Service Cut Off Valve or Stop Cock** | | |
| **10.** | Attach the anodeless transition service riser to the end of the service line with the compression coupling provide on the anode-less riser. | See Anodeless risers in this section. |
| **11.** | The top of the service riser should be above ground approximately 6 to 8 inches. | The service riser valve or stop cock is required to be accessible in the event of an emergency. |
| | **Action** | **Information** |

| | | |
|---|---|---|
| **12.** | Screw the service riser valve or stop cock onto the service riser. Valve must be set in a position that makes it easily accessible in the event of emergency. | See typical service risers and valves in this section. |
| **Backfilling** | | |
| **13.** | Complete the backfill process by filling the trench and packing the dirt into the trench. | |
| **14.** | PE piping must be allowed to reach ambient temperature before tie-in is made? | |
| **15** | Pressure test the service line based on the MAOP and soap test all fitting not pressure tested. | |

## 4.10 SERVICE LINE: VALVE REQUIREMENTS (192.363)(a)(b)(c)

The City of Carencro has installed a service line valve that meets the applicable requirement of Subpart B and D of §192.363. These valves are located above ground below the service regulator. Valves incorporated in a meter bar, that allows the meter to be bypassed is not used as a service line valve by the City of Carencro.

A soft seated service line valve will not be used if its ability to control the flow of gas could be adversely affected by exposure to anticipated heat.

Service line valves on high pressure service lines installed above aground or in an area where the blowing of gas would be hazardous, must be designed and constructed to minimize the possibility of the removal of the core of the valve with other than specialized tools.

On the following page are service valves used by the City of Carencro.

## 4.11 SERVICE LINES: LOCATION OF VALVES (192.365)(a)(b)(c)

Service line valves in relation to the regulator or meter are installed so that the service line valve is installed up-stream (below) of the regulator or, if there is no regulator, upstream of the meter.

Service line valves located outside must have a shutoff valve in a readily accessible location outside the building and high enough above ground level so that it does not become buried or covered with landscaping materials. These valves may be required to be shut off and lock off in the event of a fire or emergency.

Service line underground valves must be located in a covered durable curb box or standpipe that allows ready operation of the valve and is supported independently of the service line.

## 4.12 STEEL LINES: CONNECTIONS TO CAST IRON MAINS (192.369)

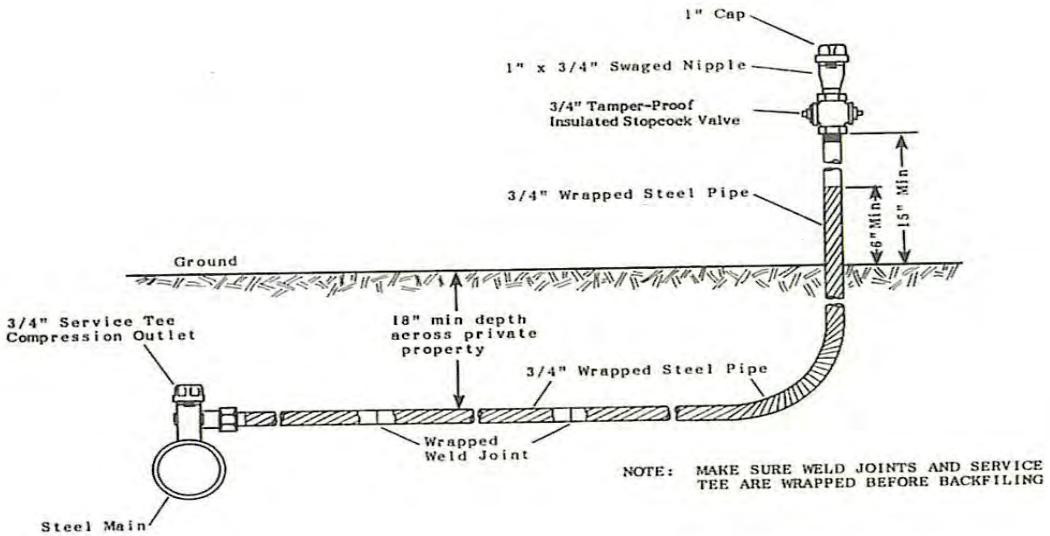
Service lines connected to a cast iron main must be connected by a mechanical clamp, drilled and tapped or by another method meeting the requirements of §192.273. The procedure used by the City of Carencro for tapping cast iron mains for service taps is by using Continental Industries, Inc., Perfection Permalock or equal steel bolt-on self tapping tees sized for cast iron. The service line outlet will be the same diameter as the service line to be tapped. The bolt on clamp to be connected to the steel main shall be for the same diameter as the main to be tapped.

### SERVICE RISERS

The City of Carencro previously made its service risers for all new services by using a pipe bender to bend the service piping into the service riser. The area of the bent service is inspected for coating defects and R-28 Mastic or Shrink Tape is applied to damaged section of pipe before burial. Mueller or McDonald plug valves are used by City of Carencro and are installed below the service regulator and above ground.

When installing services off of polyethylene mains, transition risers are used to convert from plastic services to steel above ground when exiting the trench. This transition fitting is in the form of anode-less meter risers, transition risers or compression risers with either high-pressure plug style or ball style meter cut-off valves. All services risers used by the City of Carencro meets ASTM D2513 and Department of Transportation (DOT) 192.283 standards. Mueller or McDonald ball valves are used by the City of Carencro and are installed below the service regulator and above ground.

Below is a pictorial of a typical customer gas service line installation. This particular service is an illustration of a plastic service line installation with a zinc or magnesium anode attached to the riser and a tracer wire used for locating purposes. The service is a minimum of 24" below the ground surface with the coated section of the service riser extending at least 8" above ground level. On the following pages is a typical service installation and specifications for the Mueller and McDonald stopcocks used by City of Carencro.

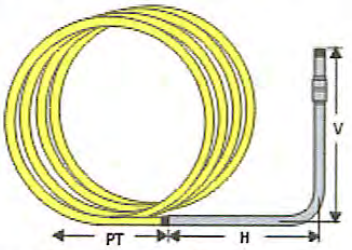


LYALL GAS PIPING PRODUCTS

Updated: **03/15/2003**

# Anodeless Risers, Prebent with Long PE Pipe Runs

**Saves Time and Money when installing complete service lines**




## Anodeless Risers, Long PE Pipe Runs
## 20 foot† Continuous PE Pipe Run

| Steel Outlet* | x | PE Pipe | W/T SDR | V x H x PT | Lyall Part Number | Min. Qty |
|---|---|---|---|---|---|---|
| 3/4" NPT | x | 1/2" CTS | .090/SDR7 | 30" x 28" x 20' | STDLY060010T-20 | 25 |
| 3/4" NPT | x | 1/2" IPS | SDR9.3 | 30" x 28" x 20' | STDLY060050T-20 | 25 |
| 3/4" NPT | x | 3/4" IPS | SDR11 | 30" x 29" x 20' | STDLY060060T-20 | 25 |

* Steel outlet is available in either NPT (Normal Pipe Thread) or BSPT (British Standard Pipe Thread).

## 40 foot† Continuous PE Pipe Run

| Steel Outlet* | x | PE Pipe | W/T SDR | V x H x PT | Lyall Part Number | Min. Qty |
|---|---|---|---|---|---|---|
| 3/4" NPT | x | 1/2" CTS | .090/SDR7 | 30" x 28" x 40' | STDLY060010T-40 | 25 |
| 3/4" NPT | x | 1/2" IPS | SDR9.3 | 30" x 28" x 40' | STDLY060050T-40 | 25 |
| 3/4" NPT | x | 3/4" IPS | SDR11 | 30" x 29" x 40' | STDLY060060T-40 | 25 |

* Steel outlet is available in either NPT (Normal Pipe Thread) or BSPT (British Standard Pipe Thread).

## 80 foot† Continuous PE Pipe Run

| Steel Outlet* | x | PE Pipe | W/T SDR | V x H x PT | Lyall Part Number | Min. Qty |
|---|---|---|---|---|---|---|
| 3/4" NPT | x | 1/2" CTS | .090/SDR7 | 30" x 28" x 80' | STDLY060010T-80 | 25 |
| 3/4" NPT | x | 1/2" IPS | SDR9.3 | 30" x 28" x 80' | STDLY060050T-80 | 25 |
| 3/4" NPT | x | 3/4" IPS | SDR11 | 30" x 29" x 80' | STDLY060060T-80 | 25 |

* Steel outlet is available in either NPT (Normal Pipe Thread) or BSPT (British Standard Pipe Thread).

## Many other PE pipe run lengths are available.

† **Note:** Approximate length shown for the PE pipe runs of each riser size. This length may vary slightly based on the riser size and PE type used. For exact PE pipe lengths and other available options please call Lyall's Customer Service.

Different vertical/horizontal bends are available. The product part numbers shown above, reference the Polyethylene (PE) Pipe as Medium Density - PE 2406 pipe. Other PE pipe choices are available; please call Lyall for more information.

## Lyall - Riser Options:

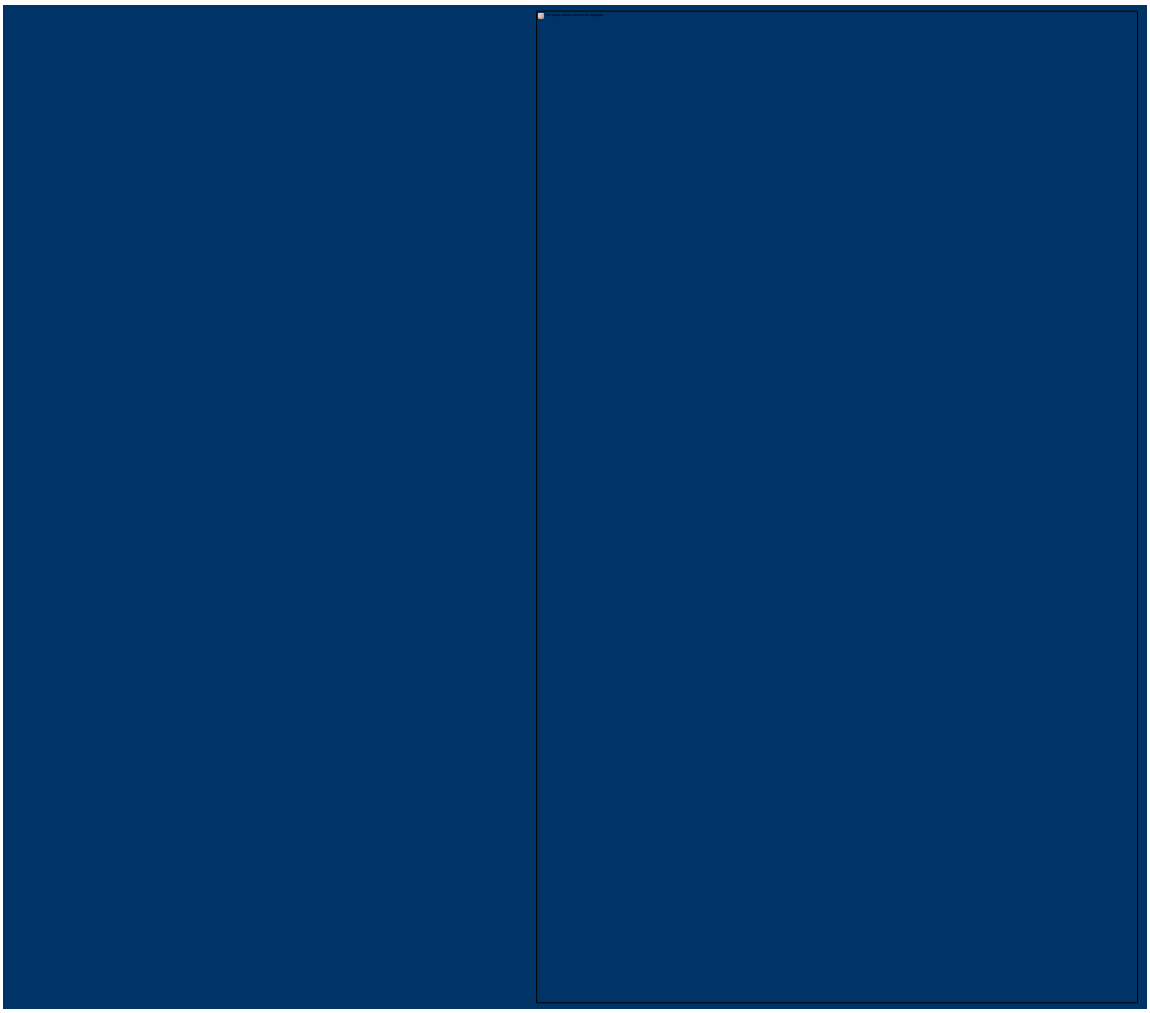
- **LYCOPRO-FINISH - Coastal Corrosion Package**
- **Factory-Installed Shut-off Valves**
- **LYCOFAST Complete Service Line Kits**
- **Riser Wall Brackets and Riser Stakes**
- **Choice of Medium or High Density PE**
- **Protector Sleeves, UV Shields**
- **Tracer Clips and Tracer Wire**
- **Wire Retainers**
- **Bypass Check Valves**
- **Custom Dimensions**

LYALL CUSTOMER SERVICE: (800) 535-9255 • Web site: www.rwlyall.com

**The products listed on this page only represent the most commonly used sizes and configurations. Please contact your local Lyall representative or a Lyall Customer Service representative for additional sizes, customized configurations and available options.**

# Anodeless Riser Specifications

## Specifications:



- Meets or exceeds all requirements for the Categorization of Mechanical Fittings within ASTM D2513-90c Category 1, and requirements from the Code of Federal Regulations, Title 49 part 192.281, 192.283 and 192.375.
- Meets or exceeds NFPA-58-1992.
- Listed with IAPMO/UPC and CSA.
- Pipe Threads conform to ANSI B1.20.1.
- All Gas Carrying Steel parts meet or exceed ASTM A53.
- Casing materials meet or exceed ASTM A53 or ASTM A513.

- All PE Pipe and Tubing components conform to ASTM D2513.
- All Flanges meet ASME/ANSI B16.5 or MSS D2513.
- Cathodic disbonding of electrostatic applied epoxy coating evaluated in accordance with ASTM G8-90.
- Effect of salt spray (fog) on electrostatic applied epoxy coating evaluated in accordance with B117-85

**Performance:**

Proven reliability with over 15 million LYCO® Meter Risers installed since 1973.

**Cost Effective:**

LYCO® Anodeless Meter Risers provide market leading savings with a high level of quality and volume production. The simple design concepts used in the gas-tight PE to Steel transition provides lower component costs with virtually no field repair or replacement time required by the field crews.

**Safety and Dependability:**

The design and production methods used in compressing the gas-tight transition fitting provides a PE to steel joint that is much stronger than the PE pipe itself. In addition, each LYCO® Meter Riser is 100% pressure tested prior to shipment.

**Advanced Features:**

- LYCO® Anodeless Meter Risers meet all DOT 192.281, 192.283, 192.375 and ASTM D-2513 CAT-1 specifications.
- R.W. Lyall & Company pioneered the industry's first anodeless meter riser utilizing a ground level transition between the polyethylene pipe and steel pipe of the riser outlet, eliminating the need for cathodic protection for the gas-carrying steel pipe installed below ground.
- The LYCO® transition fitting provides a leak-proof seal between the smooth ID surface of the polyethylene pipe and the grooved steel spigot.
- An electrostatically applied epoxy coating on the riser casing provides long-term underground corrosion protection of the metal casing and a water tight, below ground seal prevents ground moisture from entering the riser.

Below is a pictorial and specifications of a typical service cut-off valve used by the City of Carencro.

## MUELLER® 500 PSIG LUBOSEAL® METER VALVE ;

- Catalog number---H-11185
- Sizes*---1/2"x1/2"x3/4", 3/4"x3/4", 1"x1", 1-1/4"x1-1/4", 2"x2"
- Meets all applicable parts of D.O.T./CFR TITLE 49 PART 192 and ASME B16.33
- Lockwing head
  Special lubrication system---can be re-lubricated under pressure
- Quad-ring sealed key
- Tamperproof feature
- Inlet and outlet with recessed internal I.P. (F.I.P.) thread
- Available with black (rough) or galvanized finish---1/2" x 3/4" available in galvanized only and 2" available in black only
- Maximum working pressure 500 psig (3450 kPa), 750 psig (5170 kPa) test pressure
- **MUELLER® OPTIONAL EQUIPMENT ; 11.21 – Revision 12-94**

### Carton Quantities

| | | | | |
|---|---|---|---|---|
| 1/2"x1/2"x3/4" | 3/4x3/4 | 1x1 | 1-1/4x1-1/4 | 2x2 |
| 10/Ctn | 10/Ctn | 6/Ctn | 5/Ctn | 2/Ctn |

**H-11185**

### Material specifications

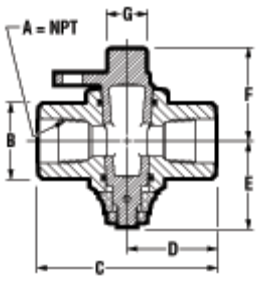
- Body---ductile iron, ASTM A395, Grade 60-40-18
- Key---ductile iron, ASTM A395, Grade 60-40-18
- Key washer---brass (CZ 2000)

### Optional equipment

**H-11199** Relubricating tool Used to relubricate Mueller Luboseal Meter Valves with H-853 lubricant shown below. A hex wrench is built into the tool handle for removal of valve lubricating port pipe plug. One tool fits all valve sizes.

**H-853**

**H-853** Ground key lubricant Used for dry, natural or manufactured gas, air and vacuum applications. NOT recommended for petroleum solvents, mineral oils or concentrated acids or alkalies. Box of 24 #1 sticks




### H-11185 Mueller Luboseal Meter Valve dimensions

| Dimension | Valve size* | | | | |
|---|---|---|---|---|---|
| | 1/2"x1/2"x3/4" | 3/4"x3/4" | 1"x1" | 1-1/4"x1-1/4" | 2"x2" |
| A | 1/2"-14x3/4"-14 | 3/4"-14 | 1"-11-1/2 | 1-1/4"-11-1/2 | 2"-11-1/2 |
| B | 1-27/32" | 1-27/32" | 2-15/64" | 2-43/64" | 3-31/32" |
| C | 4-7/16" | 4-7/16" | 5-3/16" | 5-3/4" | 6-3/4" |
| D | 2-7/32" | 2-7/32" | 2-19/32" | 2-7/8" | 3-3/8" |
| E | 2-11/64" | 2-11/64" | 2-19/64" | 2-7/8" | 3-1/2" |
| F | 2-11/32" | 2-11/32" | 2-5/8" | 3-1/16" | 3-13/16" |
| G | 59/64" | 59/64" | 1-11/64" | 1-27/64" | 1-29/32" |

EST. 1856
McDonald

# A.Y. McDonald Mfg. Co.

## GAS DISTRIBUTION PRODUCTS

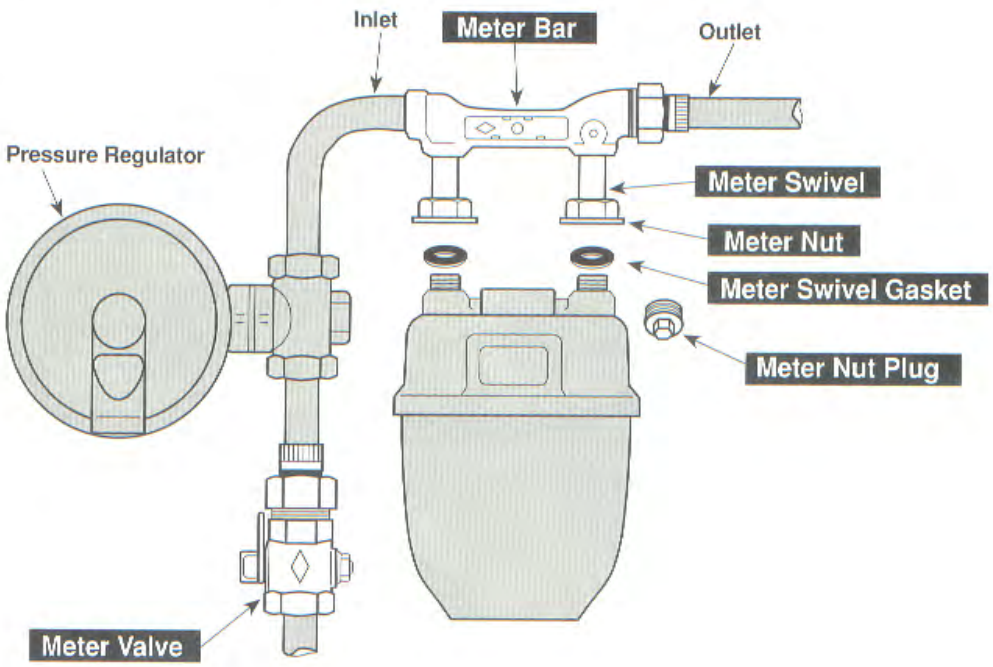
## VALVES

*Serving the gas industry with quality products and service*

*Revised 10-94*

Gas Distribution Products

## General Information



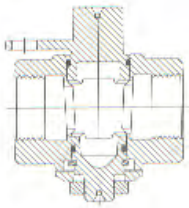

***A.Y. McDonald Mfg. Co.*** has been known in the gas industry for its wide variety of house piping valves, gas meter valves, and curb valves. Through new products it is becoming even more dedicated to serving the needs of gas utilities. The boxed items indicated above are examples of this effort. Our products represent a new era of offerings that are consistent with our state-of-the-art manufacturing facilities and efforts to enhance our gas distribution products.

Traditionally a strong competitor in the industry, A.Y. McDonald Mfg. Co. continues to reinforce its founder's philosophy:

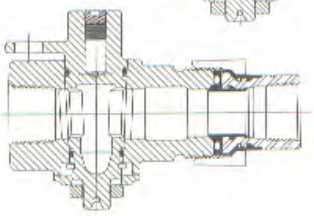
***"WE WILL MAKE GOOD PRODUCTS AND SELL THEM HONESTLY"***

# High Pressure Meter Valves

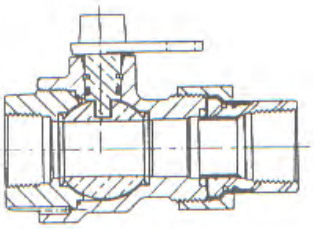
A. Y. McDonald manufactures iron body meter valves in both a plug design and a new ball design with soft seats. The plug style valves are pressure rated at 100 PSIG or 175 PSIG. The soft seat ball type valves are pressure rated at 175 PSIG. All A. Y. McDonald meter valves have a tamperproof feature and come with a flat operating head with or without lockwings. All meter valves meet or exceed ASME/ANSI B16.33 standard.



**100 PSIG Plug Style Meter Valves** are precision machined to assure a precise match between the body and the plug. The machined tapers are then lapped to better retain the sealing lubricant. All valves are assembled with a torque wrench to better control the running or operating torque required to turn the valve.



**175 PSIG Plug Style Meter Valves** are similar to our 100 PSIG valves but can be relubricated while in service. Special machined grooves in the plug channel provide grease to all sealing surfaces. See page 4 for relubing instructions.



**175 PSIG Ball Style Meter Valves** are precision machined and offer bubble tight leak protection both open and closed. Ball Valves offer the added feature of lower and more closely controlled operating torques for the life of the valve. The brass ball rides between two metal reinforced neoprene port seals that require no lubrication. The unique one piece cap/stem has an O-Ring seal and this assembly cannot be removed from the valve. The body and endpiece threads are pinned to prevent disassembly without damaging the valve. No field adjustment or maintenance of this valve is needed.

## Plug and Ball Valve Features

- Valves are designed and tested to comply with ASME/ANSI B16.33.
- 90° rotation provides complete shut-off from open position. Valves can be rotated a full 360°.
- Pressure can be applied from either direction as valves are non-directional.
- Available in traditional lockwing or less lockwing designs. Lockwings accommodate standard barrel locks or padlocks.
- Port openings accommodate traditional stop changers and provide more flow than reduced port valves.
- Valves are intended for use with Natural, Manufactured and L.P. Gas.
- Temperature Range: –20° to +150°F.
- Available in N.P.T. x N.P.T. models and N.P.T. x Insulated or Non-insulated Union Models.
- All valves pressure tested at 1 1/2 times rated pressure in both closed and open positions.

## Material Specifications

| | |
|---|---|
| **BODY/END PIECE** | Cast Iron per ASTM A 126 Class B |
| **PLUG/CAP STEM** | Cast Brass - ASTM B 584/Alloy 83600 or Alloy 84400 |
| **BRASS BALL** | CDA 36000 |
| **BRASS NUTS & WASHERS (Plug Style)** | ASTM B 584/Alloy B83600 or Alloy 84400 or MPIF Std. 35 Code CZ 3002 |
| **O-RINGS/TORQUE SEALS** | Buna-N (Nitrile Rubber) |
| **PRIMARY SEALS (Ball Style)** | Neoprene Rubber |
| **INSULATED TAILPIECE** | Corrosion Resistant Plated Steel coated with Zytel Plastic |
| **UNION NUT** | Malleable Iron per ASTM A 47 |

## 4.13 SERVICE LINES: EXCESS FLOW VALVE PERFORMANCE STANDARDS (192.381)(a)(b)(c)(d)(e)

Excess Flow Valves (EFV) procured by the City of Carencro for use on new, replaced or repaired service line installation that operate continuously throughout the year at a pressure not less than 10 psi will be manufactured and tested by the manufacturer in accordance with industry specifications or the manufacturer's written specifications to ensure that each valve will:

1. Function properly up to the maximum operating pressure at which the valve is rated.
2. Function properly at all temperatures reasonably expected in the operating environment of the service line, at 10 psi
   a. close at, or not more than 50% above the rated closure rated flow rate specified by the manufacturer and
   b. upon closure reduce gas flow.
      - for an excess flow valve designed to allow pressure to equalize across the valve, to no more than 5 percent of the manufacturer's specified closure flow rate, up to a maximum of 20 cubic feet per hour (0.57 cubic meters per hour);
        or
      - for an excess flow valve designed to prevent equalization of pressure across the valve, to no more than 0.4 cubic feet per hour (0.01 cubic meters per hour);
        and
      - not close when the pressure is less than the manufacturer's minimum specified operating pressure and the flow rate is below the manufacturer's minimum specified closure flow rate

3. An excess flow valve must meet the applicable requirements of Chapters 7 and 11 of this Subpart. [49 CFR 192.381(b)]
4 An operator must mark or otherwise identify the presence of an excess flow valve on the service line. [49 CFR 192.381(c)]
5. An operator shall locate an excess flow valve as near as practical to the fitting connecting the service line to its source of gas supply. [49 CFR 192.381(d)]
6. An operator should not install an excess flow valve on a service line where the operator has prior experience with contaminants in the gas stream, where these contaminants could be expected to cause the excess flow valve to malfunction or where the excess flow valve would interfere with necessary operation and maintenance activities on the service, such as blowing liquids from the line

The Excess Flow Valves installed in the City of Carencro Gas Distribution System are manufactured to the Manufacturers Standardization Society of Valve and Fittings Industry, Incorporated Standard Practice SP-115 and covers those EFVs for use with nominal 1/2" through 1 1/4" pipe or tubing sizes and conform to one of the following standards:

a) Steel: ASTM A 53, ASTM A 106, ASTM A 333, ASTM 513
b) Polyethylene: ASTM D 2513

The EFV's shall be capable of operating at temperatures from 0 to 100 degrees Fahrenheit and shall be capable of withstanding the equivalent pressure ratings of the service line and its components, whether steel, polyethylene, or other material. E FV's are tested by the Manufacturer in accordance with ASTM F 1802-97, Standard Test Method for Performance Testing of Excess Flow Valves. E ach EFV shall be marked on i ts outermost surface for installation in accordance with MSS SP-25 with at least the following:

1. Manufacturers identification
2. Type of EFV: Bypass (EFVB) or Non-bypass (EFVNB)
3. Flow direction arrow
4. Size
5. Pressure rating designation
6. Lot identification

The operator for the City of Carencro shall identify the presence of an Excess Flow Valve on each service line where an EFV has been installed. This may be accomplished by documentation or by physically placing a permanent marker on the service line riser or stop cock.

The installation of the EFV on the service line shall be made as near as practical to the fitting/tap connecting the service line to the source of gas supply. A mple space between the tap and the EFV should be considered in the event that maintenance on the service line is required.

Excess flow valves should not be installed on a service line where the operator has prior experience with contaminants in the gas stream and where these contaminants could be expected to cause the EFV to malfunction or where the EFV would interfere with necessary operation and maintenance activities on the service, such as blowing liquids from the line. See procedures for installation and re-setting of EFV's on the following pages.

Prior to installing an excess flow valve on a new or replacement service it is of utmost importance to determine the size or capacity of the EFV. Below is information regarding what the EFV is designed to accomplish, where to install the EFV, and how to determine the size of the EFV needed for each service line.

## EXCESS FLOW VALVE (EFV)

Q1 **WHAT IS AN EXCESS FLOW VALVE?**

A1 AN EXCESS FLOW VALVE STOPS THE FLOW OF NATURAL GAS WHEN THE CAPACITY OF THE EFV IS EXCEEDED OR WHEN THE EFV SENCES A LINE BREAK DOWNSTREAM.

Q2 **WHEN DO I BEGIN INSTALLING EFV's?**

A2 ALL GAS DISTRIBUTION SYSTEMS ARE REQUIRED TO INSTALL AN EFV ON EACH NEW OR REPLACEMENT/REPAIRED SERVICE BEGINNING JULY 1, 2008.

Q3 **WHERE IN THE SERVICE LINE DO I INSTALL THE EFV?**

A3 EFV's MUST BE INSTALLED AS CLOSE TO THE GAS MAIN AS POSSIBLE.

Q4 **WHAT SIZE EFV IS REQUIRED FOR EACH NEW OR REPLACEMENT SERVICE?**

A4 EFV's COME IN DIFFERENT SIZES OR CAPACITIES (THE AMOUNT OF GAS FLOW THROUGH THE EFV). MANUFACTURERS RECOMMEND THAT YOU SIZE THE EFV TO EACH CUSTOMER 30% HIGHER THAN THE TOTAL CAPACITY OF THE HOME OR RESIDENCE.

Q5 **HOW DO I DETERMINE THE CAPACITY OF GAS NEEDED FOR EACH CUSTOMER?**

A5 CAPACITY OF EACH GAS CUSTOMER RESIDENCE IS CALCULATED AS FOLLOWS:

1. CHECK THE BTU RATING ON E ACH GAS APPLIANCE (STOVE, WATER HEATER, FURNACE, GAS GENERATOR OR OTHER GAS APPLIANCES)
2. ADD THE TOTAL BTU RATING OF EACH APPLIANCE.
3. DIVIDE THE TOTAL BTU RATINGS BY 1000.
4. THE RESULTS IS THE **CUBIC FEET OF GAS PER HOUR** REQUIRED TO OPERATE ALL GAS APPLIANCES SIMALTANEOUSLY.

| | | |
|---|---|---|
| **EXAMPLE:** | STOVE | – 95,000 BTUs |
| | WATER HEATER | – 65,000 BTU's |
| | FURNACE | - 130,000 BTU's |
| | TOTAL BTU's | 290,000 BTU's |

DIVIDE TOTAL BTU's **290,000** BY **1000** = **290 CUBIC FEET PER HOUR**
SIZE OF EFV SHOULD BE **30% HIGHER** THAN TOTAL BTU OR:
290 X .30 = 87 290 + 87 = 377

IN THIS EXAMPLE THE EFV SHOULD BE RATED TO PASS A MINIMUM OF 377 CUBIC FEET OF GAS PER HOUR.

**REMEMBER: IF THE EFV INSTALLED CANNOT PASS THE TOTAL AMOUNT OF GAS REQUIRED IT WILL SHUT OFF – IN THE EXAMPLE YOU HAVE NOT INCLUDED A GAS GENERATOR. IF ONE IS INSTALLED, WHEN IT COMES ON THE GAS FLOW REQUIRED TO OPERATE THE GENERATOR WILL EXCEED THE CAPACITY OF THE EFV AND THE EFV WILL SHUT OFF.**

Q6 **IF THE EFV SHUTS OFF HOW DO I RESET IT?**

A6 EFV'S ARE DESIGNED SO THAT THERE IN NOT A 100% STOPPAGE OF GAS. IN OTHER WORDS A S MALL AMOUNT OF GAS CONTINUES TO LEAK THROUGH THE EFV. T O RESET THE EFV PERFORM THE FOLLOWING:

A. SQUEEZE OFF THE GAS SERVICE LINE DOWNSTREAM OF THE EFV TO STOP THE SMALL FLOW OF GAS.
B. TURN OFF THE VALVE AT THE METER AND REPAIR THE SERVICE LINE.
C. REMOVE THE SQUEEZE TOOL. A SMALL AMOUNT OF GAS WILL BEGIN FLOWING THROUGH THE EFV. W HEN THE GAS PRESSURE ON THE DOWNSTREAM SIDE OF THE EFV EQUALS THE GAS PRESSURE ON THE UPSTREAM THE EFV SHOULD RESET AUTOMATICALLY.
D. TURN OF THE GAS SHUTOFF VALVE AND RELIGHT APPLICANCES.

## PROCEDURE FOR INSTALLING EFV'S

| | Action | Information |
|---|---|---|
| **Inspect EFV'S Prior to Installation** | | |
| 1. | Inspect each Excess Flow Valve for:<br>• Cleanliness<br>• Shipping Damage<br>If the EFV is damaged, do not use and report according to Company policy | Verify that the EFV is clean of dirt, debris and grease. This fitting may be joined using the fusion process or by mechanical means. Use either fusion procedures or fitting procedures when installing. |
| 2. | Make sure the fusion equipment adapters are the proper size for the pipe to be fused. | |
| **Location of EFV Installation** | | |
| 3 | EFV's are to be installed as close to the gas main as possible. | If the EFV is not installed near the gas main and the gas line is cut, severed or damaged between the main line and the EFV, the EFV will not perform its intended function which is to shut off the flow of gas. |
| **Proper EFV Alignment** | | |
| 4 | The arrow on the EFV must always be pointed in the same direction as the flow of gas in the pipe. | The EFV will not function if it is installed against the flow of gas. It is essential that the direction of the arrow on the valve be pointed in the same direction as the flow of gas. |
| 5 | Verify that no dirt, debris or partials in the valve.<br>• Dirt, rocks, liquid or other particles can cause the valve to malfunction. | Keep the valve out of dirt and keep the protective casings on until the valve is to be joined to the line. |
| 6 | Avoid excessive pressure at couplings. | The valve mechanism can be impaired by damaging the metal casing at installation. Do not over-twist threaded valves or apply excessive pressure to coupling mounts. |
| 7 | Use wrench only where marked. | **Do not** wrench between indentations (crimps). |
| 8 | For proper seal on transition end, insert polyethylene pipe over stiffener and into fittings. Tighten nut until it bottoms on fitting. | See specific fittings manufactured installation notice for further details. |
| 9 | Lock type compression fittings are required on plain end; stab type valves at tee or installation point. | |
| 10 | Keep welding flame at ends of casing. Where welding is used to install the valve, flame must be confined to the extreme ends of the casing. | Careless application of flame to the center of the device could cause melting of the mechanism. Wet rag procedures should be followed on all weld type installations. |

| | Action | Information |
|---|---|---|
| 11 | No customer modifications should be made to standard models supplied. | Compression and weld end models should not be threaded in the field. |
| 12 | All valves supplied in plain polyethylene tubing must be used with mechanical couplings or be butt fused into place to prevent movement of the valve body. Socket fusion or electro-fusion connections must provide a positive stop on the inlet and outlet side of the valve. | |
| 13 | Valve models incorporated into PE fittings should use protection sleeves to eliminate stress risers | Required on models 30 and 39 but not necessarily limited to these. |
| 14 | All valves supplied can be tested to DOT Code 192 requirements for maximum allowable operating pressure. | |
| 15 | Series 1800 – High Capacity Valves should not be used on service line diameters of less than ¾" IPS or 1" CTS. | |

## PROCEDURE FOR RE-SETTING CLOSED EFV'S

| | Action | Information |
|---|---|---|
| 1 | Most EFV's do not have a 100% shut off should the gas line downstream of the EFV become cut, damaged or severed. | A small amount of gas continues to leak by the closed EFV. |
| **Re-Setting the EFV** | | |
| 2 | Turn gas off at customer meter using the meter stop cock. | |
| 3 | Excavate the service line up stream of the EFV and if plastic squeeze pipe to stop gas flow. If service is steel, turn off gas at service tap plug by turning clockwise. | Use proper squeeze procedures. |
| 4 | Excavate area where gas service line has been damaged, cut or severed. | Use precaution when working with PE Pipe because of static electricity. Use soapy rags to discharge static charge. |
| 5 | Repair damaged service line. | Use repair procedures for PE pipe or Steel pipe as applicable. |
| 6 | After pipe is repaired remove squeeze tool if plastic or turn service tap plug counter clockwise if steel to apply gas pressure on the upstream side of the EFV. | Gas pressure on the down stream side of the EFV should begin to increase slowly depending on the length of the gas service line. The longer the service line the more time it will take to pressurize the service line between the EFV and the Meter Stop Cock. |
| 7 | Allow approximately 5 to 10 minutes for gas pressure to equalize. | Once gas pressure on the downstream side and the upstream side of the EFV is approximately equal, the EFV should open fully and allow sufficient gas flow to operate customer equipment. |
| 8 | Prior to closing excavation, either pressure check as required to meet MAOP requirements or soap the repair area to check for gas leaks. | |
| 9 | Backfill excavated area(s) and leave customer property as neat as possible. | |
| 10 | Turn of customer meter and re-light appliances in accordance with light-up procedures. | |

## 4.14 EXCESS FLOW VALVE - CUSTOMER NOTIFICATION (192.383)(a)(b)(c)

The City of Carencro provides gas service to both residential and commercial customers. Gas service is provided through both steel and plastic gas services that tie into the gas main and terminates at the customer meter. Prior to June 2008, EFVs were not required, but could be installed at the request of the customer. After June 2008 regulations required that all new and replaced or repaired service lines had an EFV installed provided the service operated at 10 psig or more and was a single family residence. Beginning in April 2017, the City of Carencro will install an Excess Flow Valve in new service installations and in existing service lines that are being replaced or repaired. These Excess Flow Valves (EFVs) will be installed on services as follows:

- Branched service lines to a single family residence (SFR) installed concurrently with the primary SFR service line (a single EFV may be installed to protect both lines);
- Branched service lines to a SFR installed off a previously installed SFR service line that does not contain an EFV;
- Multifamily installations, including duplexes, triplexes, fourplexes, and other small multifamily buildings (*e.g.,* apartments, condominiums) with known customer loads at time of service installation, based on installed meter capacity, up to 1,000 SCFH per service; and
- A single, small commercial customer served by a single service line, with a known customer load at time of service installation, based on installed meter capacity, of up to 1,000 SCFH per service.

The City of Carencro will give all customers notice of the option to request an EFV installation, except where the service line does not operate at a pressure of 10 psig or greater through the year, where the operator has experienced contaminants in the gas stream that could interfere with EFV operation, where the EFV could interfere with operation and maintenance activities, or where an EFV meeting performance standards in § 192.381 is not available. The Excess Flow Valves to be installed by the City of Carencro meet the performance standards prescribed under 192.381, Service Lines: Excess Flow Valve Performance Standards. The City of Carencro will maintain records of Excess Flow Valve installations.

The City of Carencro will install an Excess Flow Valve in both new service line installations and in existing service lines that are being replaced or repaired at the locations stated above, unless one or more of the following conditions is present:

1. The service line does not operate at a pressure of 10 psig or greater throughout the year;
2. The operator has prior experience with contaminates in the gas stream that could interfere with the EVF' operation or cause loss of service to a residence;
3. An EFV could interfere with necessary Operation of maintenance activities, such as blowing liquids from the line; or
4. An EFV meeting performance standards in §192.381 is not commercially available to the operator.

The operator for the City of Carencro, on an annual basis, report the number of EFVs installed pursuant to §192.381 as part of the annual report required by §192.11. The City of Carencro will maintain records of Excess Flow Valve installations including marking or otherwise identifying the presence of an excess flow valve on the service line.

Date:_____

Dear Customer:

RE: Excess Flow Valve

Your are hereby advised that on any replaced service line or new service line an excess flow valve is available from the City of Carencro to install if the customer bears the costs associated with such installation.

The excess flow valve, if approved by the customer, will be installed on or near the connection of the service line to the distribution main. The primary safety function of the excess flow valve is its design to shut off the flow of natural gas automatically if the service line between the distribution main and customer meter is cut or breaks for whatever reason, thus decreasing the chance of hazardous uncontrolled gas flow and possible pressure loss in the main.

The excess flow valve is an integral part of the fitting that connects to the distribution main. If the customer requests the operator to install an excess flow valve, the customer bears all costs associated with the cost of the excess flow valve, installation of the excess flow valve, equalizing the pressure from the meter to the distribution main with air compressor to activate the excess flow valve, and purging the air from the line with gas. The cost of materials and installation is $350.00.

Prior to ordering an excess flow valve, customer must provide a certified report by licensed plumber or licensed mechanical contractor of the total natural gas requirements, in BTU/hour, of all appliances connected to the system. This information is required to properly size the excess flow valve. The cost of this service will be paid by the customer directly to plumber or contractor.

You are further advised that cost for maintaining and replacing an excess flow valve may later be incurred. It is estimated that these costs would be in the order of $200.00.

If a customer requests installation of the operator will install the excess flow valve at mutually agreeable date.

BY: _____

Accepted:_____

Declined:_____

# EFV
# Excess Flow Valves
## FOR GAS SERVICE LINES

Perfection Corporation

# EFV excess flow valves

The safe delivery of gas remains a primary mission of the worldwide natural gas industry. To help accomplish this fundamental task, more and more utilities are taking safeguards to minimize occurrences of blowing gas due to pipe line breaks caused by third party damage and natural disasters. And the easiest, most dependable, and economical way is with an EFV excess flow valve from Perfection.

Powell Flow Limiters, marketed by Perfection, and other excess flow valves are incorporated into our Permasert® couplings and other gas distribution products... making the installation of an EFV as easy as installing these Perfection products. These self-actuating valves automatically close when gas flow exceeds a predetermined rate.

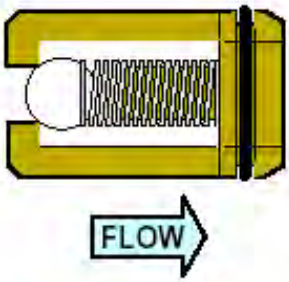
## Benefits

- Self-actuating valve
- Automatic reset when line pressure is equalized
- Consistent trip flow rate
- Easy to install
- Maintenance-free

## How the EFV functions

The Powell Flow Limiter prevents catastrophic leakage by automatically tripping when gas flow exceeds a predetermined rate. When the gas flow rate reaches the predetermined critical value, the forces on the ball exceed the opposing force on the spring, thus causing the ball to seal against the bored diameter. Bleed-by is achieved with a small notch in the ball seat at the bored diameter.

Powell Flow Limiters are currently available for operation at trip flow rates of 400, 800 and 1800 SCFH (measured at 10 psig). These valves are designed to provide dependable maintenance-free operation for many years. The valve's design and large port area allow particulate matter to pass through without damage or build-up. These excess flow valves provide extremely consistent trip flow rates and very low pressure drop across the valve. Carefully controlled bleed-by assures automatic reset at a pressure differential as low as 1.5 psi.




## Specifications

*(Powell Flow Limiters)*

| | |
|---|---|
| Valve body | 360 brass |
| Spring | 300 series stainless steel |
| Ball | Precision ground nylon |
| O-ring | Buna-N (Nitrile) |

## Testing and compliance

We performed an extensive array of tests at our research and development laboratories to confirm all performance characteristics of the Powell Flow Limiter. Testing for trip flow rates, bleed-by flow rates, and pressure drop confirmed that it meets or exceeds all applicable existing and proposed standards and regulations. Test results are shown on back cover.

Powell Flow Limiters are in full compliance with the requirements of MSS SP-115 and US DOT CFR Title 49, Part 192.381.

# EFV product applications

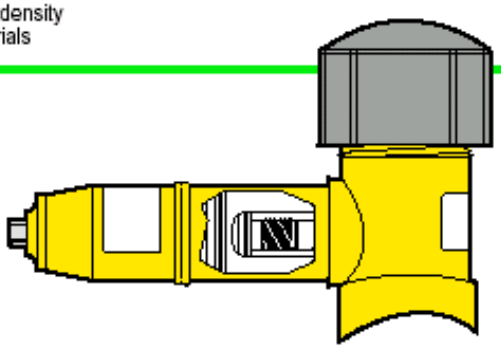
## Permasert® couplings

The heart of our complete main-to-meter gas distribution system, Permasert couplings are safe and remarkably easy to install. Permasert EFV couplings are available in many different configurations and sizes, including a special repair coupling. All Permasert couplings provide a pull-out strength greater than the connected polyethylene tubing.

- Ideal for retrofitting EFVs into service lines or for new installations
- Sizes from 1/2" CTS to 1-1/4" IPS
- Available for all plastic pipe wall thicknesses
- Molded from ASTM D-2513 listed, gas grade, medium density PE 2406 and high density PE 3408 polyethylene materials

## Saddle fusion tapping tees

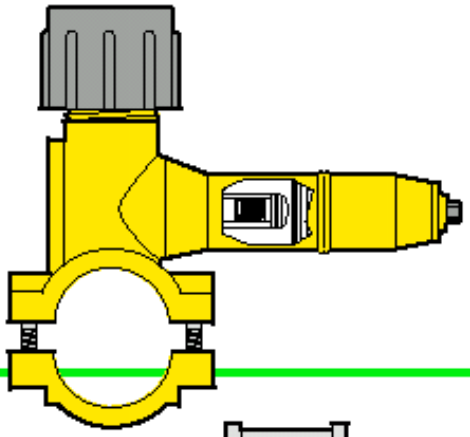
Saddle fusion tapping tees are available from Perfection with factory-installed excess flow valves located in the tee outlet. Permasert couplings or fusion outlets are available.



- Ideal for new service line installations of EFVs
- All main sizes
- Permasert or fusion outlet sizes from 1/2" CTS to 1-1/4" IPS

## PermaLock® mechanical tapping tees

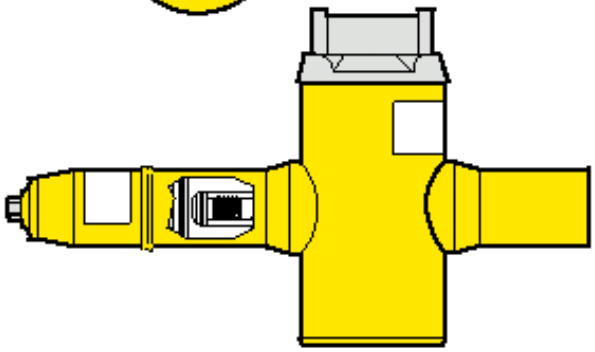
Our full-encirclement mechanical tapping tee is the safe, reliable and economical way to join a polyethylene service line to a polyethylene gas main. PermaLock EFV tees provide a simple, gas-tight, non-heat fusion service line connection without special equipment.



- Economical means of installing EFVs into new service lines without the need for special tools
- Main sizes of 1-1/4", 2", 3", 4" and 6" IPS
- Permasert and fusion outlet sizes from 1/2" CTS to 1-1/4" IPS
- Molded from ASTM D-2513 listed PE materials

## PSV™ polyethylene shut-off valves

The Perfection PSV polyethylene shut-off valve replaces non-PE plastic curb stops and metallic valves to provide economical compatibility with all PE gas distribution systems. It eliminates the need for corrosion inhibiting coatings, cathodic protection, federally mandated inspection and corrosion control record-keeping.



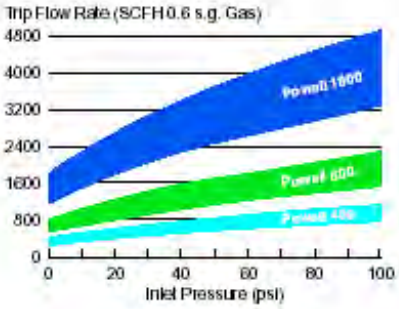
- Sizes from 1/2" CTS to 1-1/4" IPS
- Temperatures from -20° F to 100° F
- Meets or exceeds requirements of ASTM D-2513, US DOT Part 192, and ANSI B16.40

# EFV performance characteristics

*(Powell Flow Limiters)*

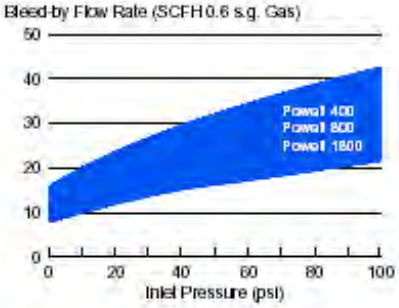
## Trip Flow Rate

The flow rates were measured at 10 psi for a random sampling of 20 EFVs. The range was calculated using +/-3 standard deviations about the mean. The trip flow rate throughout the pressure range was then extrapolated by testing three (3) typical EFVs at various pressures and adding and subtracting the same percentage of flow as at 10 psi to achieve +/-3 standard deviations.



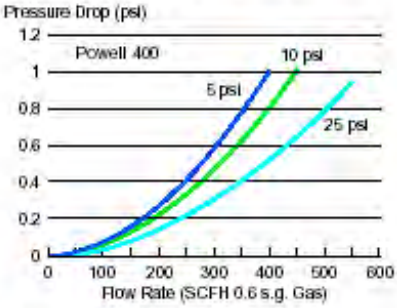

## Bleed-by Flow Rate

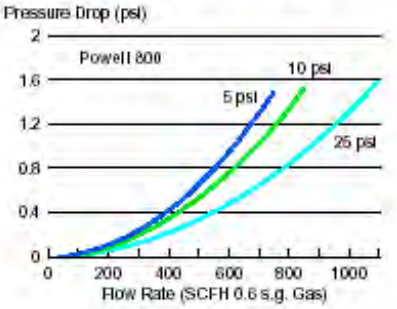
The bleed-by was measured by actuating the EFV at various pressures throughout the range.

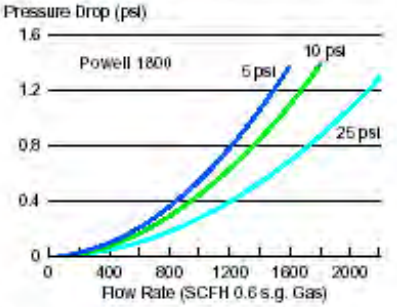



## Pressure Drop Flow Rate

The pressure drop over the EFV was measured at various flow rates for inlet pressures of 5 psi, 10 psi and 25 psi.




*Test results shown are for the Powell 400, 800 and 1800 SCFH excess flow valves located in a pipe line.*

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E-Mail perfection@perfectioncorp.com
Web Site: www.perfectioncorp.com
ELSTER AMCO

EFV-RAWHASM1001
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The Powell EFV, marketed by Perfection Corporation, is manufactured to its own specifications and testing requirements. These requirements are available upon request. The accompanying data should be consulted as a guide for the selection and use of the EFV since the environment can impact operation and actuation of the installed EFV. As with many EFVs, the Powell Flow Limiter is not designed to actuate at pressures less than 5 psig, thus, under no circumstances should the EFV be used in any application where the system pressure is below 5 psig.

Any questions relating to the suitability of a Powell EFV for a particular application should be directed to Perfection Corporation.

All Perfection Corporation terms and conditions of sale apply to all products and services sold.

ISO 9001

UMAC Excess Flow Valve 2/6/06 5:45 PM Page 1

UMAC®
INCORPORATED

# Excess Flow Valves

## Automatic Safety Cut-Off Valves for Natural Gas Service Lines

## Self-activating, quick operating shut-off valve for service lines

*Series M40*

*Series M60 and M75*

*Series M175*

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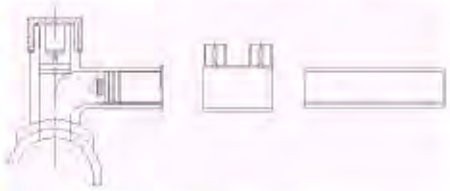
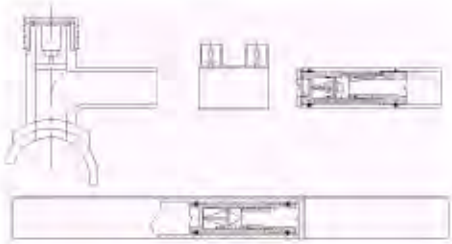


*Tee Outlet (20, 25, 32 & 63 mm)*
*Series M40, M60, M75 & M175*



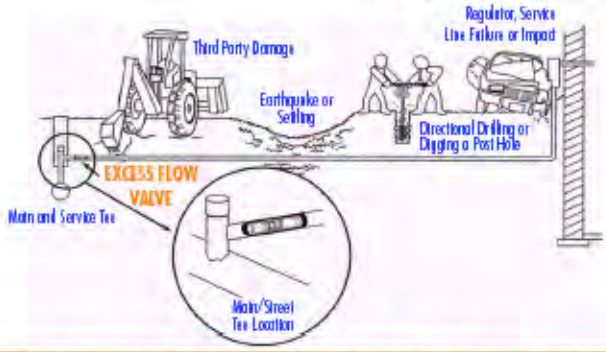
*In Tubing (25, 32 & 63 mm)*
*Series M60, M75 & M175*

UMAC Excess Flow Valves (EFVs) are similar to electrical circuit breakers that trip when electrical current exceeds the design limits. EFVs automatically shut off, instantly, when the gas flow to a residence or commercial facility exceeds the preset flow value. UMAC valves have a simple design that use the flow of the natural gas as the sensing source. The most common cause of excessive gas flow is the rupture of service lines which can occur during the excavation process.

Millions of UMAC EFVs are in service around the world providing reliable, trouble-free service to our customers. They are designed to meet our customer's standards.

### Benefits of UMAC EFVs

- 100% factory tested and certified
- Normal operation after repairs are made either by automatic pressure equalization or manual pressure equalization via back pressure
- Compatible with meter sizes from G4 through G250
- Pressure rated from 75 mbar to 10 bar
- M60 and M75 steel models rated to 100 bar
- Increase public confidence in gas
- Provide safe working conditions for personnel at scene of a service line break
- Safeguard gas company against unwarranted negative publicity and excessive liabilities that result from gas leak emergencies
- Fabricated with fitting and piping materials from other manufacturers
- Constructed of maintenance-free materials

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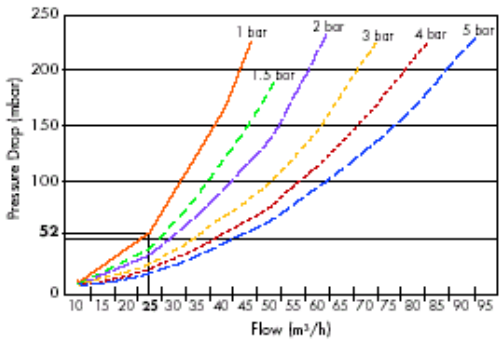
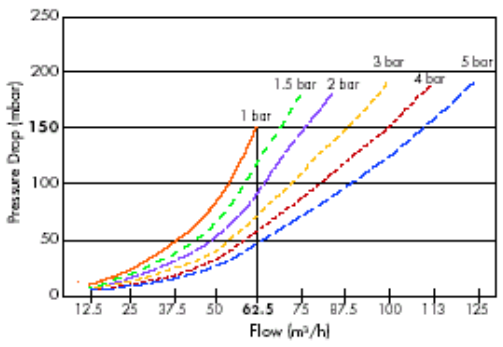
## Excess Flow Valves

### Series M40 - 20 mm
Shutoff Range (Trip Point) Between 225 and 275 mbar
Flow Range up to 175 mbar



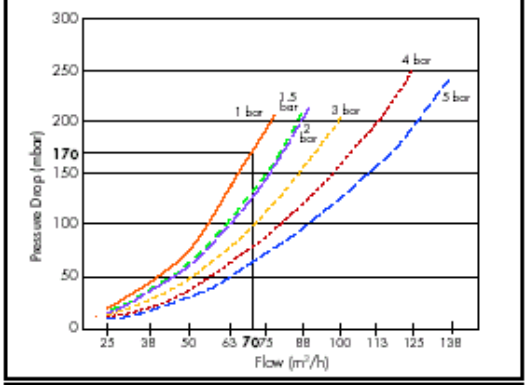

| Meter Size | Vn m³/h[SC] at 1-5 bar |
|---|---|
| G16 | 25 |

### Series M60 - 32 mm
Shutoff Range (Trip Point) Between 200 and 250 mbar
Flow Range up to 150 mbar



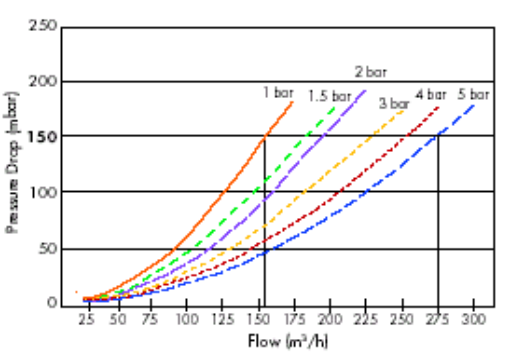

| Meter Size | Vn m³/h[SC] at 1-5 bar |
|---|---|
| G40 | 62.5 |

### Series M75 - 32 mm
Shutoff Range (Trip Point) Between 275 and 375 mbar
Flow Range up to 210 mbar




| Meter Size | Vn m³/h[SC] at 1-5 bar |
|---|---|
| G65 | 70 |

### Series M175 - 63 mm
Shutoff Range (Trip Point) Between 200 and 275 mbar
Flow Range up to 150 mbar




| Operating Pressure (bar) | Vn (m³/h) at 1-5 bar |
|---|---|
| 1.0 | 157 |
| 1.5 | 181 |
| 2.0 | 193 |
| 3.0 | 228 |
| 4.0 | 252 |
| 5.0 | 274 |

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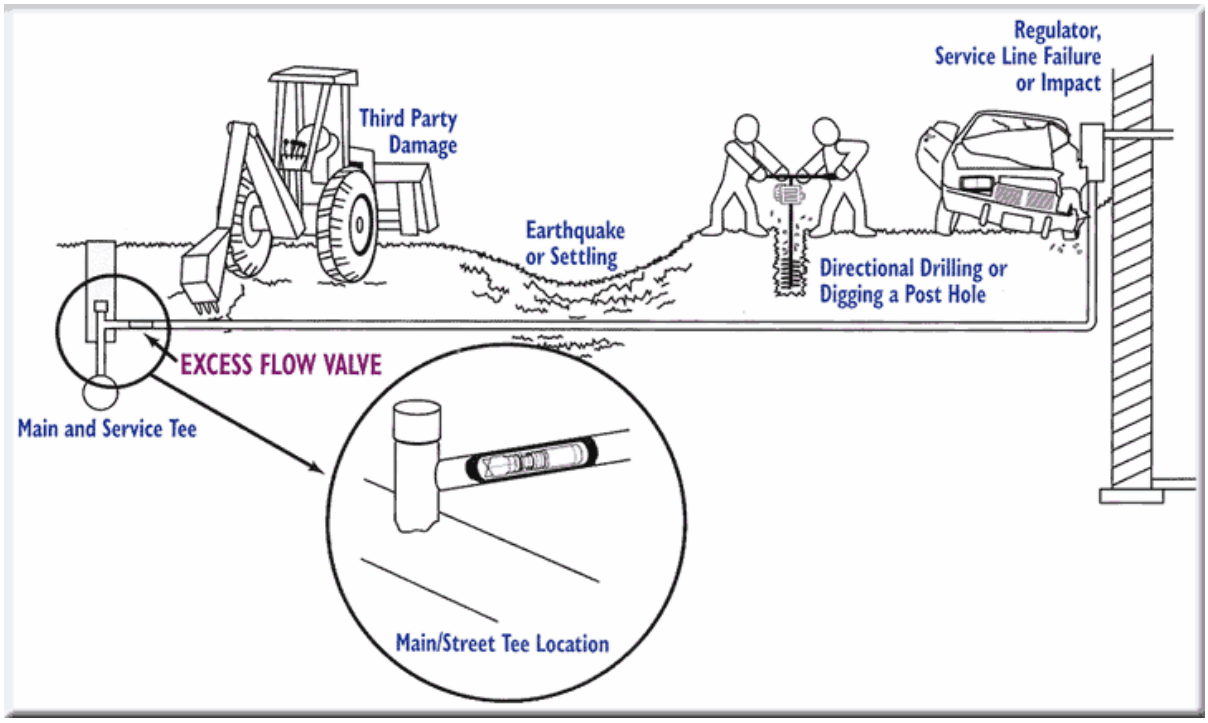
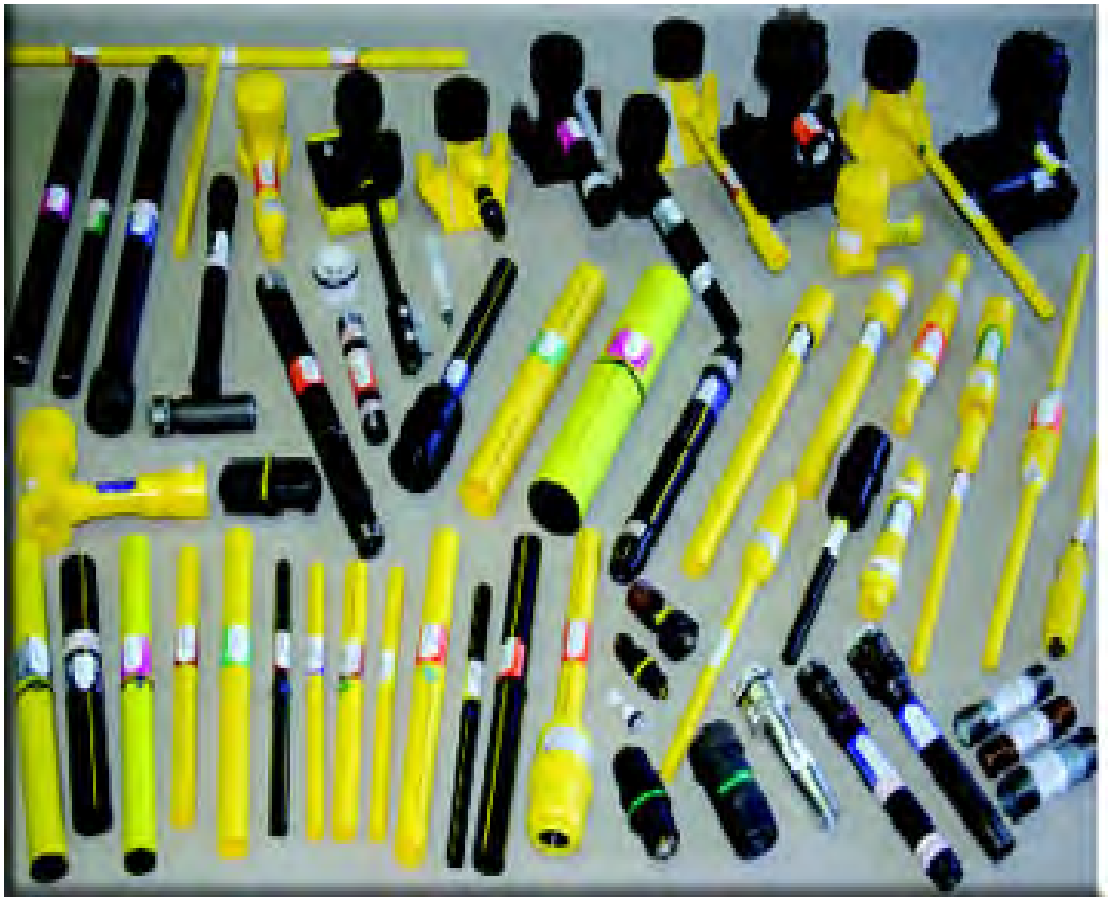
# UMAC EFV Benefits

- Improve environmental impact by reducing the amount of methane escaping into the atmosphere – EPA STAR Program compliance
- Meet DOT 192.381 and MSS-SP-115 for excess flow valves for use in natural gas system
- Meet ASTM F 1802-97 - Performance testing of EFVs
- Meet ASTM F 2138-01 - Standard Specifications for EFVs
- Accommodates pressures from 7" w.c. to 1000 psi
- For higher pressures contact UMAC
- Diameter sizes available from 1/2" to 8"
- Service line capacities from residential to commercial loads
- Compatible with fittings and piping materials from most manufacturers
- Safeguard utilities against unwarranted negative publicity and excessive liabilities that result from gas leak emergencies
- Increase public confidence in gas
- Save time and money by reducing the number of emergency situations
- Bypass or Non-Bypass models available
- Tamper-proof, in-line installation
- Provide safe working conditions for utility personnel at the scene of a service line break
- 100% of all UMAC Valve assemblies are factory tested to meet or exceed DOT 192.381 performance



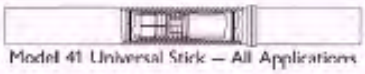


# UMAC Excess Flow Valve Assembly Guide

## All Plastic

## All Plastic

### STICKS



Model 41 Universal Stick – All Applications

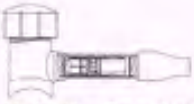
Model 32 – Butt Fusion and Mechanical Applications only

### ASSEMBLIES

**Socket Fusion Applications**

Model 58 – Model 32 with coupling on outlet

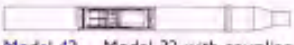
Model 33 – Model 32 with coupling on inlet & outlet



Model 44 – Tee with valve inserted & coupling on outlet

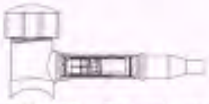
Model 46 – Tee with Model 32 attached & coupling on outlet with pigtail

**Butt Fusion Applications**



Model 42 – Model 32 with coupling on outlet

Model 62 – Tee with Model 32 on outlet

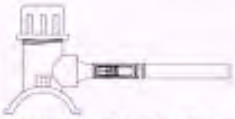


Model 39 – Tee with valve inserted & coupling on outlet

**Electrofusion Applications**

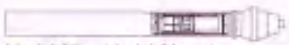
Model 81 Model 82
Valve machined for insertion into electrofusion tee or pipe

Model 70 – Tee with Model 41 attached



Model 71 – Tee with valve inserted & pigtail

**Mechanical Applications**

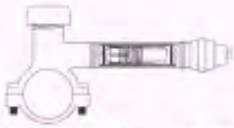


Model 35 – Model 32 with mechanical fitting

Model 75 Model 76
Valve in stiffener for Continental & Metfit couplings

Model 40 – Tee with valve inserted & mechanical outlet

Model 31 – Tee with Model 35 attached



Model 65 – Mechanical tee with Model 35 attached

## All Steel

Model 11 – Steel pipe nipple threaded both ends with valve inserted

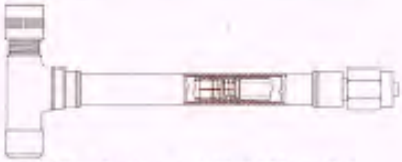
Model 14 – Steel pipe nipple with weld ends with valve inserted

Model 12 – Steel tee & steel compression outlet with valve installed

## Steel to Plastic

Model 29 – Steel pipe nipple threaded on inlet & compression adapter for plastic on outlet with valve installed

Model 25 – Steel pipe nipple weld inlet & compression adapter for plastic on outlet with valve installed



Model 13 – Steel tee with Model 35 installed

Model 18 – Transition fitting steel to plastic with valve installed

Steel to Plastic standard outlet sizes available in 1/2" CTS and 1" CTS. Other sizes available on request.

The technical data contained herein are guides to the use of UMAC Valves. The advice contained herein is based upon tests and information believed to be reliable, but users should not rely upon it absolutely for specific applications. It is given and accepted at user's risk and confirmation of its validity and suitability in particular cases should be obtained independently. UMAC, INCORPORATED makes no guarantee of results and assumes no obligation or liability in connection with its advice. This publication is not to be taken as a license to operate under or recommendation to infringe any patents.

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## 4.14 Manual Service Line Shut-Off Valve Installation 192.385(a)(b)(c)

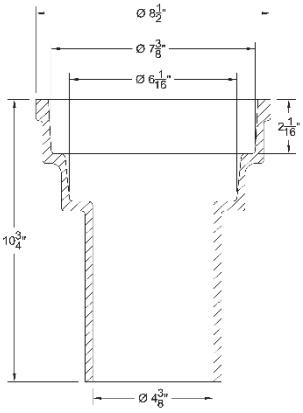
The City of Carencro will install a manual service line shut-off valve such as a curb valve or other manually operated valve located near the service line that is safely accessible to operator personnel or other personnel authorized by the operator to manually shut off gas flow to the service line as required.

The City of Carencro will install either a manual service line shut-off valve or an EFV for any new or replaced service line with installed meter capacity exceeding 1000 SCFH. Those service line using less than 1000 SCFH should have an appropriately sized EFV installed. Those service line that use more than 1000 SCFH are required to install a service line shut-off valve with a valve box for easy access. The service line shut-off valves for any new or replaced service line will be installed in such a way as to allow accessibility during emergencies. The service line shut-off valve will be installed at or near the property line and will be installed inside a valve box for easy access. These service shut-off valves installed are subject to regular scheduled maintenance, as documented by the operator and consistent with the valve manufacturer's specification.
Curb valves are manufactured with both plastic and metal. Don't forget the effects of corrosion on steel piping. Below on the left is a typical curb valve to be used on polyethylene pipe services lines. On the right is a typical steel curb valve to be used on steel service lines. Metal curb valves are not recommended for PE service lines because of corrosion concerns.

Curb valve should be placed in a curb valve box for easy access. See typical curb valve box on the following page.

*Slide-Type & Screw-Type*

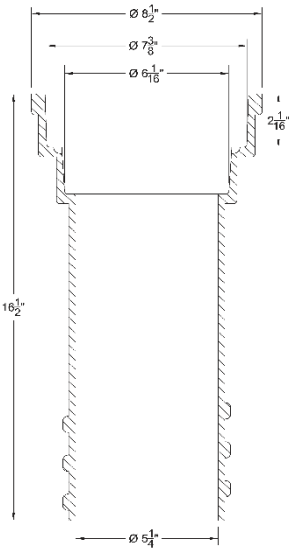
Provides a method for adjusting valve boxes to pavement level.




## *Slide-Type "Rite-Hite"*

| *Trumbull Item No.* | *Adjustment Range* | *Weight* |
|---|---|---|
| **367-5050** | 2-1/2" - 8" | 16.00lbs. |

- Top of box should be flush with surface
.
- .




## *Screw-Type "Rite-Hite"*

*Paving Adapter No. T-69*

This type adapter screws into the top section of the valve box.

| *Trumbull Item No.* | *Adjustment Range* | *Weight* |
|---|---|---|
| **367-5060** | 2-1/2" - 8" | 25.00lbs. |

## PROCEDURE FOR INSTALLING CURB VALVES & BOXES

| | Action | Information |
|---|---|---|
| **Inspect EFV'S Prior to Installation** | | |
| 1. | Inspect each Curb Valve for:<br>• Cleanliness<br>• Shipping Damage<br>If the Curb Valve is damaged, do not use and report according to Company policy | Verify that the Curb Valve is clean of dirt, debris and grease. This fitting may be joined using the fusion process or by mechanical means. Use either fusion procedures or fitting procedures when installing. |
| 2. | Make sure the curb valve size and material is compatible with the service pipe size material. | PVC Coated curb valves on PE Pipe and steel curb valves on steel pipe. |
| **Location of Curb Valve Installation** | | |
| 3 | Curb valves are to be installed as close to the property line as possible. | Curb valve is to be installed so that it is easily accessible. |
| 4 | Curb valves are quarter turn valves just like the service riser valve. | Function of the curb valve is to be able to turn gas off to the customer meter near the street or road in and emergency situation such as fire. |
| **Valve Box** | | |
| 5 | A valve box must be placed over the curb valve so that the valve can be turned off should there be an emergency. | The valve box should be placed over the curb valve in a manner that allows the curb valve wrench to fit over the valve allowing the valve to be opened or closed in emergency situations. |
| 6 | Top of curb valve box should be level with the surrounding surface, either concrete or lawn. | |
| 7 | Verify that no dirt or debris is in the curb valve box..<br>• Dirt, rocks, liquid or other particles may prevent access to valve. | Keep dirt and debris from the inside of the valve box. |
| 8 | Avoid allowing the curb valve box to rest upon the service line. | On steel service lines this could deplete cathodic protection. |
| 9 | Document the location of each curb valve using measurement and maintain a record of installation | Records of curb valves are required by PHMSA and Pipeline Safety and the number installed each year and the total number installed is recorded on the Annual Report. |

## SECTION 5 - CORROSION REQUIREMENTS (SUBPART I)

The City of Carencro Gas Distribution System is cathodically protected using a combination of rectifiers and magnesium anodes. There is one (1) 36-volt, 36-amp rectifier located on University Drive providing cathodic protection current on the gas distribution system. In addition, the City of Carencro has installed 17- and 32-pound magnesium anodes on the remainder of gas distribution piping throughout the entire gas distribution system. One (1) pound magnesium anodes are also installed on isolated service lines. The cathodic protection system meets or exceeds the requirements identified in Pipeline Safety Regulation §192.457 and Section 5 of the Operation and Maintenance Manual and have been installed in accordance with the requirements of this manual. Below is a picture of a typical rectifier installation.

**RECTIFIER UNIVERSITY DRIVE (LA. 182)**

Cathodic protection test stations have been established throughout the entire gas distribution system at strategic locations in order to provide an assessment of the level of cathodic protection on the system. These test stations are documented on a cathodic protection survey data sheet. Test stations or test points are located throughout the gas distribution system. These test points are read each year and will continue to be read annually to provide evidence that all steel gas piping, including isolated sections of steel gas distribution piping comply with the requirements of a minimum of -.85 VDC Pipe-to-Soil potential taking into consideration an IR Drop or current drain. This is accomplished with a current interrupter. These isolated services are generally located in sections of the distribution system that have been replaced with plastic and the services and/or service risers have not been replaced. These test points may also be on steel services tied into steel mains that are isolated from the main with a dresser coupling. A cathodic protection data sheet is used to document all of these pipe-to-soil potential readings. City of Carencro shall read 10% of these isolated services annually during the cathodic protection survey to verify compliance with cathodic protection criteria. Each year a different 10% of these services will be read.

## 5.1 PURPOSE

This document establishes the procedural requirements for the protection of the City of Carencro Natural Gas Distribution System from external and atmospheric corrosion.

## 5.2 SCOPE

To provide instructions for installation, monitoring, maintaining, troubleshooting and repairs to cathodically protected piping on the City of Carencro Natural Gas Distribution System.

## 5.3 REFERENCES

1. Part 192, Title 49 of the Code of Federal Regulations, Subparts 192.451 through 192.491

2. NACE Standard RP-01-69, Recommended Practices - Control of External Corrosion on Underground or Submerged Metallic Piping Systems

3. NACE Standard RP-05-72, Recommended Practices - Design, Installation, Operating and Maintenance of Impressed Current Deep Ground-beds
4. Control of Pipeline Corrosion, A.W. Peabody

## 5.4 DEFINITIONS

1. Anode - An electrode at which oxidation of its surface or some component of the solution is occurring
2. Cathodic Protection - A technique to prevent the corrosion of a metal surface by making that surface the cathode of an electrochemical cell.
3. Continuity Bond – A metallic connection that provides electrical continuity.
4. Electrical Isolation - The condition of being electrically separated from other metallic structures or the environment
5. .Distribution - Pipeline other than a gathering or transmission line.
6. Gas - Natural gas, flammable gas, or gas which is toxic or corrosive
7. High Pressure Distribution System - A distribution system in which the gas pressure in the main is higher than the pressure provided to the customer.
8. Impressed Current - Direct current supplied by a power source external to the electrode system
9. Interference Bond - A metallic connection designed to control electrical interchange between metallic systems.
10. IR Drop - The voltage across a resistance in accordance with Ohm's Law. A pipe-to-soil potential reading taken immediately after the rectifier is turned off by a current interrupter.
11. Main - A distribution line that serves as a common source of supply for more than one service line.
12. Operator - A person who engages in the transportation of gas.
13. Pipeline - All parts of those physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies.
14. Polarization - The change of potential of a metal surface resulting from the passage of current directly to or from an electrolyte.
15. Reference Electrode - A device whose open circuit potential is constant under similar conditions of measurement. Service Line - A distribution line that transports gas from a common source of supply to:
    a) A customer meter or the connection to a customer's piping, whichever is farther downstream, or
    b) The connection to a customer's piping if there is no customer meter.
16. Stray Current - Current flowing through paths other than the intended circuit.
17. Structure-to-electrolyte (Voltage) - The voltage difference between a buried metallic structure and the electrolyte that is measured with a reference electrode in contact with the electrolyte.
18. Electrolyte - Soil or liquid adjacent to and in contact with a buried or submerged metallic structure, including the moisture and other chemicals contained therein.
19 Service Line - A distribution line that transports gas from a common source of supply to:
    - A customer meter or the connection to a customer's piping, whichever is farther downstream, or
    - The connection to a customer's piping if there is no customer meter.

20. Business District - An area of two or more businesses within one-hundred (100) yard of each other and within 100 yards along the linear length of any gas pipeline. The district will extend 100 feet past the defined boundaries of the last business in the district. Business districts include schools, churches, playgrounds and places where persons congregate.

## 5.5 RESPONSIBILITIES

The operator for City of Carencro is responsible for assuring that this procedure is being effectively implemented. The Operator is also responsible for assuring that cathodic protection is installed on the gas distribution system and monitored and maintained in accordance with this procedure.

The operator for City of Carencro is responsible for documenting and maintaining cathodic protection survey data including repairs made to the Cathodic Protection System.

The operator for City of Carencro is responsible for taking remedial action to correct identified deficiencies in the cathodic protection system.

## 5.6 GENERAL (192.453)

This procedure implements the requirements of Subpart I - Requirements for Corrosion Control. The implementation of this procedure and the procedure requirements must be under the direction of person(s) qualified by experience and training in pipeline corrosion control methods. This procedure is applicable to buried or submerged pipelines installed before August 1, 1971. In addition, any pipelines installed after July 31, 1971 must be externally coated and protected against external corrosion within one year after installation. When undertaking any corrosion activity, consider NACE Standard RP-01069, Recommended Practice - Control of External Corrosion on Underground or Submerged Metallic Piping Systems. Cathodic protection may be achieved through the use of impressed current rectifiers and/or galvanic anodes or a combination of both. The City of Carencro has developed procedures for the design, installation, operation and maintenance of the gas distribution cathodic protection system. Corrosion control procedures required by this Operation and Maintenance Manual and §192.605(b)(2), including those for the design, installation, operation, and maintenance of cathodic protection systems has been developed by the City of Carencro, and their implementation is under the direction of the gas operator who is qualified in pipeline corrosion control methods. A qualified corrosion control consultant who is also qualified in pipeline corrosion control methods may assist him.

## CATHODIC PROTECTION SYSTEM DESIGN

### CATHODIC PROTECTION SYSTEM DESIGN

Prior to undertaking the installation of a cathodic protection system, the City of Carencro considered NACE Standard RP-01069, Recommended Practice - Control of External Corrosion on Underground or Submerged Metallic Piping Systems. Base on the layout of the gas distribution system, a determination was made to utilize a cathodic protection rectifier and magnesium anodes to provide the amount of current required to meet the minimum cathodic protection requirements. Soil resistance, pipe size, condition of pipe coating and other factors were taken into consideration prior to making the final determination to install this type cathodic protection system. Cathodic protection may be achieved through the use of impressed current rectifiers and/or galvanic anodes or a combination of both. Since the City of Carencro has some isolated sections of steel pipe galvanic anodes are installed on those isolated sections of steel pipe.

### CATHODIC PROTECTION SYSTEM INSTALLATION

Construction work for the installation, maintenance and repairs to cathodic protection systems should be in accordance with drawings and specifications. The specifications should be in accordance with recommended practices of RP-01-69. All construction work performed on cathodic protection systems should be under the surveillance of trained and qualified personnel to verify that the installation is made in strict accordance with drawings and specifications. Rectifiers or other power sources should be inspected for assurance that internal connections are mechanically secure and that no damage is apparent. Rectifier or other power source should be installed so that possibility of damage or vandalism is minimized. Rectifiers should be installed as depicted in the attached drawing included in this procedure.

Wiring to rectifiers shall comply with local and national electrical codes and requirements of utility supplying power. An external disconnect switch on a-c wiring should be provided and the rectifier case properly grounded. Conductor (negative lead wire) to the pipeline or structure must be connected mechanically secure, electrically conductive and verified that the connection is correct. This connection should be made by cadwelding the negative lead to the pipeline to ensure continuity between the pipeline and the negative lead. (Verification is made after the direct current power source has been energized.) Conductor (positive lead wire) to the anodes must be connected mechanically secure, electrically conductive and verified that the connection is correct. (Verification is made after the direct current power source has been energized.)

### CATHODIC PROTECTION SYSTEM MAINTENANCE

The City of Carencro Gas Department personnel shall read each rectifier bi-monthly and record the amperage reading, the voltage reading and the date that each rectifier is read. There is an analog meter on the inside of each rectifier that is labeled volts and amps. In addition, the individual reading the rectifiers will ensure that each rectifier is clean or free of foreign material such as ants, bird nest, rat nest, etc. If necessary, he/she shall clean the rectifier as necessary taking caution not to come into contact or damage any of the electrical connections. Should a reading of “0” amps or “0” volts be observed during the bi-monthly rectifier reading process, either the City of Carencro or a qualified contractor shall determine the cause of the problem and

make the necessary repairs to the rectifier. Repairs shall be completed within 90 days of discovery.

Annually, the City of Carencro or contract personnel will review rectifier readings taken over the past twelve months to determine any trends such as ground-bed deterioration. This will be accomplished in conjunction with the annual cathodic protection survey.

## OPERATION OF THE CATHODIC PROTECTION SYSTEM

The installation, operation, monitoring and maintenance of the cathodic protection system have been contracted to a corrosion consulting firm. The consultant personnel have been trained and qualified to the requirements of the Midwest Energy Association Operator Qualification Program or equivalent. Anodes and rectifiers are installed in accordance with the requirements of this Operation and Maintenance Manual. Rectifiers are operated so as to ensure that minimum cathodic protection requirement (-0.85) is achieved at all ends of the gas distribution system. However, voltage and amperage is adjusted so as not the have excess current on the gas distribution system which could cause damage to the wrapping on the pipeline.

Cathodic protection rectifiers are read bi-monthly by the City of Carencro Gas Department personnel and documented on the appropriate data sheet. The gas distribution system is surveyed annually by a contracted consulting firm for verification that adequate cathodic protection is achieved throughout the entire gas distribution system. This is described in detail in section 5.10 of this manual.

The sections of the gas distribution system protected by galvanic anodes are also checked annually during the annual cathodic protection survey to ensure the each anode is providing the required amount of current to meet the minimum cathodic protection requirements (-0.85) pipe-to-soil potential. Disconnecting the anode positive lead and the pipeline negative lead and taking the reading on the pipeline lead measure the pipe-to-soil potential at each anode station.

## 5.7 EXTERNAL CORROSION CONTROL INSTALLED AFTER JULY 31, 1971 (192,455)(a)(1)(2)(e)

This procedure is applicable to buried or submerged pipelines installed before August 1, 1971. In addition, any pipelines installed after July 31, 1971 must be protected against external corrosion and must have an external protective coating meeting the requirements of §192.461. It must also have a cathodic protection system designed to protect the pipeline in accordance with this subpart, installed and placed in operation within 1 year after completion of construction. unless the operator can demonstrate by test, investigation and experience as specified in 455(b) a corrosive condition does not exist. For a temporary pipeline with an operating period of service not to exceed 5 years beyond installation, corrosion during the 5-year period of service of the pipeline will not be detrimental to public safety. If a pipeline is externally coated, it must be cathodically protected in accordance with this paragraph. The City of Carencro has not installed any copper or aluminum in its buried or submerged pipelines and has no intention of installing copper or aluminum piping. The City of Carencro has not installed any aluminum in its buried or submerged pipelines and has no intention of installing aluminum piping

## 5.8 EXTERNAL CORROSION CONTROL INSTALLED BEFORE AUGUST 1, 1971 (192.457)(a)

All buried or submerged gas distribution lines that were installed before August 1, 1971, must be cathodically protected in areas of active corrosion at:

- Bare or coated pipes at regulator and metering stations
- Bare or coated distribution lines include all electrically continuous sections of steel piping as well as all isolated sections of piping within the gas distribution system.

Bare or coated distribution lines that were installed before August 1, 1971 have been cathodically protected along the entire area. This includes all electrically continuous sections of steel piping as well as all isolated sections of piping within the gas distribution system.

## 5.9 REQUIRED EQUIPMENT

1. High impedance volt/ohm meter capable of detecting AC/DC voltage and AC/DC amperage including mili-volts and mili-amps, resistance and current directional indication.
2. Copper Sulfate Electrode or half cell
3. Neilson Pipe and Cable Locator
4. Soil Resistance Measuring Equipment
5. Cadwelding equipment for bonding test leads to pipeline

## 5.10 EXTERNAL CORROSION CONTROL – EXAMINATION OF PIPELINES WHEN EXPOSED (192.459)

Portions of buried pipeline that have become exposed shall be examined by the operator for evidence of external corrosion if the pipeline is bare or if the coating is deteriorated. If external corrosion requiring remedial action under §192.483 through §192.489 is found, the operator shall investigate circumferentially and longitudinally beyond the exposed portion (by visual examination, indirect method, or both) to determine whether additional corrosion requiring remedial action exists in the vicinity of the exposed portion. This examination should be documented on an exposed piping report. See "Report of Main and Service Line Inspection" report in this section. Pipeline coating/wrapping should be examined for evidence of damage or holidays. Pipeline should be examined for evidence of pitting if the wrapping has been damaged or pipeline is bare.

**CITY OF CARENCRO**
**OPERATION AND MAINTENANCE MANUAL**

**GAS UTILITY**_____

## REPORT OF MAIN AND SERVICE LINE INSPECTION

This form to be completed each time a transmission main or distribution main or service line is uncovered for inspection or other reason, such as making service connection, main extension, replacement, etc.

(if you are not **POSITIVE,** Leave answer blank)

Location:_____

Name of Inspector:_____

Designation of Line: Trans._____ Distribution:_____Service_____

Age:_____Years Line Size:_____ Inches

Maximum Operating Pressure:_____

Pipe Specification:_____

Cathodic Protection: Yes:____ NO:____ Anodes: _____ Other: _____

Coating: Type: _____Condition:_____

External Condition: Smooth_____Pitted_____Depth of Pits:_____

Internal Condition: Smooth_____Pitted_____Depth of Pits:_____

Other Structures in Area Endangering Pipeline_____

_____

_____

_____

Condition of Right-of-Way: _____

_____

_____

Corrective Measures Taken if Needed: _____

_____

_____

Number of Anodes Installed: Size:_____ Location: _____

Soil: Kind: Sand □ Clay □ Loam □ Cinders □ Refuse □
Packing: Loose □ Medium □ Hard □
Moisture Content: Dry □ Damp □ Wet □

## 5.11 EXTERNAL CORROSION CONTROL – PROTECTIVE COATING (192.461)(a)(b)(c)(d)(e)

Protective coating applied for the purpose of external corrosion must be applied as follows:

1. On a properly prepared surface.
2. Protective coating shall have sufficient adhesion to the pipeline surface to resist migration of moisture.
3. Have sufficiently ductile to resist cracking.
4. Have sufficient strength to resist damage due to handling and soil stress.
5. Have properties compatible with supplemental cathodic protection
6. Protective coatings shall have low moisture absorption and high electrical resistance.
7. Inspected prior to lowering into the ditch for backfilling. Detected damage to the coating shall be repaired
8. Each external protective coating must be protected from damage resulting from adverse ditch conditions or damage from supporting blocks.

If coated pipe is installed by boring, driving, or other similar method, precautions must be taken to minimize damage to the coating during installation. Desirable characteristics of coatings include:

1. Low moisture absorption
2. High electrical resistance
3. Effective electrical insulator
4. Ease of application to pipe
5. Applicable to piping with a minimum of defects
6. Good adhesion to pipe surface
7. Ability to resist development of holidays over time
8. Ability to withstand normal handling, storage, and installation
9. Ability to maintain substantially constant electrical receptivity with time
10. Resistant to dis-bonding when under cathodic protection
11. Ease of repair

Protective coating must be inspected just prior to lowering the pipe into the trench and backfilling. Any damaged detrimental to effective corrosion control must be repaired. Protective coating must be protected form damage resulting from adverse trench conditions or damage from supporting bocks. When coated pipe is installed by boring, driving, or other similar method, precaution must be taken to minimize damage to the coating during installation.

The City of Carencro uses Royston Roskote R28 Rubberized Mastic although shrink tape may also be used for coating exposed sections of steel pipelines and for most all field patching. On the following pages are detailed instructions for the use and application of Roskote R28 Rubberized Mastic.

# Royston RoskoteR28 Rubberized Mastic

Easy to Apply and, Fast Setting
A high performance coating that has outstanding resistance to cathodic disbondment

## Royston Roskote R28 Rubberized Mastic

Royston Roskote R28 Rubberized Mastic is a co ld-applied coating with high electrical resistivity designed to protect underground steel pipes, tanks and other structures against corrosion.

Royston Roskote R28 Rubberized Mastic bonds firmly to clean steel surfaces without use of a primer and also to coal tar and hot applied asphalt. It forms a thick, tough coating, which will not oxidize, craze, alligator, crack, check, loosen or scale. It provides a high degree of electrical resistivity and shows excellent performance in cathodic protection or stray current situations. It withstands soil stresses and resists attack by alkalis, acids, salts and moisture.

Royston Roskote R28 Rubberized Mastic should be used as a general purpose coating for underground protection of all fabricated steel products, such as pipes, conduits, valves, fittings, tanks, hydraulic cylinder castings and structural steel. For field coating joints of mill coated pipe, it can be used in conjunction with reinforcing fabric such as Royston Glas-Wrap.

In certain areas in or near petroleum refineries, gasoline bulk plants, service stations, oil producing fields and similar locations, Roskote A-51 Plus which is resistant to both oil and gasoline should be used.

## How to Use It

**Handling Precautions:** Royston Roskote R28 Rubberized Mastic is a solvent based material which should be kept away from heat or open flame and should be used only with adequate ventilation. Repeated or prolonged contact with the skin should be avoided.

**Surface Preparation:** Surfaces should be dry for maximum adhesion. Remove rust, scale, soil, mud, oil, grease and other contaminants in the field by wire brushing. Sandblasting or chemical treatment may be more convenient for in-plant surface preparation. No adhesive is required except on newly galvanized surfaces which, should be coated with a suitable phosphate wash primer prior to mastic application.

**Thinning:** Thinning is not required except for cold spray at temperatures below 60°F. If excess thickening occurs because of solvent evaporation from opened containers, original viscosity may be restored by adding Royston Thinner 11 (Toluene).

**Stirring:** Royston Roskote R28 Rubberized Mastic should be stirred thoroughly before using

**Application:** Royston Roskote R28 Rubberized Mastic is applied cold by brush, spray, flow coat, dip or rubber glove. Apply two coats of Royston Roskote R28 Rubberized Mastic at the proper thickness, allowing the first coat to dry to the touch before applying the second.**Typical Properties**

| | |
|---|---|
| **Composition** | A pyrobituminous resin processed by homogenization with inhibitive pigments and aromatic solvents. |
| **Color** | Black |
| **Volume Resistivity** | $2.12 \times 10^{13}$ ohm $cm^3$ |
| **Application Temperature** | 32°F to 120°F |
| **Service Temperature** | 0 to 250°F |
| **Shelf Life** | At least one year |
| **Weight per Gallon** | 9.42 lbs |
| **Specific Gravity** | 1.13 |
| **Percent Solids:**<br>**By Volume**<br>**By Weight** | <br>58.6%<br>69.5% ±2% |
| **Flash Point** | 44°F Seta Closed Cup |

# Application

- **When brushing** Royston Roskote R28 Rubberized Mastic, it should be applied liberally with a generous amount on the brush at all times. It should never be brushed thin.

- **For spray application**, booster type spray equipment is required because of Royston Roskote R28 Rubberized Mastic's heavy consistency. At temperatures above 60°F, Royston Roskote R28 Rubberized Mastic may be sprayed as received without thinning or heating, but below 60oF it is usually necessary to thin with one quart of thinner to each five gallons of Royston Roskote R28 Rubberized Mastic, or to use an in-line heater set at 120°F maximum. Either air types of airless spray equipment commercially available from several manufacturers may be used. The following equipment and procedures have provided satisfactory results, but alternates may be equally successful.**For Use With Reinforcing Wrap.** Using with a reinforcing woven mesh such as Royston Glas-Wrap, the first step is to apply one coat of Royston Roskote R28 Rubberized Mastic and allow to dry to the touch. This amount of drying is necessary before proceeding further to prevent the wrap from pulling through the coating to the metal surface. From this point there are two alternate procedures in common use.

    1. Apply the wrap and then put on a second coat of Royston Roskote R28 Rubberized Mastic.

    2. Apply the second coat of Royston Roskote R28 Rubberized Mastic and then wrap use either while the Royston Roskote R28 Rubberized Mastic is still wet or after it has dried to the touch. Wrap tightly to embed the mesh in the coating.

- **Drying Time:** Royston Roskote R28 Rubberized Mastic usually dries to the touch in approximately 20 minutes. In 1-1/2 hours, it is sufficiently dry for light handling and backfilling. If it is necessary to backfill while the Royston Roskote R28 Rubberized Mastic is still wet or soft, apply pipeline felt to protect against damage to the coating.
- **Coverage:** Each coat of Royston Roskote R28 Rubberized Mastic should be applied at a coverage rate of 75-80 square feet per gallon, which will provide a dry film thickness of about 12 mils.**Holiday Detection:** The suggested setting for holiday detector instruments is 125 volts for each mil of dry film thickness. The coating must be thoroughly dry before testing. Allow at least 24 hours for complete solvent evaporation.

# ROYSTON ROSKOTE A-51 PLUS

ROYSTON ROSKOTE A-51 PLUS should be used as a general purpose coating for underground corrosion protection of all fabricated steel products, such as pipes, tanks, conduits, cylinder casings and structural steel.

It is particularly useful for corrosion protection of bolted couplings, valves, fittings and other objects of irregular shape. It is frequently used with ROYSTON GLAS-WRAP as a r einforcement for coating field joints of mill coated pipe or elevator hydraulic cylinder casings.

Because of its resistance to gasoline and oil, it should also be used at service stations, terminals, bulk stations, producing fields and similar locations. It is used above ground for resistance to corrosive fumes and severe atmospheric conditions.

## *Features*

- High electrical resistivity designed to protect underground steel pipes, tanks and other structures against corrosion particularly in soils saturated with oil and gasoline.
- Excellent above ground coating for protection against severely corrosive atmospheric fumes and against moisture and salt in coastal areas.
- Bonds firmly to steel surfaces without the use of primer.
- Forms a tough coating which becomes resistant to oxidizing, crazing, alligatoring, cracking, checking, loosening or scaling.
- Endures over a long period of time because of its resistance to soil stress and to attack by alkalis, acids, salts, moisture, gasoline and oil.

## *Surface Preparation*

Surfaces should be dry and cleaned of all rust, scale, soil, mud, oil, grease and other contaminants in the field by wire brushing. Sand blasting or chemical treatment may be more convenient for in-plant surface preparation. No primer is required.

## Typical Properties

| | |
|---|---|
| **Composition**: | Heavy mastic with synthetic elastomeric additivesin a mixed solvent system. |
| **Color**: | Black |
| **Weight per Gallon**: | 9.22 lbs. |
| **Specific Gravity**: | 1.11 |
| **Percent Solids**: | By Volume - 51%<br>By Weight - 62% |
| **Volume Resistivity**: | $1.4 \times 10^{11}$ ohms $cm^3$ |
| **Temperature Range**: | $-40^oF$ to $150^oF$ ambient and to $300^oF$ transient. |
| **Flash Point**: | $40^oF$ Seta-Flash Closed Cup. ASTM D327 8-73 |
| **Shelf Life**: | At Least One Year |

## *Application Procedure*

ROYSTON ROSKOTE A-51 PLUS should be stirred thoroughly before using. Thinning is not required except for cold spray at temperatures below $60^oF$. The heavy mastic is specially formulated to obtain a thick protective coating. If excess thickening occurs because of solvent losses from opened containers, restore to original viscosity with Royston Thinner No. 70 or a mixture of equal parts of toluene and MEK.

Apply cold by brush, glove or booster-pump spray. Apply to cover 65 to 70 square feet per gallon, which will provide a dry film thickness of about 12 mils per coat. When the first coat has dried to the touch, which will usually require less than an hour, apply a second coat at the same thickness.

## *Brush and Glove Application*

Apply liberally with a generous amount at all times. It should never be applied thin. However, a wet film thickness of .040 i nches is maximum per coat to reduce the possibility of mud cracking.

The City of Carencro may also use Shrink Tape to repair damaged protective coating on steel piping systems. This is use primarily on sections of piping that is exposed to the atmosphere such as over canals and ditches.

## SHRINK TAPE

For field patching underground pipe and fittings such as bolt-type couplings, services tees, valves, flanges, transition pipe, and above ground metal surfaces, Shrink Tape may be applied to irregular surface and pressed into conformity. It is applied to the pipe by wrapping and layering the tape in the area to be coated and heated to conform to the pipe surface and form a barrier between the pipe surface and the environment. The Wax-Tapes are made of a petroleum wax-saturated synthetic fabric that conforms to irregular surfaces. The Wax-Tapes have outstanding waterproofing and wetting characteristics, and are also an excellent dielectric barrier. The Wax-Tape stops atmospheric corrosion and eliminate the cost of constantly repainting above ground piping by using Trenton Wax Tape as a pipe coating. Shrink Tapes are environmentally friendly, UV Stabilized, can be installed on a wet pipe, and lasts for over 20 years. The one-time application is perfect for vaults, bridge crossings and problem meter sets.

Shrink Tape prevents corrosion on underground pipe, including wet and irregular surfaces. It requires no waiting time or drying time, can be backfilled immediately, and supports cathodic protection. Shrink Tape is user friendly, contains no VOCs, and is non-toxic, non-hazardous and non-carcinogenic. It provides excellent protection for a variety of applications, including couplings, valves, fittings, weld cutbacks and cadwelds.

Where greater protection form backfill soil is required, Shrink Tape can be over wrapped with Poly-Ply protective wrappers for increased electrical resistance and mechanical strength. Other suitable protective coatings may also be used.

## 5.12 EXTERNAL CORROSION CONTROL: CATHODIC PROTECTION (192.463)(a)(b)(c)

Each cathodic protection system is required to provide a level of cathodic protection that complies with one or more of the applicable criteria contained in appendix D of 49CFR192. If none of these criteria is applicable, the cathodic protection system must provide a level of cathodic protection at least equal to that provided by compliance with one or more of these criteria. If amphoteric metals are included in a buried or submerged pipeline containing a metal of different anodic potential: The amphoteric metals must be electrically isolated from the remainder of the pipeline and cathodically protected, or the entire buried or submerged pipeline must be cathodically protected at a cathodic potential that meets the requirements of Appendix D of this part for amphoteric metals. To comply with this requirement, steel gas pipelines in the City of Carencro gas distribution system meet or exceed the following requirements:

1. A negative (cathodic) voltage of 0.85 VDC, with IR Drop taken into consideration, as measured between the structure surface and a s aturated copper-copper sulfate reference electrode contacting the electrolyte. (Determination of voltage is made with current applied)
2. Cathodic protection must be controlled so as not to damage the protective coating or the pipeline. Pipe-to-soil potential readings should not exceed -2.20 VDC.
3. Segments of gas distribution piping identified as inadequate or not meeting the minimum acceptable cathodic protection criteria is subject to prompt remedial action to correct the deficiencies. Corrected within 90 days of discovery.

## 5.13 EXTERNAL CORROSION CONTROL MONITORING (192.465)(a)(b)(c)(d)

Cathodic Protection surveys shall be conducted at the following required frequency.

1. Cathodic Protection surveys must be conducted over the entire pipeline system at least once each calendar year, but with intervals not exceeding fifteen (15) months.
2. Separately protected short sections of mains or transmission lines, not exceeding 100 feet, or separately protected service lines may be surveyed on a sampling basis. T en (10%) percent of these structures over the entire system shall be surveyed each calendar year so that the entire system is tested in each ten year period. A different 10% shall be surveyed each year.
3. All impressed current cathodic protection rectifiers shall be inspected six times each calendar year with intervals not exceeding 2 1/2 months to ensure operation. See typical Rectifier Inspection Data Sheet in this Section 5)
4. Presently there are no interference bonds in the City of Carencro system. Should interference bonds be installed between the City of Carencro system and a foreign pipeline (transmission line), each reverse current switch, each diode and each critical interference bond whose failure would jeopardize structure protection be electrically checked for proper performance six times each calendar year but with intervals not exceeding 2 ½ m onths. Each other interference bond must be checked at least once each calendar year but with intervals not exceeding fifteen (15) months.
5. The areas identified during the survey will be corrected to comply with the minimum cathodic protection requirements. Remedial action to correct deficiencies in the cathodic protection system shall be completed within a reasonable period of time. This is within 90 days after discovery.

The electrical potential of pipe cannot be measured directly with a standard voltmeter. Instead, measure potential in reference to another know metal that is in contact with the same soil by using a copper sulfate half-cell which provides the reference in pipeline corrosion work. To measure the P/S voltage, connect a high resistance voltmeter to the pipeline and to the earth as follows:

<table>
<tr><th colspan="3">PROCEDURE FOR CONDUCTING PIPE-T0- SOIL POTENTIAL READINGS</th></tr>
<tr><th></th><th>Action</th><th>Information</th></tr>
<tr><td>1.</td><td>Connect the voltmeter to the pipe and to the earth through an electrode (the copper sulfate half-cell).<br>To connect to the pipe, use either:<br>• A wire type test station<br>• Direct contact with the exposed pipe.<br>• A metal contact probe</td><td>Connect the voltmeter as follows:<br><table><tr><th>Voltmeter Lead</th><th>Digital Voltmeter</th><th>Analog Voltmeter</th></tr><tr><td>Positive</td><td>Pipe or Test Lead</td><td>Copper Sulfate Half-Cell</td></tr><tr><td>Negative</td><td>Copper Sulfate Half-Cell</td><td>Pipe or Test Lead</td></tr></table></td></tr>
<tr><td>2.</td><td>Make sure the porous plug is in good contact with the soil. This means the:<br>• Half-cell is directly over the pipeline<br>• Porous plug of the electrode is wet with copper sulfate solution.</td><td>NOTE Solution in electrode (half-cell) is a mixture of copper sulfate and water. Mix approximately one and one-half to two tablespoons of copper sulfate with water. Water level in half-cell should be near top of electrode. Solution in electrode should be blue/green in color and have crystals in the saturation..</td></tr>
<tr><td>3.</td><td>Place the electrode away from buried anodes to prevent inaccurate readings.<br>• Keep the electrode directly above the pipe and as close to the pipe as possible.<br>• The closer the electrode is to contacting the pipe, the more accurate the P/S voltage.<br>• As the distance from the pipe to the electrode increases, the signal spreads out, and the reading is diffused over a larger area of pipe.</td><td>The electrode must be out of the immediate field of anode influence to obtain P/S voltage correctly</td></tr>
<tr><td>4.</td><td>Make sure the half-cell is in direct contact with the soil.</td><td>You will get false readings if the half-cell contacts materials other than soil.</td></tr>
<tr><td>5.</td><td>Make sure the soil is sufficiently moist.</td><td>In dry soil, add water to lower the resistance.</td></tr>
<tr><td>6.</td><td>Read the meter on the voltmeter.</td><td>NOTE: If the meter reads a negative potential, it will display a negative sign.</td></tr>
<tr><td>7.</td><td>Record the reading on the form.</td><td>NOTE: Reading must be a minimum of -0.85. If reading is less than -0.85 this indicates either an open compression coupling or a short - meter or underground metallic structure.</td></tr>
<tr><td>8.</td><td>If positive (+) polarity is present, notify the corrosion department.</td><td>Positive polarity indicates accelerated corrosion due to interference from neighboring structures.</td></tr>
<tr><td>8.</td><td>If positive (+) polarity is present, notify the corrosion department.</td><td>Positive polarity indicates accelerated corrosion due to interference from neighboring structures.</td></tr>
</table>

| PROCEDURE FOR READING RECTIFIER UNITS | | |
|---|---|---|
| | **Action** | **Information** |
| 1. | Before opening the rectifier cabinet, always touch the rectifier door with the back side of your hand. | This is to avoid potential electric shock should the A/C be shorted to the rectifier cabinet. Touching with the back of the hand, should the rectifier cabinet be energized, prevents the individual from becoming attached to the rectifier unit and being electrocuted. |
| 2. | Open the door and check/clean all debris, such as rat nests, grass and dirt from ants nests. | This debris collects at the bottom screen of the rectifier preventing air from entering the unit and causing the unit to run hot. |
| 3. | Turn rectifier **OFF**. Check for and tighten all loose connections. This includes both positive and negative lead to the pipeline structure (negative lead) and to the anode ground bed (positive lead), tap bar connections (rectifier adjustments, and finally two bolts on the shunt. | Loose connections can cause electrical sparking. **CAUTION: Failure to turn the rectifier off prior to tightening connections could cause electrical shock.** |
| 3. | **CATHODIC PROTECTION TECHNICIANS**<br>Turn rectifier **ON.** With a volt/ohm meter set on DC Volts, take a voltage reading across the positive and negative terminals at the bottom of the rectifier. The volt/ohm meter leads must be connected as follows:<br>• Red Lead (positive) to the negative rectifier terminal at bottom left of unit.<br>• Black lead (negative) to the positive rectifier terminal at bottom right of unit.<br>Record the reading on the rectifier inspection report. | Readings should always be taken with the positive lead (red) on the volt/ohm meter connected to the negative terminal and the negative lead (black) on the volt/ohm meter connected to the positive terminal. The negative terminal on the rectifier unit attaches to the Pipeline and the positive terminal on the rectifier attaches to the anode ground bed. The reading obtained should have a "-" negative symbol in front of the reading. This verifies polarity and that the rectifier is connected to the anode ground bed and the pipeline correctly. |
| 4. | **COMPANY EMPLOYEE NOT A CP TECHNICIAN**<br>Follow steps 1, 2 and 3. Read the volt meter and the amp meter on the face of the rectifier unit. Record each reading on the rectifier inspection document. | Employees who have **not** been trained in cathodic protection practices, the employee simply reads the volt meter and the amp meter on the face of the rectifier unit and records each reading in the appropriate spot on the rectifier inspection document. |
| 5. | Should either the volt reading, the amp reading or both volt and amp reading indicate "0", contact your cathodic protection contractor so he/she can trouble shoot the unit to determine the cause and correct the problem. | A zero "0" reading on the amp gauge indicates a discontinuity in the anode bed or a discontinuity in the line between the rectifier and the pipeline. A zero "0" reading on the volt gauge indicates no A/C power to the rectifier. Check to make sure the disconnect box is in the on position. |
| 6. | Records of rectifier reading should be maintained so that should a problem occur, the cathodic protection technician can review the readings and determine the cause of the problem. | Records are to be maintained for the life of the system. |
| 7. | Close and lock the rectifier door. | **NOTE:** Electrical shock can be a potential hazard for anyone obtaining access to the rectifier unit. |

**RECTIFIER NAME/LOCATION: ____________________________________**

| DATE | INSPECTOR | VOLTS | AMPS | COMMENTS |
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## 5.14 ELECTRICAL ISOLATION (192.467)(a)(b)(c)(d)(e)(f)

All buried or submerged pipelines in the City of Carencro gas distribution system is electrically isolated, and physically separated from other underground metallic structures, unless the pipeline and the other structures are electrically interconnected and cathodically protected as a single unit. Inspection and electrical tests must be made to assure that electrical isolation is adequate. Each residential and commercial gas-metering device is also electrically isolated with an insulating device to facilitate the application of corrosion control. E ach pipeline in the City of Carencro gas distribution system is electrically isolated from metallic casings that are a part of the underground system and there is an insulating device at the purchase point between the transmission co. and the City of Carencro pipeline. However, if isolation is not achieved because it is impractical, other measures must be taken to minimize corrosion of the pipeline inside the casing. An insulating device may not be installed in an area where a co mbustible atmosphere is anticipated unless precautions are taken to prevent arcing. There are two locations at which the City of Carencro and other facilities change ownership., Gulf South Gas Company supplies natural gas to the purchase point located on University Drive (La. 182) and Florida Gas Company supplies gas to the purchase point located on Prejean Road. Both purchase points are electrically isolated either by insulated union or insulated at a flange within the metering station.

Inspection and electrical tests are be made to assure that electrical isolation is adequate. This is accomplished during the annual cathodic protection survey. Insulation devices are not installed in areas where a co mbustible atmosphere is anticipated unless precautions are taken to prevent arcing. Precautions include using a temporary bond wire to bypass the insulator.

Where a pipeline is located in close proximity to electrical transmission tower footings, ground cables or counterpoise, or in other areas where fault currents or unusual risk of lightning may be anticipated, it must be provided with protection against damage due to fault currents or lightning, and protective measures must also be taken at insulating devices. The following procedure is used to repair shorted meter installations:

### PROCEDURE FOR DETERMINING IF A METER IS SHORTED

There are two methods commonly used to determine if a meter insulator is operating correctly by providing isolation between the customer's houseline and the gas company pipeline facilities. These two methods and how they operate are as follows:

1. **A device with two probes and a receiver/speaker**.
   Place one probe in contact with the company side of the meter upstream of the insulator being tested. This generally the elbow on t he inlet side of the gas meter. Place the other probe on the customer piping down stream of the insulator being tested. A buzz heard in the receiver/speaker indicates the isolation device is operating properly. If no buzz is heard, this indicates that the isolation device is faulty and needs replacement.
2. **An ohm meter.**

Using a common volt/ohm meter, place the selector switch in the Ohms position and place one probe in contact with the company side of the meter upstream of the insulator being tested. This generally the elbow on the inlet side of the gas meter. Place the other probe on the customer piping down stream of the insulator being tested. A reading of one (1) or infinity indicates that the isolation device is operating properly. Any reading of less than one ( 0 - .99) indicates that the isolation device is faulty and needs replacement.

## PROCEDURE FOR CHANGING METER INSULATOR

1. If insulator is found to be faulty, it must be replaced.
2. Notify customer that the gas meter will be turned off for a brief period of time to change the insulation device.
3. Turn meter off at the stop cock or meter valve.
4. Once gas is off, the insulated meter swivel will be removed and replaced with two (2) new insulated swivels installed on the inlet and outlet side of the meter.
5. Check across insulators with either of the two devices to verify that insulators are isolating the company facility from the customer's houseline.
6. Notify customer that the gas is ready to be turned back on and check to verify that all appliances are in the off position.
7. Turn gas back on and purge the houseline of air.
8. Re-light appliances.
9. If the customer is not at home, turn and lock meter valve in off position and leave a note/card notifying customer that gas is off and to contact the gas department in order to turn gas back on and to re-light appliances.

All casing in which a portion of the City of Carencro steel gas distribution system enters will be examined to determine if the gas piping is shorted to the casing. All piping and casings are tested annually to determine if the gas piping is shorted to the casing. Should test indicate that the gas structure or pipeline is shorted or in contact with the casing, the city of Carencro will either monitor the area over and around the casing by a flame ionization leak detection survey once every six (6) months or twice a year not to exceed seven and one-half (7 1/2) months or separate or isolate the pipeline from the casing.

## TESTING OF CASINGS FOR ELECTRICAL ISOLATION

All casing in which a portion of steel gas distribution system enters will be examined to determine if the gas piping is shorted to the casing. Should test indicate that the gas structure or pipeline is shorted or in contact with the casing, the City of Carencro will either monitor the area over and around the casing by a flame ionization leak detection survey once every six (6) months or twice a year not to exceed seven and one-half (7 1/2) months or separate or isolate the pipeline from the casing.

Pipeline must be electrically isolated from metallic casings that are a part of the underground system. However, if isolation is not achieved because it is impractical, other measures must be taken to minimize corrosion of the pipeline inside the casing. Presently, the City of Carencro does not have any steel piping inside steel casings. Should steel piping be inserted into casings, the casing is tested annually during the annual cathodic protection survey to determine if the pipeline is shorted to the casing.

## 5.15 EXTERNAL CORROSION CONTROL - TEST STATIONS (192.469)

Test station are installed throughout the entire gas distribution system and placed at strategic locations to ensure adequacy of the cathodic protection system. Each test lead wire installed will be cadwelded to the metal gas pipelines as detailed in the following paragraph. Test leads will be brought up to a test station box to enable the collection of cathodic protection data in volts direct current. The minimum requirements for cathodic protection requirement are addressed in section 5.10 of this Operation and Maintenance Plan.

All pipelines owned and operated by the City of Carencro and under cathodic protection are required to have sufficient test stations or other contact points for electrical measurement to determine the adequacy of cathodic protection. The test stations for City of Carencro are located at the end of each dead end section of piping to insure complete coverage of system piping. Additional test stations located along the pipeline enhance trouble-shooting efforts. These test points are established at strategic locations on the gas distribution system, and provide verification of the adequacy of cathodic protection. The stations are a combination of meter set test points, main gas line test stations and anode test station. These test points and test stations are identified on the cathodic protection survey data sheet and system mapping. (See typical Cathodic Protection Survey Data Sheet in this section.)

## 5.16 EXTERNAL CORROSION CONTROL – TEST LEADS (192.471)(a)(b)(c)

Each test lead wire installed will be cadwelded to the metal gas pipeline so as to remain mechanically secure and electrically conductive and must be attached to the pipeline so as to minimize stress concentration on the pipe. At the point of connection to the pipeline the connection must be coated with an electrical insulating material compatible with the pipe coating and the insulation on the wire. Test wire connection points and test boxes will be coated and/or maintained. Test leads are be brought up into a test station box to enable the collection of cathodic protection data in volts direct current. The minimum requirements for cathodic protection requirement are addressed in Section 5.11 of this Operation and Maintenance Plan.

## 5.17 EXTERNAL CORROSION CONTROL: INTERFERENCE CURRENTS (192.473)(a)(b)

Each operator whose pipeline system is subjected to stray currents shall have in effect a continuing program to minimize the detrimental effects of such currents. Each impressed current type cathodic protection system or galvanic anode system must be designed and installed so as to minimize any adverse effects on existing adjacent underground metallic structures.

Presently there are no interference bonds or interference problems in the City of Carencro Distribution System. However, 49CFR192.465(c) addresses interference or stray electrical current and requires that each reverse current switch, each diode and each interference bond whose failure would jeopardize structure protection be electrically checked for proper performance six times each calendar year but with intervals not exceeding 2 ½ months. Each other interference bond must be checked at least once each calendar year but with intervals not exceeding fifteen (15) months. Should interference

be detected on the City of Carencro Gas Distribution System, they will be handled in accordance with 192.465(c).

## 5.18 INTERNAL CORROSION: GENERAL (192.475)(a)(b)

Just as metallic structures or pipelines corrode externally, structures such as pipelines also corrode internally. This type corrosion is most often caused by poorly process gas, but may also be caused by differences in metallic chemical and physical composition. No corrosive contaminates are to be transported in the gas supplier's transmission pipeline unless the corrosive effect of the gas on the pipeline has been investigated and steps have been taken to minimize internal corrosion. Corrosion can weaken pipe by causing a loss in the wall thickness, leading to leaks. Internal corrosion sometimes occurs because of corrosive gas situations, but usually is caused by moisture condensates in the pipeline. Corrosive gas situations occur when unprocessed or poorly processed natural gas contains contaminants such as carbon dioxide, sulfur, or water (moisture) that can cause deterioration of the base metal from the inside.

To combat internal corrosion, when excavating existing gas piping for repairing leaks, the pipeline should be inspected thoroughly for evidence of internal corrosion. Should other areas adjacent to the leak area also indicate damage or potential damage due to corrosion, that section of pipeline must be cut out and removed. The cut out section of pipeline should be inspected internally for pitting and evidence of corrosion. If internal corrosion is detected, that section of pipeline must be replaced. See Section 5.17 of this manual for minimum wall thickness requirements.

Replacement must be made to the extent required by the applicable paragraphs of 192.487 or 192.489. See Section 5.23 of this manual for minimum wall thickness requirements. Gas containing more than 0.25 grain of hydrogen sulfide per 100 standard cubic feet (5.8 milligrams/m3) at standard conditions (4 parts per million) may not be stored in pipe-type or bottle-type holders.

## 5.19 INTERNAL CORROSION CONTROL – MONITORING (192.477)

**If** corrosive gas is being transported, coupons or other suitable means must be used to determine the effectiveness of the steps taken to minimize internal corrosion. Each coupon or other means of monitoring internal corrosion must be checked twice each calendar year, but with intervals not exceeding 7 1/2 months. Presently there is no evidence of internal corrosion in the gas piping as determined by inspection of sample coupons.

The gas superintendent should obtain from the natural gas supplier, a "Gas Analysis Report" which identifies the content of the gas being delivered to the purchaser including the moisture content of the gas.

## INTERNAL CORROSION CONTROL INSPECTION FORM

**DATE OF INSPECTION:** _____

**NAME OF INSPECTOR:** _____

**LOCATION OF MAIN/SERVICE LINE:** *(Provide address and street/road of gas facility where inspection was made)* _____

_____

_____

_____

_____

**RESULTS OF INSPECTION:**

- ☐ **Shiny**
- ☐ **Slight Rust/Oxidation**
- ☐ **Slightly Pitted**
- ☐ **Severely Pitted**

**Provide any other Information Deemed Necessary:** _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

## 5.20 ATMOSPHERIC CORROSION CONTROL (192.479)(a)(b)

For the purposes of this Operation and Maintenance Manual, all above ground metallic structures including piping and associated fittings in the gas distribution system are considered to be in an atmospheric corrosive environment and require protection against atmospheric corrosion. All aboveground pipelines owned and operated by City of Carencro, regardless of when the pipeline was installed shall be cleaned and either coated with a protective coating or jacketed with material suitable for the prevention of atmospheric corrosion. Pipelines located in regulator or metering stations as well as meter sets are painted with paint suitable for the prevention of atmospheric corrosion. There are three (3) such stations located on the City of Carencro gas distribution system. The two (2) purchase point stations and one (1) City Gate Station located on the gas distribution system are monitored for atmospheric corrosion. Each station shall be examined periodically to inspect condition of painted surfaces of piping and associated equipment. Exposed sections of pipelines shall be examined every three (3) years to inspect condition of coating.

## 5.21 ATMOSPHERIC CORROSION MONITORING (192.481)(a)(b)(c)

The operator for the City of Carencro Natural Gas System must inspect each pipeline or portion of pipeline that is exposed to the atmosphere for evidence of atmospheric corrosion at least once every three (3) calendar years, but with intervals not exceeding 39 months. During the inspections the operator must give particular attention to pipe at soil-to-air interfaces, under thermal insulation, under dis-bonded coatings, at pipe supports, in splash zones, at deck penetrations, and in spans over water. If atmospheric corrosion is found during an inspection, the operator must provide protection against the corrosion as required by §192.479. Remedial action must be completed promptly not to exceed 90 days.

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**

## ATMOSPHERIC CORROSION CONTROL INSPECTION FORM

**COMPANY:** _____

**Location:** _____

**Inspector:** _____ **Date:** _____

This form is to be completed when above ground piping is inspected for corrosion from atmospheric conditions or corrosive conditions that cannot be controlled by cathodic protection. Inspect all exposed piping every three (3) years for atmospheric corrosion per §§192.479, 192.481and 192.491.

Designation of Line: Transmission ( ) Distribution ( ) Service ( )

Line Size: _____

Area of Corrosion: Pipe ( ) Meter Set ( ) Fitting ( )
Regulator ( ) Support ( ) Vent ( )
Other (describe): _____

Type of Paint or Coating Used: _____

If General Painting of Exposed Piping is Undertaken, List Address Below:

## 5.22 REMEDIAL MEASURES – GENERAL (192.483)(a)(b)(c)

Each segment of metallic pipe that replaces pipe removed from a buried or submerged pipeline because of external corrosion must have a properly prepared surface and must be provided with an external protective coating that meets the requirements of §192.461. Segments of metallic pipe that replaces pipe removed from a buried or submerged pipeline because of external corrosion must also be cathodically protected.

Except for cast iron or ductile iron pipe, each segment of buried or submerged pipe that is required to be repaired because of external corrosion must be cathodically protected.

## 5.23 REMEDIAL MEASURES FOR DISTRIBUTION SYSTEMS (192.487)(a)(b)

Any section of distribution piping on the City of Carencro Natural Gas System gas distribution system with a wall thickness of less than that required for the MAOP of the pipeline or remaining wall thickness of less than 30% of the nominal wall thickness shall be replaced. However, corroded pipe may be repaired by a method that reliable engineering tests and analyses show can permanently restore the serviceability of the pipe. Segments of distribution line pipe with localized corrosion pitting to a degree where leakage might result must be replaced or repaired. Corrosion pitting so closely grouped as to affect the overall strength of the pipe is considered general corrosion.

Repairs are made to sections of the gas distribution piping affected by general corrosion where the effected area of piping is small. Segments of distribution piping when excavated for any reason is inspected for localized corrosion pitting where leakage might occur. When identified, this piping is replaced or repaired. Piping that has been replaced or repaired shall be coated to provide a barrier between the electrolyte and the metallic piping to prevent corrosion. During annual cathodic protection surveys, areas of the gas distribution system which are identified as not in compliance with minimum acceptable cathodic protection criteria will be evaluated to determine cause of inadequate pipe-to-soil potential readings. The areas identified during the survey will be corrected to comply with the minimum cathodic protection requirements. Remedial action to correct deficiencies in the cathodic protection system shall be completed within a reasonable period of time. This must be accomplished within 90 days after discovery.

## 5.24 REMEDIAL MEASURES; CAST IRON PIPELINES(192.489)(a)(b)

Each segment of cast iron or ductile iron pipe on which general graphitization is found to a degree where a fracture or any leakage might result must be replaced. Each segment of cast iron or ductile iron pipe on which localized graphitization is found to a degree where any leakage might result, must be replaced or repaired, or sealed by internal sealing methods adequate to prevent or arrest any leakage.

## 5.25 INSTALLATION OF GRAPHITE ANODES

Impressed current anodes can be buried vertically, horizontally, or in deep holes as determined by either specifications or conditions. Backfill material must be placed to assure that there are no voids around the anodes. Anodes should be placed in stratums of soil that have the lowest soil resistance measurements. Resistance measurements are measured in ohm centimeters using a soil resistance meter. Soil resistance determines how anodes are to be installed. Installation can be horizontally, vertically or vertically in deep anode ground beds.

Individual leads for each anode are used when installing deep well ground beds and are installed per the attached drawing in this procedure. A header cable with anode leads attached is the most common method for installation of horizontal and vertical ground beds. This type installation is depicted in the attached drawings in this procedure. Underground splices on header cable (positive lead wire) to ground bed should be kept to a minimum. Connection between header cable and conductors from anodes should be mechanically secure, electrically conductive and sealed to prevent moisture penetration so that electrical isolation from the environment is assured. When using a header cable with anodes, connections should be accomplished with crimped "C" Clamps, wrapped securely first with insulation tape and then electrical tape with a moisture retarding sealer applied over the electrical tape. Sealer must be allowed to dry before burial.

**NOTE**

**Failure to properly insulate and/or provide adequate moisture sealant will result in failure from electrolytic corrosion.**

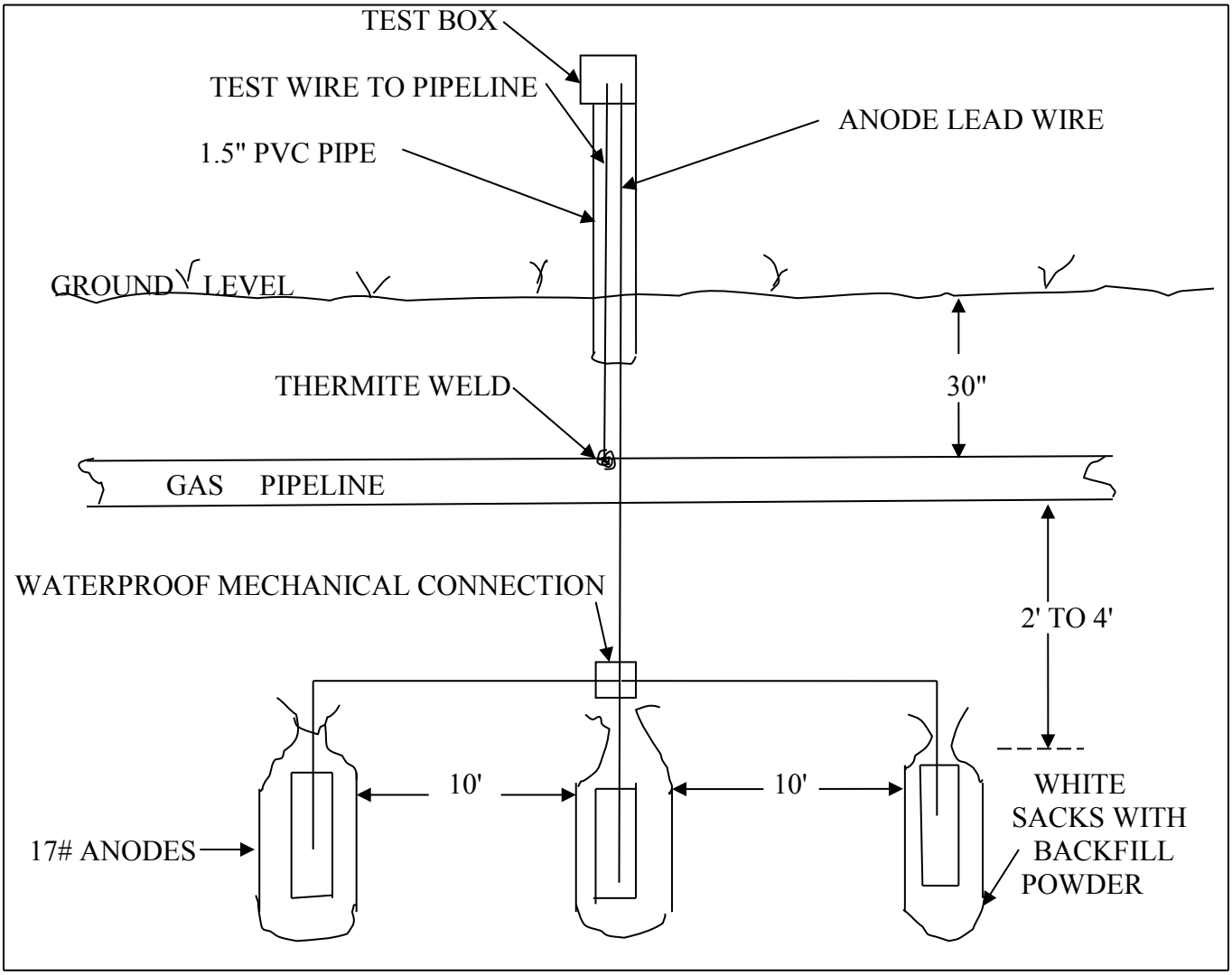
## 5.26 INSTALLING MAGNESIUM ANODES

The City of Carencro uses Magnesium anodes for the protection of isolated sections of the gas distribution system such as service lines off plastic mains and isolated sections of the main gas lines and as additional current. Magnesium anodes are buried approximately two (2) feet to four (4) feet below the gas service or gas main. Generally, the closer the anode is to the water table, the higher the current output. Once the anode has been buried below the structure and backfilled, the pipeline or service line must be cleaned to ensure electrical continuity. This is accomplished by removing all wrapping and/or undercoating on the structure. The structure should appear shiny prior to the anode lead with being attached to the structure. The anode may be installed by either using a clamp that mechanically connects the anode to the structure or by bonding the anode to the structure as described in section 5.13 of this manual titled, Cadwelding. When using mechanical clamps to connect the anode to the structure, the clamp is installed around the service line or structure, secured tight enough to ensure electrical continuity and inserting the anode lead wire into the hole in the clamp with the set screw. The setscrew must be tightened enough to ensure electrical continuity between the anode lead wire and the mechanical clamp. A Pipe-to-Soil potential reading taken on the service riser after anode installation using a volt/ohm meter with a copper-copper sulfate reference electrode is the method used to verify proper installation. Service lines with proper anode installation should indicate a reading of -0.85 volts or higher.

**PROCEDURE FOR INSTALLING MAGNESIUM ANODES**

| | ACTION | INFORMATION |
|---|---|---|
| 1. | Evaluate the pipe coating. | The more holidays in a coating, the more current the anodes have to generate to protect the pipe.<br>• The more current an anode generates, the shorter the life of the anode. |
| 2. | Anchor the wire. | For steel pipe, the wire must be anchored by wrapping it around the pipe and looping the end back up on the pipe. |
| 3. | Determine proper anode distance from the pipe. | NACE recommends that anodes should be at least 3' away from coated pipe and 6' away from bare steel pipe.<br>• Prevent the powder in the anode sack from causing a future corrosion cell, and<br>• Provide a better current spread on bare piping. |
| 4.. | Determine proper anode depth. | NACE recommends that anodes should be at least 1' deeper than the pipeline.<br>• This will generally insure that the anode will be in a more moist soil than the pipeline in dry weather. |
| 5. | Determine proper anode spacing. | When more than one anode is installed on a piece of pipe, never put the anodes closer than 10' apart.<br>• Anodes installed closer than 10' apart do not put out as much current. |
| 6. | Install the anode(s) as described above in the bottom of the hole in a vertical position with the lead wire facing upward. | • Use a post hole digger or auger, bore or dig a hole in the bottom of the existing hole so that the anode can be placed in an upright position. The anode lead wire can then come out of the ground into a test box. |
| 7. | Tamp the earth firmly around all sides of the anode. | • Leave some slack in the lead wire so the backfill does not strain the weld.<br>• Be careful not to break the anode lead wire when tamping. |
| 8. | After installing the anode in the hole, run the anode lead wire into and through a 1.5" PVC pipe and attach the wire to one of the connection points in the test box. | Always run this wire to the test box. This wire will be the anode lead wire. |
| 9. | Using a second wire, bond it to the gas pipeline by cadwelding (Thermite Weld) to the pipeline. (See procedure for making Thermite Welds in this Section of the O&M Manual.) Run this wire through the same 1.5" PVC pipe and attach the wire to a different connection point in the box. | This second wire (cadwelded to the pipeline) and run to the test box is used to make the connection between the anode lead wire and the pipeline. **NOTE:** Any connection of anode wire to header cable or when tying two or more anodes together must be made by mechanical connectors and wrapped to prevent moisture from contacting the connection point. |
| 10. | Patch the coating where it is damaged or has been removed at the connection point of the anode wire to the pipeline. | **NOTE**: In the case of bare steel. Coat all bare piping exposed in the excavation. |
| | **ACTION** | **INFORMATION** |

| | | |
|---|---|---|
| 11. | Place the test box where it can be easily located. | Make sure the test box is protected from damage, preferably near a utility pole or other type structure. |
| 12. | Pour water around the anode. Wet the area thoroughly. | The backfill powder attracts moisture to keep the anode working. wetter the anode is the more current it produces |
| 13. | Carefully backfill the hole with dirt. | Do not allow heavy loads of dirt to fall directly onto the anode wire or the wire that is attached to the pipeline. This could cause the wire to disconnect from the pipeline. |
| 14. | **Do Not** allow foreign structures to contact the pipe | This causes a short which takes away current from the pipeline |
| 15. | Insulate all gas meters when connected to a cathodically protected system. | There are two reasons for this:<br>• Customer piping must be insulated from the gas system.<br>• Insulation will prevent foreign structures from draining protection from the system. |



## 5.27 ELECTRICAL CONTINUITY

Electrical Continuity is essential to the installation and maintenance of cathodic protection systems**.** To provide cathodic protection to all underground piping in the gas distribution system, discontinuities (dresser couplings prohibiting the conduction of electricity) must be found, excavated and bonded/cadwelded electrically using number 6, seven strand insulated wire. Care should be taken to cover with a compatible protective coating all areas of the pipeline, exposed bonding wire and bonded connection points. Dresser couplings should be bonded/cadwelded so that the bonding wire is cadwelded from the pipeline to the barrel of the dresser coupling to the pipeline as depicted in the attached drawing, using cadwelds. This process should be documented on a Dresser Coupling Bonding Record per the attached drawing.

**CAUTION**

**When installing short sections of plastic pipe for making repairs to any section of steel pipeline that is under cathodic protection, jumper the plastic pipe with #4 seven strand wire by bonding wire from existing steel line to existing steel. Bonding is accomplished in accordance with the following paragraph. This provides a current path for cathodic protection current.**

**CADWELDING**

Cadwelding is the most desirable method of assuring electrical continuity throughout the entire gas distribution system. All metal surfaces including pipelines, compression couplings and flanged valves that require bonding/cadwelding of wire to provide continuity must be cleaned down to the metal surface. This is accomplished by removal of the tar coating and using a file to clean/shine the surface area. The shined area should be slightly pitted to prepare surface for a good bond. The cleaning of the metal surface area should be kept to a minimum, but large enough to make a secure bond. Once the wire is bonded to the surface of the pipeline, compression coupling or valve, a protective tar covering, or wrap must be applied to the area ensuring that there is no surface area that is not completely wrapped. Failure to properly bond dresser coupling may accelerate corrosion of metallic structures. The procedures and instructions for proper cadwelding techniques are on the following pages.

## PROCEDURE FOR CADWELDING/THERMITE WELDING

| | Action | Information |
|---|---|---|
| | **Prepare the Pipe** | |
| 1. | Place a fire extinguisher up wind from the site of the wild | The fire extinguisher must be manned by a qualified operator. |
| 2. | Put on personal protective equipment (PPE) | PPE should include:<br>• Welder's gloves<br>• Goggles for eye protection |
| 3. | Prepare a 3" x 3" area of the metal pipe surface for bonding by removing all:<br>• Coating<br>• Rust or scale<br>• Moisture<br>• Dirt | The mold must rest on a thoroughly cleaned metal surface.<br>• Use a wire brush to clean the pipe.<br>• Use a file or hammer to remove the pipe coating. |
| 4. | Find an area where the pipe is in good conditions. | |
| 5. | File an area the size of the weld to a bright, shiny state. | Use a portable grinder or file until the area is dry and bright. |
| 6. | Do not touch the prepared surface. | Contamination prevents successful welding. |
| | **Prepare the Wire** | |
| 7. | Remove the wire insulation.<br>• Strip a minimum of 2" of insulation from the end of the wire.<br>• Strip the wire so the exposed length is ¼" longer than the copper sleeve. | |
| 8. | Scrape, file, or sand the bare end clean. | |
| 9. | Use a copper sleeve with #12 wire to insure adequate bonding to the pipe. | A copper sleeve is a prepared, round fitting used on smaller size wires for reinforcement.<br>• For wire sizes 14, 12, and 10 use copper sleeves<br>• For wire sizes 8, 6 and 4, no sleeve is required.<br>• For wire size 2 and larger, use formed terminal connections.<br>Anodes cone with a #12 solid wire. |
| 10. | Place the copper sleeve over the bare wire and crimp it in place. | |
| 11. | Wrap the wire around the pipe and twist it. | Leave plenty of slack in the wire to prevent damage when backfilling. |

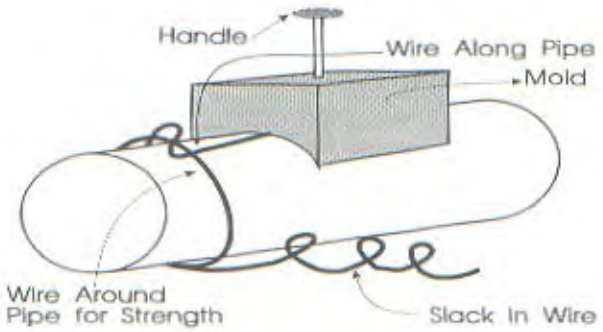



Figure 15: Wire Preparation

| | Action | Information |
|---|---|---|
| | **Prepare the Mold** | |
| 12. | Before making the weld, prepare the thermite weld mold. | The thermite weld mold (also called the crucible) holds the weld shot, a steel disk, and a wire in a stationary position on the pipe. |
| 13. | Inspect the mold to make sure it is intact and has no physical defects. | Do not use a mold that has no cover or is otherwise defective since the shot may splatter and burn you. |
| 14. | Clean the mold to remove all:<br>• Slag<br>• Dirt<br>• Aches. | The mold is made of relatively soft carbon material. Be careful not to chip or break it. |
| 15. | Make sure the mold is completely dry | **WARNING!** Wet or damp molds will produce violent reactions. |
| 16. | Use the proper size mold. | This will prevent undue running of weld material. |
| 17. | Carefully remove the weld shot from its protective case. | The weld shot is a package containing flammable welding powder, starting powder, and a steel disk. |
| 18. | Place the steel disk in the bottom of the mold. | Position it so it seals off the opening to the pipe. |
| 19. | Remove the cap of the cartridge container, and dump the vial of powder into the mold on top of the steel disk. | The welding powder is the top powder. The starting powder is the bottom powder (the fine gray powder).<br>Dump the vial so the two powders do not mix. |

| | Action | Information |
|---|---|---|
| 20. | If the starting powder in the container is caked and won't fall out, break it up by crushing the container between your thumb and finger. | Then dump the loosened starting powder on top of the other powder.<br>• Starting powder may be trailed to the opening in the lid of the m old for easier ignition. |
| 21 | Close the mold cover. | Avoid contact with either the welding powder or the starting powder. |

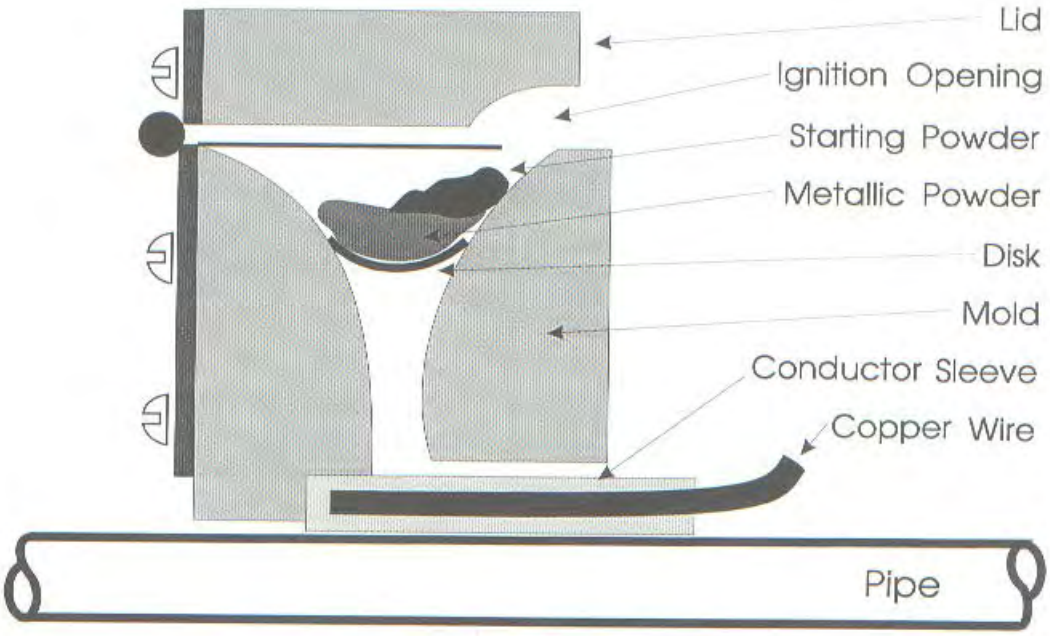



Figure 16: Preparing the Mold

| | | |
|---|---|---|
| | **Make the Weld** | |
| 22. | Place the mold upright on the pipe. | |
| 23. | Insert the wire halfway into the mold slot. | Make sure the lead wire has no tension. |
| 24. | Make sure the lid of the mold is closed. | |
| 25. | Set the mold with the wire parallel to the pipe. | |
| 26. | Place the mold over the cleaned surface of the pipe and hold it firmly so that it is in full contact with the surface. | Keep the mold in place by holding the handle firmly. |
| 27. | Always test the excavation for gas before thermite welding. | Proceed only when:<br>• The work area is 100% gas free.<br>• All safety equipment is in place. |

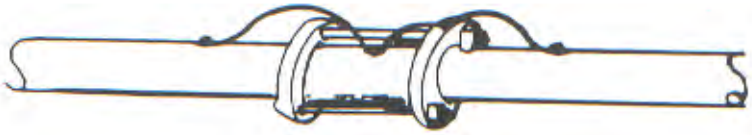
| | Action | Information |
|---|---|---|
| 28. | Put on protective goggles and gloves before igniting the shot. | |
| 29. | Tap the side of the mold with the sparking gun. | This is to ensure the shot burns completely. |
| 30. | Use a flint type-sparking gun to ignite the starting powder. | Never use matches or a lighter. Improper ignition may cause severe burns. |
| 31 | Hold the mold against the pipe surface until the weld has solidified.<br>• Remove the mold by the handle. | This should be at least 10 seconds. |
| 32 | Test the finished weld by tapping it once or twice on each side with a hammer | This is to:<br>• Make sure the weld is strong.<br>• Remove loose slag particles. |
| 33 | Make sure the wire is fused to the sleeve and the weld. | To void weakening the wire:<br>• Pull the wire in line with the sleeve<br>• Do not make a sharp bend at the weld. |
| | **Protect the Weld** | |
| 34. | Wait until the pipe has cooled to the touch. | This will be at least 5 minutes. |
| 35. | Protect the weld by:<br>• Leaving sufficient slack in the wire<br>• Running the wire up the side of the bell hole. | This is so the backfill will not strain the weld by pulling on the wire. |
| 36. | Apply primer to the weld. | Extend the primed area at least 2” beyond the edge of the intact coating. |
| 37. | Protect the area around the bonded surface by applying an approved protective coating. | • Protective coatings include tape and handy caps.<br>• Make sure the primer is still tacky. |
| 38. | If the primer dries completely, apply it again before taping or coating | |

To properly bond or cadweld/thermoweld across compression couplings or dresser couplings for continuity purposes, is important to bond to the barrel of the compression coupling or dresser coupling as well as the gas main on either side of the coupling.

**PROCEDURE FOR BONDING COMPRESSION COUPLINGS**

| | Action | Information |
|---|---|---|
| 1. | Clean off an area where the bonds are to be made. | Each area should be cleaned down to the bare shiny metal. |
| 2. | Using the bonding procedure on the previous page:<br>1. Bond the wire to the cleaned spot on one end of the pipe.<br>2. Bond the wire to the barrel of the coupling.<br>3. Bond the wire to the cleaned spot on the other end of the pipe | Failure to bond the wire to the barrel of the coupling could lead to aggressive corrosion of the dresser coupling. |
| 3. | Coat all exposed metal with mastic or suitable protective coating. | See Section 5.8 of this O&M |

Below are examples of correctly bonded dresser couplings.

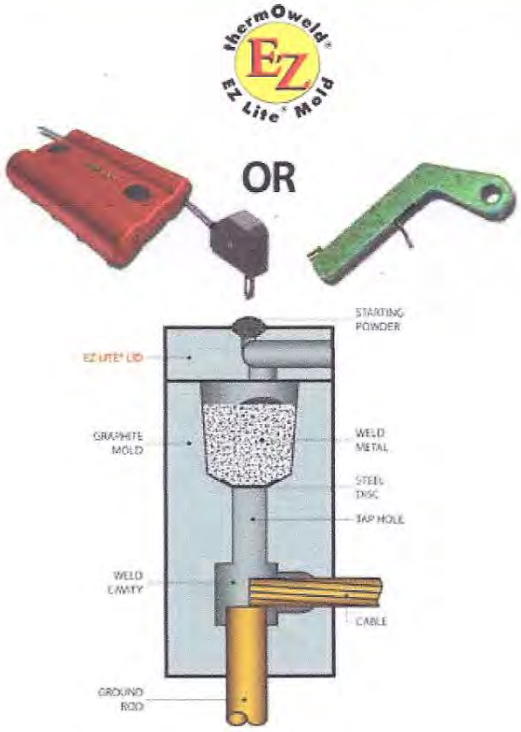


# TECHNICAL INFORMATION



## The thermOweld® Process

The thermOweld® permanent-connection process has been engineered to be an easy and efficient field welding system. No outside power, bulky gas tanks or other equipment associated with welding are required with the thermOweld® system. Any field installer or contractor can use our high-grade graphite molds designed and produced in thermOweld's world-class volume CNC manufacturing operations.




**Incorporating our patented EZ Lite® mold lid (see page 10), ignition is done safely from the top of the mold with limited exhaust emanating from the side vent.** This innovation from thermOweld®, combined with other unique features, make even tight field installations possible. For indoor connections where desired, thermOweld® offers low-emissions molds as well. Contractors worldwide demand thermOweld® for ease of use and the safest operation.

Using thermOweld's superior weld metal (see page 90), a high-temperature reaction between special formulations of copper oxide and aluminum occurs in the mold crucible. Upon reaching critical temperature, the resulting molten copper drops into the weld cavity, instantly creating a high-temperature molecular bond with the conductor. This weld connection cools rapidly and the mold can be removed for the next connection with thermOweld's special off-set handle clamps (page 94). The thermOweld® process creates a superior connection without the excessive applied heat of brazing, arc welding or soldering. This is important especially for welding insulated cables or to thin-wall pipe.

The thermOweld® process creates a permanent, homogenous and molecular bond that cannot loosen or corrode. Compared to compression connectors, split bolts, crimp connectors, brazing and other connections, the thermOweld® connection is clearly superior. In fact, a thermOweld® connection will also withstand more current than the conductor itself.

**It's easy to see why thermOweld® is The Contractor's Choice worldwide!**

The thermOweld® process has been used to weld materials other than copper for electrical purposes, including:

| | | | | | |
|---|---|---|---|---|---|
| Stainless Steel | Galvanized Steel* | Columbium | Kama | Brass | Chromax |
| Copperweld® | Silicon Bronze | Plain Steel | Steel Rail | Bronze | Cast Iron |
| Nichrome V | Copper-Clad Steel | Everdur® | Cor-Ten® | Niobium | Monel |

*When welding to galvanized steel it is recommended to resurface exposed bare steel.

### Standards Relating to thermOweld Designs of Earthing, Grounding and Lightning Protection

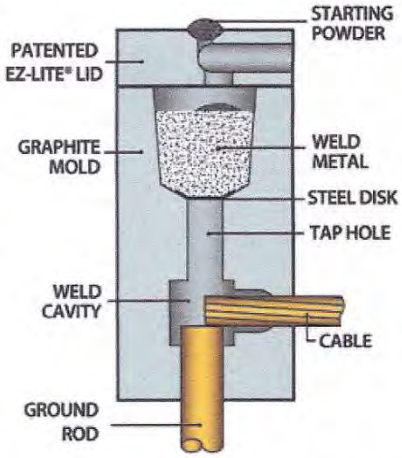
| Standards | Country | Description |
|---|---|---|
| IEEE: 80-1986 | USA, Australia, Asia, Europe, Latin America | Guide for Safety in AC Substation Grounding |
| IEEE: 837-2002 | USA, Australia, Asia, Latin America | Standard for Qualifying Permanent Connections used in Substation Grounding |
| IEEE: 81-1983 | USA, Australia, Asia | Guide for Measuring Earth Resistivity, Ground Impedance and Earth Surface Potential of a Ground System |
| IEEE: 998-1996 | USA, Australia, Asia | Guide for Direct Lightning Strike Shielding of Substations |
| UL 467 | USA, Australia, Asia | Grounding and Bonding Equipment |
| NFPA 780 | USA, Australia, Asia | Lightning Protection |
| IEC/TS 60479-1 | Europe, Brazil | Effects of Current passing through human beings & livestock |
| EN62305-3: 2011 | Europe | Protection against Lightning, Physical damage to structure and life hazard |
| ANCE NMX-J-549-2005 | Latin America | Lightning Protection |

# TECHNICAL INFORMATION



## thermOweld® EXOTHERMIC MOLDS

thermOweld® is a process of welding copper to copper, copper to steel and copper to ductile iron. The exothermic reaction takes place in a semi-permanent graphite mold with a special formula of copper oxide and aluminum.




thermOweld® connections are solid copper molecular bonds that do not loosen or corrode throughout the life of the host structure. These bonds are the superior connection method for the most reliable and highest longevity of grounding, lightning protection, cathodic protection and other critical infrastructure systems.

**Standard Molds** – thermOweld® standard molds are given in the tables on the pages in this catalog and are used with new clean AWG and Metric wire and cable. A standard mold is not for use in "heavy-duty" applications; see Heavy Duty Molds.

**Heavy Duty Molds** – thermOweld® heavy-duty molds are given in the tables on the pages in this catalog (with an H suffix) and are employed for use with reused or reclaimed and heavily oxidized AWG and Metric wire and cable. In these cases a "heavy-duty" mold is recommended as it accepts this larger wire diameter and utilizes a larger weld metal cartridge size. The resulting connection is larger than a standard mold connection. Note that the grounding engineer may determine that the calculated theoretical ground fault current level may be abnormally high and therefore would prefer the larger mass of a heavy-duty mold connection.

thermOweld® has designed and produced over 15,000 unique molds to meet application needs worldwide. We have solved many applications with unique and customized molds, utilizing our CAD engineering and specialized CNC machining capabilities. If you don't see what you need in this comprehensive catalog, contact us. We are ready to support you quickly!

## SINGLE SHOTS

thermOweld® single shot molds are an economical way to make cable connections onto the top of a ground rod or rebar. The single shot is a disposable single use ceramic mold that comes complete with everything required except the flint ignitor. This innovative process eliminates the need for a mold, handle clamps, and frames.

## SUPERIOR WELD METAL

thermOweld® weld metal is packaged in moisture resistant plastic cartridges that have tight fitting caps. These cartridges and the necessary steel discs are then packaged in boxes that are shrink wrapped. Shrink wrapping ensures the weld metal will arrive in good condition, always dry, and ready for a positive ignition every time.

All weld metal is eligible for thermOweld's SDS (Same Day Service) shipment. Our SDS program is just like having it on your shelf.

# TECHNICAL INFORMATION



## The Molecular Bond

The thermOweld® connection is a molecular weld. The weld has the same melting point as copper. This factor, along with the increased cross sectional area of the connection and insure the following:

- thermOweld® connections are not affected by a high current surge. Tests have shown that the electrical conductor will melt before the thermOweld® connection, when subjected to high short circuit current. Consult IEEE Standard 837.
- thermOweld® connections will not loosen or corrode at the point of weld. There are no contact surfaces or mechanical pressures involved.
- thermOweld® connections have a current-carrying capacity equal to or greater than that of the conductors.

## The EZ Lite® Mold

- Makes all thermOweld® molds EZ to ignite.
- Lights from the top at any angle.
- Reduces emissions by 50% or more.
- Reduces splatter.
- Keeps the handle clamps clean and prolongs life.
- Added Safety - The EZ Lite® Lid points the exhaust away from the user.

thermOweld® EZ Lite® Mold PATENTED

## INSTALLATION IS EASY!

### Making a thermOweld® Connection

Position cleaned conductors in mold.

Place metal disc in bottom of mold crucible.

Pour powder into crucible.

Place a small amount of starting powder in the ignition pocket.

Ignite the starting powder with the Flint Ignitor.

Remove weld and clean mold before making next connection.

Visit www.thermOweld.com for training videos

# INSTALLATION IS EASY!

## Making a thermOweld® Connection using the EZ Lite Remote® Electric Start System

Position cleaned conductors in mold.

Place metal disc in bottom of mold crucible.

Pour powder into crucible.

Insert the EZ Lite® Ignitor in the connector.

Insert the EZ Lite® Ignitor in the top opening of the EZ Lite® Lid.

Turn the power button to the "ON" position.

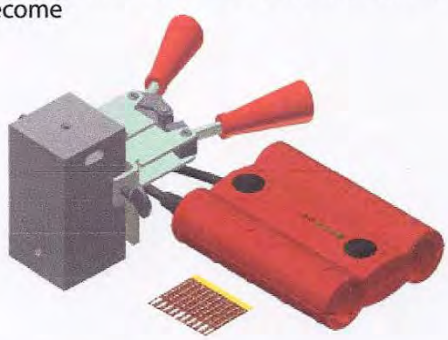
Press the "Operate" button until the exothermic reaction is initiated.

Remove weld and clean mold before making next connection.

thermOweld's EZ Lite Remote® is the latest technological advance for thermOweld® exothermic products and the entire industry! For over 50 years, thermOweld® has been developing and inventing products and practical solutions that have become "The Contractor's Choice" worldwide.

With our patent-pending EZ Lite Remote®, the contractor, installer and distributor has versatility and ease-of-use in hand.

You can use your existing thermOweld® EZ Lite® molds and weld metal that you already have in your truck, the jobsite or on your shelf!



Visit www.thermOweld.com for training videos or scan the QR Code at the top of this page.

# TECHNICAL INFORMATION

Section 1
Technical Information

## Why Cathodic Protection?

Cathodic protection (CP) is a technique used to control the corrosion of a metal surface by making it work as a cathode of an electrochemical cell. This is achieved by placing in contact with the metal to be protected, another more easily corroded metal to act as the anode of the electrochemical cell. Cathodic Protection systems are most commonly used to protect steel, water/fuel pipelines and storage tanks; steel pier piles, ships, offshore oil platforms and onshore oil well casings.

Clean pipe before making weld.

Position conductor and mold onto pipe.

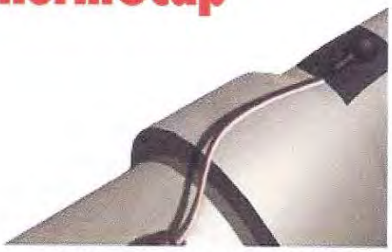
Place metal disc in bottom of mold.

Pour weld metal into mold.

Close lid and place starting powder on top. Ignite starting powder with Flint Ignitor.

Remove and clean mold before making next connection.

thermOcap®



Finish your connection with a Ci thermOcap®. page 175

Visit www.thermOweld.com for training videos

# INSTALLATION IS EASY!

## Making a thermOweld® Low Emission Connection using the EZ Lite Remote® Electric Start System

Position cleaned conductors in mold.

Place filter pad into lid.

Place metal disc in bottom of mold crucible.

Pour powder into crucible.

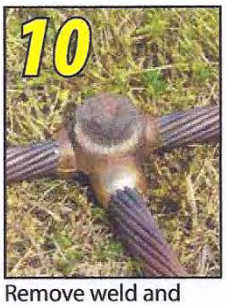
Insert the EZ Lite® Ignitor in the connector.

Place EZ Lite® Ignitor on the side of the mold and place gasket on top of ignitor.

Close lid and secure with latch.

Turn the power button to the "ON" position.

Press the "Operate" button until the exothermic reaction is initiated.



Remove weld and clean mold before making next connection.

Visit www.thermOweld.com for training videos

# How to Order thermOweld® Molds

The most common ***exothermic connections*** for concentric and solid copper conductors are listed in this thermOweld® catalog. Save Time and Money by using molds listed in this catalog. If you cannot find the necessary connection please contact thermOweld® at 1-800-558-1373 or visit our web site at www.thermoweld.com and go to the ***Mold Selection Wizard*** for assistance.

1. **Determine the Weld Type required:**
   a. Know the application to determine what materials are to be welded.
   b. Refer to Selector Chart for correct weld type on pages 20-30.
   c. Find the appropriate Weld Type within the catalog.

   *There are pictures of each weld type in the upper corners of the catalog pages for easy reference*
2. **Determine the Correct Mold #:**
   a. Determine the Conductor Size or Sizes, Ground Rod Size or surface to be welded.
   b. Locate each of the above to find the correct Mold #.

   *The thermOweld® catalog lists molds that are designed for stranded AWG concentric and solid cable, as well as ground rods, bus bar, lugs, steel, rebar, and other special grounding accessories. For sizes not listed please contact thermOweld® at 1-800-558-1373.*
3. **After Determining the Correct Mold # Verify the Following:**
   a. Price Key - Find the price of the mold by crossing it on the thermOweld® price lists.
   b. Weld Metal (size) needed to make weld.
   c. Handle Clamps required for the mold.
   d. Packing Materials (if needed).
   e. See Notes - for other accessories needed or suggested to make this connection.

## Please Check to make sure you have the following to make a proper weld:

1) Mold that fits your application.
2) Weld Metal required for the connection.
3) Handle Clamps or frame.
4) Flint Ignitor or EZ Lite Remote®- (Low emission molds require the use of the EZ Lite Remote®).
5) Sleeves, packing or other accessories required or suggested.

**Mold Availability:**

The mold availability is listed under the lead-time column in the catalog.

- SDS – Same Day Service *(Orders placed by 5:00 pm Central time can ship Same Day)*
- 2 - Ships 2 days following the date the order is placed.
- 4 - Will ship in 4 days ARO *(Design molds will take up to 4 days to ship after receipt of order.)*

*Call Today Ship Today!*

## 5.28 DOCUMENTATION (192.491)(a)(b)(c)

The operator for the City of Carencro shall maintain records or maps to show the location of cathodically protected piping, cathodic protection facilities, galvanic anodes, and neighboring structures bonded to the cathodic protection system. Records or maps showing a stated number of anodes, installed in a stated manner or spacing, need not show specific distances to each buried anode. Each record or map must be retained for as long as the pipeline remains in service.

The operator shall maintain a record of each test, survey, or inspection required by this subpart in sufficient detail to demonstrate the adequacy of corrosion control measures or that a corrosive condition does not exist. These records must be retained for at least 10 years, except that records related to §§192.465 ( a) and (e) and 192.475(b) must be retained for as long as the pipeline remains in service.

All cathodic protection survey data is to be documented on the attached Cathodic Protection Survey Data Sheet that identifies the test point location, pipe-to-soil potential reading, date of inspection and identification of inspector. Inspection of cathodic protection rectifiers is to be documented on the attached Rectifier Inspection Data Sheet that identifies rectifier voltage and amperage output. All bonded dresser couplings should be documented and transferred to system mapping. The following records shall be maintained and stored at the City Hall on East St. Peter Street in Carencro, La. until the pipeline is retired from service.

1. Maps or records showing the location of cathodically protected in service piping.
2. Maps or records showing the location of cathodic protection facilities (rectifiers/test stations).
3. Maps or records showing the location of galvanic anodes
4. Maps or records showing the location of bonded structures to the cathodic protection system.
5. Operator Qualification Record of person directing the design, installation, operation, and maintenance of cathodic protection systems.
6. Records of inspections/examinations
7. Annual pipe-to-soil monitoring (**1 per yr/15 months**) for short sections of main less than 100 feet and separately protected service lines (**10% per year; all in 10 years**)
8. Rectifier monitoring (**6 per yr/not to exceed 2½ months**)
9. Interference bond monitoring – Critical if applicable (**6 per yr/2½ months**)
10. Prompt remedial actions
11. Unprotected pipeline surveys, cathodic protection active corrosion areas (**1 per 3 cal yr/39 months**)(If Applicable)
12. Electrical isolation (**including casings**)
13. Test stations – Record demonstrating sufficient number of test stations exist to determine adequacy of cathodic protection. (Annual Corrosion Surveys)
14. Test lead maintenance – Record demonstrating test leads are electrically conductive
15. Interference currents – Record of program to minimize detrimental effects of stray currents if pipeline is subject to them.
16. Internal corrosion; corrosive gas investigation
17. Internal corrosion; internal surface inspection; pipe replacement
18. Internal corrosion control coupon monitoring (**2 per yr/7½ months**)
19. Atmospheric corrosion control monitoring (**1 per 3 calendar yr/39 months**)
20. Remedial: replaced or repaired pipe; coated and protected; corrosion evaluation and actions
21. Maps of the Gas Distribution System

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**

## TYPICAL CATHODIC PROTECTION P/S DATA SHEET

**Bld Enterprises, Inc.**
**BUILDING AND SERVICE INSPECTION REPORT**

**CLIENT: CARENCRO GAS DEPARTMENT** **DATE: March 10, 2004**

| NO. | LOCATION | STREET | P | N | REMARKS |
|---|---|---|---|---|---|
| 1. | Beige Wooden House | Hector Connoly Road | | X | |
| 2. | 1019 | Hector Connoly Road | | X | |
| 3. | 109 | Stanley Road | | X | |
| 4. | 111 | Stanley Road | | X | |
| 5. | 113 | Stanley Road | | X | |
| 6. | 179 | Stanley Road | | X | |
| 7. | Red Brick House | Stanley Road | | X | |
| 8. | 204 | Stanley Road | | X | |
| 9. | 210 | Stanley Road | | X | |
| 10. | 201 | Stanley Road | | X | |
| 11. | 212 | Stanley Road | | X | |
| 12. | 211 | Stanley Road | | X | |
| 13. | 214 | Stanley Road | | X | |
| 14. | 215 | Stanley Road | | X | |
| 15. | 220 | Stanley Road | | X | |
| 16. | 223 | Stanley Road | | X | |
| 17. | 222 | Stanley Road | | X | |
| 18. | 224 | Stanley Road | 3 | | Page 1 |
| 19. | 225 | Stanley Road | | X | |
| 20. | 919 | Hector Connoly Road | | X | |
| 21. | 908 | Hector Connoly Road | | X | |
| 22. | White Wooden Building | Stanley Road | | X | |
| 23. | 835 | Hector Connoly Road | | X | |
| 24. | Blue House/White Trim | Hector Connoly Road | | X | |
| 25. | 1500 | Hector Connoly Road | | X | |
| 26. | | | | | |

**NUMBER OF SERVICES SURVEYED: 25 (1) 0 (2) 0 (3) 1 Total 1**

**TECHNICIAN: Barry Dupuis** **GUIDE: O' Neal Woods**

## SECTION 6 - TEST REQUIREMENTS (SUBPART J)

### 6.1 GENERAL REQUIREMENTS (192.503)(a)(b)(c)

Persons may not operate a new segment of pipeline, or return to service a segment of pipeline that has been relocated or replaced, until it has been tested in accordance with this section of the Operation and Maintenance Manual and §192.619 to substantiate the maximum allowable operating pressure. All potentially hazardous gas leaks have been located and eliminated/repaired. Air will be used as the test medium for pressure testing mains and service lines. Since the MAOP or the gas distribution system does not require test pressures that would approach hoop stress there is no requirement for hoop stress limitation requirements.

The City of Carencro gas distribution is designed to carry internal pressure of up to 60 psi on sections of piping between the purchase points and the City Gate Station as described in Section 7.7 of the City of Carencro Operation and Maintenance Manual. These values have been derived based on historical data, affidavits, relief valve set points and pressure test records. Entire rolls of plastic pipe will be tested at 150% of its intended Maximum Allowable Operating Pressure (MAOP) or 50 PSIG whichever is greater. Short sections of piping will also be tested at these same values. Test duration for mains is one (1) hour and 15 minutes for service lines. Testing of piping systems will be accomplished with either air or nitrogen and must be relatively free of sedimentary materials, and except for natural gas, nonflammable.

Joints used to tie in a test segment of pipeline is excepted from the specific test requirements, but each non-welded joint must be leak tested at not less than its operating pressure.

If a component other than pipe is the only item being replaced or added to a pipeline, a strength test after installation is not required, if the manufacturer of the component certifies that:

(1) The component was tested to at least the pressure required for the pipeline to which it is being added;
(2) The component was manufactured under a quality control system that ensures that each item manufactured is at least equal in strength to a prototype and that the prototype was tested to at least the pressure required for the pipeline to which it is being added; or
(3) The component carries a pressure rating established through applicable ASME/ANSI, Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS) specifications, or by unit strength calculations as described in § 192.143.

Testing will be documented on a test-recording chart or test record that will be maintained by City of Carencro. Prior to placing a section of new gas main into service or returning to service a section of line that has been abandoned and reinstated, that section of piping will be tested at 150% or 1-1/2 times the intended MAOP for that system. All testing will be in accordance with the following test requirements outlined in sections 6.2, 6.3, and 6.4 of this Operation and Maintenance Manual.

## 6.2 TEST REQUIREMENTS FOR PIPELINES OPERATING BELOW 100 PSI (192.509)(a)(b)

The test procedure used to pressure test gas lines must ensure discovery of all potentially hazardous leaks in the segment being tested. E ach main that is to be operated at less than 1 p.s.i. (6.9 kPa) gage must be tested to at least 10 p.s.i. (69 kPa) gage and each main to be operated at or above 1 p.s.i. (6.9 kPa) gage must be tested to at least 90 p.s.i. (621 kPa) gage.

Except for service lines and plastic pipelines, each segment of a pipeline that is to be operated at or below 100 p.s.i. must be leak tested in accordance with the following:

A. The test procedure used must ensure discovery of all potentially hazardous leaks in the segment being tested.
B. Each main that is to be operated at less than 1 p.s.i. must be tested to at least 10 p.s.i. and each main to be operated at or above 1 p.s.i.. must be tested to at least 90 p.s.i or 1.5 times the intended MAOP whichever is higher.

The six (6") steel pipeline between the University Purchase Point and the four (4") steel gas line between the Prejean Road Purchase Point are intended to operate at pressures up to 60 psi. These steel pipelines will be tested at 150% of the intended MAOP 90 PSIG. The test duration of these gas distribution lines is also one (1) hour.

All steel main lines located downstream of the City Gate Station on University Drive is intended to operate at 25 psi. These gas mains will also be tested at 90 psi for a minimum of one (1) hour.

## 6.3 TEST REQUIREMENTS FOR STEEL SERVICE LINES (192.511)(a)(b)(c)

Each segment of service line (other than plastic) must be leak tested in accordance with this section before being placed into service. If feasible, the service-line connection to the main must be included in the test; if not feasible, it must be given a leakage test at the operating pressure when placed in service.

Each segment of a service line (other than plastic) intended to be operated at a pressure of at least 1 p.s.i. (6.9 kPa) gage but not more than 40 p.s.i. (276 kPa) gage must be given a leak test at a pressure of not less than 50 p.s.i. (345 kPa) gage.

Each segment of a service line (other than plastic) intended to be operated at pressures of more than 40 p.s.i. (276 kPa) gage must be tested to at least 90 p.s.i. (621 kPa) gage, except that each segment of a steel service line stressed to 20 percent or more of SMYS must be tested in accordance with §192.507 of this subpart.

Service lines constructed of steel piping within the City of Carencro Gas Distribution System shall be tested in accordance with this section of the Operating and Maintenance Manual before being placed in service. If possible, the service line connection to the main will be included in the test. If this is not possible, the service line connection will be leak tested at the operating pressure when placed in service. Service lines are intended to operate at a maximum allowable pressure of 60 PSIG. These service lines will be tested at a minimum of 90 PSIG for a minimum of fifteen (15) minutes.

All steel service lines located downstream of the City Gate Station on University Drive is intended to operate at 25 psi. These gas mains will also be tested at 90 psi for a minimum of one (1) hour.

## 6.4 TEST REQUIREMENTS FOR PLASTIC PIPE (192.513)(a)(b)(c)(d)

The test procedure used to pressure test gas lines must ensure discovery of all potentially hazardous leaks in the segment being tested. The test pressure must be at least 150 percent of the maximum operating pressure or 50 p.s.i. (345 kPa) gage, whichever is greater. However, the maximum test pressure may not be more than three times the pressure determined under §192.121, at a temperature not less than the pipe temperature during the test. During the test, the temperature of thermoplastic material may not be more than 100°F (38°C), or the temperature at which the material's long-term hydrostatic strength has been determined under the listed specification, whichever is greater.

All plastic gas distribution mains will be pressure tested at 150% or 1-1/2 times its intended maximum operating pressure or a minimum of 50 PSI, whichever is greater. The test pressure must be maintained as long as required to identify any leaks or other hazards. Test pressure for polyethylene mains with a intended MAOP of 60 PSI will be a minimum of 90 PSIG for a minimum of one (1) hour with the temperature of the thermoplastic piping not exceeding 100° degrees F during the test. The Operator of the gas distribution system will approve deviations from this test pressure for the City of Carencro

Service lines with a intended MAOP of 60 PSI will be pressure tested to a minimum of 90 PSIG and for a minimum of fifteen (15) minutes with the temperature of the thermoplastic piping not exceeding 100° degrees F during the test. Service lines with a intended MAOP of 25 PSI will be pressure tested to a minimum of 50 PSIG and for a minimum of fifteen (15) minutes with the temperature of the thermoplastic piping not exceeding 100° degrees F during the test. While the test is on the newly installed gas service, all connections including the saddle, coupling(s) and connection to the service riser will be soap tested at operating.

## 6.5 TEST RECORDS (192.517)(a)(b)

The City of Carencro will shall make, and retain for the useful life of the pipeline, a record of each test performed under §§192.505 and 192.507. The record must contain at least the following information:

1. Operators name, Employee responsible for making the test, and the name of any test company used.
2. Test medium used
3. Test Pressure
4. Test Duration
5. Pressure recording charts
6. Leaks and failures identified and the disposition of each.

Each operator must maintain a record of each test required by §§192.509, 192.511, and 192.513 for at least 5 years. The City of Carencro will maintain copies of test record for all pressure testing of new and reinstated section of gas distribution system piping. These test records shall be maintained at the Carencro City Hall on East St. Peter Street in Carencro, La. See copy of typical pipeline test report on next page.

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**

## PIPELINE TEST RECORD

This form must be completed for each section of newly installed section of pipe or service line and on each service line that is disconnected from the main for any reason.

**DATE:**_____

**Name of Gas Distribution System:** _____

**Type of Pipe (Include Batch No.:** _____

**Size of Pipe:** _____

**Length of Line:** _____

**Location of Line:** _____
_____
_____
_____

**Tested With:** **Nitrogen:** □ **Air:** □ **Natural Gas:** □ **Water:**□ **Other:** □

**Time Started:** _____

**Time Stopped:** _____

**Test Pressure Start:** _____

**Test Pressure Stop:** _____

**Line Loss:** _____

**Reason For Line Loss:** _____
_____
_____

**Corrective Measures Taken:** _____
_____
_____

**Signed By:**_____
(Person Making Test)

Sketch Location on Back of Sheet for Mapping Purposes
Use Actual Measurements and Adequate Reference Points

On the following page are charts and tables that detail pressure-testing requirements.

## PRESSURE TEST REQUIREMENTS FOR STEEL & PLASTIC PIPELINES

| **Class Location** Population Density (1=least, 4=most dense) | **Test Factor For Pipe Segment:** Installed before Nov. 12, 1970 | Installed after Nov. 11, 1970 | Converted under 49 CFR § 192.14 |
|---|---|---|---|
| Class 1 | 1.1 | 1.1 | 1.25 |
| Class 2 | 1.25 | 1.25 | 1.25 |
| Class 3 | 1.4 | 1.5 | 1.5 |
| Class 4 | 1.4 | 1.5 | 1.5 |

## DOT Location Test Factors For Steel Pipe

| | **Under 30% SMYS** | | | **30% SMYS and above** |
|---|---|---|---|---|
| **MAOP** | Less Than 1 psig | 1 psig to 100 psig | 100 psig and Above | All pressures |
| **Minimum Test Pressure** | 10 psig | 90 psig | MAOP X Location Factor | MAOP X Location Factor |
| **Maximum Duration** | As required to identify hazards | | As required (Min. 1 hour) | As required (Min. 8 hours) |
| **Maximum Test Pressure** | See Hoop Stress Chart (Table 2, Page 10) | | | |
| **Test Media** | Natural Gas, Air, or Inert Gas | | | |

## Test Requirements For Steel Mains

| **MAOP** | Less than 1 psig | 1 psig to 40 psig | 41 psig to 99 psig | 100 psig and over |
|---|---|---|---|---|
| **Minimum Test Pressure** | 10 psig | 50 psig | 90 psig | MAOP X 1.5 |
| **Minimum Test Duration** | As required to identify hazards | | | |
| **Maximum Test Pressure** | See Hoop Stress Chart (Table 2, Page 10) | | | |
| **Test Media** | Natural Gas, Air, or Inert Gas | | | |

## Test Requirements For Steel Service Lines

| **MAOP** | Less than 1 psig | 1 psig to 33 psig | 33 psig and over | |
|---|---|---|---|---|
| **Minimum Test Pressure** | 50 psig | 50 psig | MAOP X 1.5 | |
| **Minimum Test Duration** | As required to identify hazards | | | |
| **Maximum Test Pressure** | Not to Exceed 125 psig | | | |
| **Test Media** | Natural Gas, Air, or Inert Gas | | | |

## Test Requirements of Plastic Pipe

## PROCEDURE FOR CONDUCTING PRESSURE TEST.

| | Action | Information |
|---|---|---|
| **1.** | Isolate the test segment by sealing any open ends as follows:<br>**Flanged Steel:**<br>• Install a matching blind flange.<br>**Unflanged Steel:**<br>• Weld on a weld cap, or<br>• Install a compression fitting and bull plug (with proper reinforcement).<br>**Plastic:**<br>• Fuse on a cap or install valve. | |
| **2.** | Reinforce compression joints as required.<br>• Use welded or fused reinforcement whenever possible | Reinforcement may be:<br>• Welded straps<br>• Lug bolt assembly<br>• Backfill. |
| **3** | Connect the pressure testing equipment to the line.<br>• Follow Company policy and manufacturer's instructions. | If you must attach the pressure testing assembly on steel pipe with a compression fitting, reinforce or block the fitting for the **test** pressure, **NOT** the **operating** pressure. To test shorter or smaller diameter mains, attach the pressure test assembly to one of the following:<br>• Service tee<br>• Service riser<br>• 3-way tee<br>• Special adapter that screws into the purge tap (for plastic mains). |
| **Conduct the Test** | | |
| **4.** | Pressure the line to the calculated test pressure.<br>• If using natural or inert gas, provide enough ventilation to avoid the risk of suffocation. | Keep PE piping at 100°F or below by partially backfilling trench as necessary<br>The MAOP for the gas distribution piping for the City of Carencro is 60 psi between the purchase points and the city gate station and 25 psi downstream of the city gate station. Calculated test pressure is 90 psi and 37.5 psi. S**teel** piping must be tested at a minimum of 90 psi and **plastic** piping at 50 psi based on Pipeline Safety regulation 192.315.<br>Duration: Mains = 1 Hour<br>Services = 15 Minutes |

| | Action | Information |
|---|---|---|
| **5** | To test long segments and/or large diameter pipes (determined by engineering and local supervision):<br>• Maintain the test long enough to be certain that the temperature of the test medium has stabilized. | The temperature must stabilize because the compressor air entering the pipe is hot. As the air cools, the pipeline pressure will drop even if there is no leak. |
| **Determine the Test Result** | | |
| **6** | Compare the readings before and after the test.<br>• If there is any pressure drop during the test, consider whether the drop was produced by temperature change. | If there is no pressure drop during the test, the pipe has passed the test and no pressure correction calculation is needed. |
| **7** | If necessary, calculate Corrected Final Pressure. | Air in the pipe can be hot from the sun or the compressor. If the air cools during the test period, you must adjust the final pressure to allow for the drop. |
| **Locate and Repair Leaks** | | |
| **8.** | If the Corrected Final Pressure is 1 psig or more below the initial pressure, there is a leak you must locate and repair.<br>• You may make temporary repairs in order to finish the test. | Depending on the test medium, leaks may be located:<br>• Visually<br>• By sound<br>• By smell<br>• Using leak detection equipment. |
| **9** | After the repair, repeat the test.<br>• If you discover a leak, make additional repairs as necessary.<br>• Make a permanent leak repair. | You must repair and retest leaks before you can tie in the pipe. |
| **Prepare the Pipe For Operation** | | |
| **10** | When the pressure test shows no sign of leakage, purge and tie in the pipe. | The pipe segment must first be tied in at one end, then purged, and then tied in at the other end. |
| **11** | Remove any temporary reinforcements, as required. | |

## 6.6 UPRATING (192.553)(a)(b)(c)

For up-rating purposes, the City of Carencro Natural Gas System has established a written procedure that will ensure that each applicable requirement is in compliance with 192.557. Whenever there is a requirement to increase the operating pressure above existing MAOP that increase in operating pressure will be made in increments, the pressure increased gradually and at a rate that can be controlled. Following each incremental increase, the pressure will be held constant while the entire segment of pipeline that is affected is checked for leaks. Each leak detected must be repaired before a further pressure increase is made, except those leaks determined not to be potentially hazardous. These leaks do not need to be repaired, if it is monitored during the pressure increase and it does not become potentially hazardous

The operator for the City of Carencro Natural Gas System, when uprating a segment of pipeline shall retain for the life of the segment a record of each investigation required by this subpart, of all work performed, and of each pressure test conducted, in connection with the uprating. Should the City of Carencro determine a need to up-rate any gas distribution system piping, this up rating will be accomplished in accordance with Section 6.7 and 192.557. Pipeline Safety should be notified prior to beginning the up-rating process.

The City of Carencro Gas Distribution System has established its Maximum Allowable Operating Pressure (MAOP) as described in Section 7.10 (192.619) of this Operating and Maintenance Manual. Presently, City of Carencro does not anticipate any need to up rate or increase operating pressure above its MAOP. City of Carencro pressures tests all gas piping in accordance with Section 6.2, 6.3 and 6.4 of this O&M. Any section of Gas Distribution System installed after July 1970 that is not covered by the signed sworn affidavit and does not have required test records, will be Uprated in accordance with the following instructions: Pipeline Safety may grant exceptions to the requirement to up-rate.

Limitation on increase in maximum allowable operating pressure. Except as provided in §192.555 (c), a new maximum allowable operating pressure established under this subpart may not exceed the maximum that would be allowed under §§ 192.619 and 192.621 for a new segment of pipeline constructed of the same materials in the same location. However, when uprating a steel pipeline, if any variable necessary to determine the design pressure under the design formula (§192.105) is unknown, the MAOP may be increased as provided in §192.619(a)(1).

## 6.7 UPRATING STEEL AND PLASTIC PIPELINES (192.557)(b)(c)

Unless the requirements of this section have been met, no person may subject

1. A segment of steel pipeline to an operating pressure that will produce a hoop stress less than 30 pe rcent of SMYS and that is above the previously established maximum allowable operating pressure; OR
2. A plastic, cast iron, or ductile iron pipeline segment to an operating pressure that is above the previously established maximum allowable operating pressure.

To increase the operating pressure of any steel or plastic piping that is above the previously established maximum allowable operating pressure, the operator shall:

1. Review the design, operating and maintenance history of that segment(s) of piping.
2. A leakage survey shall be conducted and repairs made to any leaks found, provided the segment(s) of steel or plastic piping have not been surveyed within the past year. Leaks determined not to be potentially hazardous need not be repaired provided they are monitored during the pressure increase and the leak does not become potentially hazardous.
3. Make any repairs, replacements, or alterations in the segment of pipeline that are necessary for safe operation at the increased pressure;
4. Reinforce or anchor offsets, bends and dead ends in pipe joined by compression couplings or bell spigot joints to prevent failure of the pipe joint, if the offset, bend, or dead end is exposed in an excavation;
5. Isolate the segment of pipeline in which the pressure is to be increased from any adjacent segment that will continue to be operated at a lower pressure; and,
6. If the pressure in main or service lines, or both, is to be higher than the pressure delivered to the customer, install a service regulator on each service line and test each regulator to determine that it is functioning. Pressure may be increased as necessary to test each regulator, after a r egulator has been installed on each pipeline subject to the increased pressure.
7. Pressure increases shall be made in increments that are equal to 10 psig or 25% percent of the total pressure increase whichever produces the fewer number of increments. Whenever the requirements of paragraph (b)(6) of this section apply, there must be at least two approximately equal incremental increases.

Each operator who up-rates a segment of pipeline shall retain for the life of the segment a record of each investigation required, of all work performed, and of each pressure test conducted, in connection with the uprating.

## SECTION 7 - GENERAL OPERATING AND MAINTENANCE REQUIREMENTS (SUBPARTS L & M)
## OPERATING AND MAINTENANCE PLAN

### 7.1 GENERAL PROVISIONS [192.603)(b) (RECORDS]

The operator for the City of Carencro shall keep and maintain records necessary to administer the procedures established under §192.605. Records necessary to administer this Operation, Maintenance and Emergency Plan are to be maintained by the City of Carencro for the life of the Natural Gas Distribution System. These records include but are not limited to Procedural Manual Review – Operations and maintenance (1 per yr/15 months), Availability of construction records, maps, operating history to operating personnel, Periodic review of personnel work – effectiveness of normal Operations and maintenance procedures, Periodic review of personnel work – effectiveness of abnormal operation procedures, Annual Reports, Captan/Odorization Reports and Documentation, Gas Maintenance and System Repair Records, Testing Records, Leak Survey Records including Leak Repair Records, Regulator Inspection Records, Cathodic Protection Records including Annual Surveys and Rectifier and Ground Bed Installation Records, Gas Distribution System Maps, Valve Maintenance Records and Relief Valve Inspection Records. All records are available for use and review at the City of Carencro City Hall on St. Peter Street in Carencro, La.

### 7.2 PROCEDURAL MANUAL FOR OPERATIONS, MAINTENANCE AND EMERGENCIES (192.605)(a)(b)(3)(5)(8)(9)(10)(iii)(11)(d)

This Operating, Maintenance, and Emergency Plan is established for the City of Carencro to comply with Title 49 of the Code of Federal Regulations, Part 192. This plan will be complied with and distributed to Officials of City of Carencro who are involved in activities associated with the administration, operating and distribution of natural gas to the customers of City of Carencro including those departments affiliated with law enforcement and fire protection. The Operator for the City of Carencro Gas Distribution System is responsible for complying with this plan and for the review and update at intervals not exceeding 15 months, but at least once each calendar year. Plan reviews will be documented on a n Operation and Maintenance Plan review record. Appropriate parts of the manual must be kept at locations where operations and maintenance activities are conducted.

All employees who participate in the business of installing, repairing, abandonment and maintenance of the City of Carencro Gas Distribution System facilities including meters and regulators shall comply with and be familiar with the requirements of the Operation and Maintenance Manual. All employees will comply with instructions provided in this manual. City of Carencro creates maps of its facilities including construction records and leak history and furnishes these records to appropriate personnel. These maps are located at City Hall on St. Peter Street in Carencro, La.

This O&M Manual includes procedures for the following activities to provide safety during maintenance and operation in accordance with the requirements of §49CFR192.

- Operating, maintaining and repairing pipelines.
- Controlling corrosion in accordance with the operations and maintenance requirements of Subpart I of §49CFR192.
- Making and maintaining construction records, maps, and operating history available to appropriate operating personnel.
- Gathering data needed for reporting incidents under §49CFR192 in a timely and effective manner.

Starting up and shutting down any sections of the gas distribution system will be accomplished in a manner so as to assure operation of the gas system within the Maximum Allowable Operating Pressure (MAOP) limits described in Section 7.10 of this Operation and Maintenance Manual. To shut down any section of the gas distribution system, the operator must turn off the appropriate valve(s) and must also ensure that all gas service lines to customers are turned off and locked out at the service riser valve prior to pressurizing that part of the gas distribution system once maintenance has been completed. Start up of a section of the system is accomplished by slowly pressurizing the section of the gas distribution system, which has been shut down for maintenance by slowly opening the appropriate valve(s) and by maintaining compliance with Sections 7.13 of this O&M Manual by not exceeding the approved MAOP. This is accomplished by monitoring pressure relief valves at each station. Prior to relighting the customer appliances, it is important to purge the gas piping of any air that may be trapped in the lines. Purging of air in the system may be accomplished at the gas meter following instructions in Section 7.16, "Purging with Natural Gas" of this O&M.

The Operator of the City of Carencro Distribution System is responsible periodically for reviewing the work done by maintenance personnel to determine the effectiveness and adequacy of the procedures used in normal operation and maintenance and during emergencies. Procedures will be modified when deficiencies are identified. The Operator for the City of Carencro Distribution System is responsible for complying with this plan and for review and update at intervals not exceeding 15 months but at least once each calendar year. Plan reviews will be documented on an Operation and Maintenance Plan review record. See next page for copy of form.

The operator for the City of Carencro will take adequate precautions in excavated trenches to protect personnel from hazards by providing breathing apparatus and rescue/safety harness and lines. These items must be worn by maintenance personnel when required to enter underground surface areas or place head below ground level when repairing gas leaks on both steel and plastic gas lines within the system. Equipment is furnished by the Fire Department.

Systematic and routine testing and inspection of bottle-type holders (Odorization Storage Tanks) including provisions for detecting external corrosion before the strength of the container has been impaired.

This operation and maintenance manual includes instructions for systematic and routine testing and inspection and testing of pressure limiting equipment to determine that it is in safe operating condition and has adequate capacity.

The operator is also responsible for responding promptly to a report of a gas odor inside or near a building. See caution statement in Section 8.1 describing "Repairs of Gas Distribution System Leaks/Plastic Pipelines.

This operation and maintenance manual includes instructions to enable personnel who perform operation and maintenance activities to recognize conditions that potentially may be or could lead to safety-related conditions that are subject to the reporting requirements of §192.23 and to respond promptly to a report of a gas odor inside or near a building. Safety related conditions include those conditions associated with abnormal operating conditions, found in Section 1.4 of this O&M Manual and those safety-related conditions found in Section 2.4 of this O&M Manual. Additionally, all operation and maintenance personnel have attended Operator Qualification Training and have been tested specifically on those conditions that may lead to any emergency situation and method for mitigation.

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**

## OPERATION AND MAINTENANCE MANUAL REVIEW FORM

| REVIEWED BY | REVIEW DATE | REV. DATE | COMMENTS |
|---|---|---|---|
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## 7.3 CLASS LOCATION – REQUIRED STUDY /BUSINESS DISTRICT STUDY (192.609)

Class locations for City of Carencro gas distribution system have been established as Class 1, II and III. There are no anticipated changes in current class location. However, since there is a possibility that new businesses and residences may move into the area that is provided natural gas service by the City of Carencro, class locations will be reviewed every five (5) years for updates as necessary. This may result in the increase or decrease in the business district area to be leak surveyed annually. When increase in population density indicates a change in class location, the operator shall immediately make a study to determine the following:

- The present class location for the segment involved
- The design, construction, and testing procedures followed in the original construction, and a comparison of these procedures with those required for the present class location by the applicable
- The physical condition of the segment to the extent it can be ascertained from available records.
- The operating and maintenance history of the segment.
- The maximum actual operating pressure and the corresponding operating hoop stress, taking pressure gradient into account, for the segment of pipeline involved.
- The actual area affected by the population density increase, and physical barriers or other factors which may limit further expansion of the more densely populated area.

A business district is defined as an area of two or more businesses within one-hundred (100) yard of each other and within 100 yards along the linear length of any gas pipeline. The district will extend 100 feet past the defined boundaries of the last business in the district.

## 7.4 CHANGE IN CLASS LOCATION (192.611)(a)(3)(1)(d)

The City of Carencro does not anticipate any changes in the designated class location or increasing the Maximum Allowable Operating Pressure in designated class locations. If the hoop stress corresponding to the established maximum allowable operating pressure of a segment of pipeline is not commensurate with the present class location, and the segment is in satisfactory physical condition, the maximum allowable operating pressure of that segment of pipeline must be confirmed or revised according to one of the following requirements:

1. If the segment involved has been previously tested in place for a period of not less than 8 hours then:
    - The maximum allowable operating pressure is 0.8 times the test pressure in Class 2 locations, 0.667 times the test pressure in Class 3 locations, or 0.555 times the test pressure in Class 4 locations. The corresponding hoop stress may not exceed 72 percent of the SMYS of the pipe in Class 2 locations, 60 percent of SMYS in Class 3 locations, or 50 percent of SMYS in Class 4 locations.
    - The alternative maximum allowable operating pressure is 0.8 times the test pressure in Class 2 locations and 0.667 times the test pressure in Class 3 locations. For pipelines operating at alternative maximum allowable pressure per § 192.620, the corresponding hoop stress may not exceed 80 percent of the SMYS of the pipe in Class 2 locations and 67 percent of SMYS in Class 3 locations

2. The maximum allowable operating pressure of the segment involved must be reduced so that the corresponding hoop stress is not more than that allowed by this part for new segments of pipelines in the existing class location
3. The segment involved must be tested in accordance with the applicable requirements of Subpart J of this part, and its maximum allowable operating pressure must then be established according to the following criteria:
   - The maximum allowable operating pressure after the requalification test is 0.8 times the test pressure for Class 2 locations, 0.667 times the test pressure for Class 3 locations, and 0.555 times the test pressure for Class 4 locations.
   - The corresponding hoop stress may not exceed 72 percent of the SMYS of the pipe in Class 2 locations, 60 percent of SMYS in Class 3 locations, or 50 percent of SMYS in Class 4 locations

Should the need arise to incorporate changes in MAOP; the changes will be made in accordance with section 192.611. The City of Carencro does not operate its gas distribution system at pressures that would cause hoop stress or SMYS.

The segment involved must be tested in accordance with the applicable requirements of Subpart J of this part, and its maximum allowable operating pressure must then be established according to the following criteria:

- The maximum allowable operating pressure after the requalification test is 0.8 times the test pressure for Class 2 locations, 0.667 times the test pressure for Class 3 locations, and 0.555 times the test pressure for Class 4 locations.
- The maximum allowable operating pressure confirmed or revised in accordance with this section, may not exceed the maximum allowable operating pressure established before the confirmation or revision
- Confirmation or revision of the maximum allowable operating pressure of a segment of pipeline in accordance with this section does not preclude the application of §§192.553 and 192.555.
- Confirmation or revision of the maximum allowable operating pressure that is required as a result of a study under §192.609 must be completed within 24 months of the change in class location. Pressure reduction under paragraph (a) (1) or (2) of this section within the 24-month period does not preclude establishing a maximum allowable operating pressure under paragraph (a)(3) of this section at a later date

See form for documenting class location business study on the following page.

# CLASS LOCATION BUSINESS STUDY FORM

**GAS COMPANY:**_____ **DATE:**_____

**STUDY LOCATION: (DESCRIBE STUDY AREA i.e. STREET, HIGHWAY, ECT.)** _____

_____

_____

_____

_____

_____

**NUMBER OF HOUSES PER MILE:**_____

**SCHOOLS: YES: ☐ NO: ☐**

**PLAYGROUND AREAS: YES: ☐ NO: ☐**

**OUTDOOR THEATER: YES: ☐ NO: ☐**

**RECREATION AREA: YES: ☐ NO: ☐**

**FOUR STORY BUILDINGS: YES: ☐ NO: ☐**

| **Class Location** | **Definition** |
|---|---|
| Class 1 Location | Any class location unit that has 10 or fewer building intended for human occupancy. |
| Class 2 Location | Any class location unit that has more than 10 but fewer than 46 buildings intended for human occupancy. |
| Class 3 Location | (1) Any class location unit that has 46 or more buildings intended for human occupancy; or<br>(2) Any area where the pipeline lies within 100 yards of either:<br>• A building, or<br>• A small, well defined outside area* occupied by 20 or more persons at least 5 days a week for 10 weeks in any 12-month period. **<br>*Playground, outdoor theater, recreation area, etc.<br>**The days and weeks need not be consecutive. |
| Class 4 Location | Any class location unit where the buildings are mostly four or more stories above ground. |

## 7.5 CONTINUING SURVEILLANCE (192.613)

The operator for City of Carencro gas distribution system will periodically review all required actions relating to change in class location, failures (including cast iron circumferential cracking), leakage history, corrosion, substantial changes in cathodic protection requirements and unusual operating and maintenance conditions in order to evaluate the gas distribution system to determine areas of the system that are in the greatest need of corrective action. When areas of the system are identified, the operator of the City of Carencro gas distribution system shall increase surveillance of these areas in order to maintain the system in a safe operating condition. Included in the continuing evaluation of the system is an annual review of records that would provide information as to condition of buried gas lines. The records should include significant building activity near any of the gas lines making up the distribution system. Other records that should be reviewed include leak repairs, unaccounted for gas, records of odorization, cathodic protection valve problems, new construction and any other operating and maintenance activity. The operator will take immediate actions to reduce maximum allowable operating pressure, or other actions to be taken, if a segment of pipeline is in unsatisfactory condition. Care should be taken when contractors such as telephone, under ground electric or sewer construction activity is being conducted in the vicinity of the gas distribution system.

If a segment of pipeline is determined to be in unsatisfactory condition but no immediate hazard exists, the operator shall initiate a program to recondition or phase out the segment involved, or, if the segment cannot be reconditioned or phased out, reduce the maximum allowable operating pressure in accordance with §192.619 (a) and (b). If it is determined that an immediate hazard exists, that part of the system will be shutdown and the piping repaired or replaced.

## 7.6 DAMAGE PREVENTION PROGRAM (192.614)(a)(b)(c)

Damage prevention is the first line of defense against cut, broken or damaged gas lines. The operator has developed a written program to prevent damage to the City of Carencro pipeline facilities from excavation activities. The term “excavation activities” includes excavation, blasting, boring, drilling, tunneling, backfilling, the removal of aboveground structures by either explosive or mechanical means, and other earthmoving operations. Special attention will be given to any section of the pipeline that develops a history of leakage. Personnel will be instructed to be on the alert and report any excavations in the vicinity of any pipeline system facilities to the gas system operator. Pipeline markers should be written legibly in large enough lettering to assure ease of visibility and has the words “Warning”, “Natural Gas Line”, Carencro Gas System and the telephone number 896-8481 where the operator can be reached at all times. Line markers will be designated on the City of Carencro Gas Distribution System Mapping.

When the notification has been given or received by City of Carencro that either a contractor or an individual is intending to excavate in or around any of the system facilities, the supervisor or operator shall be notified and gas department personnel will be dispatched to locate and mark the gas pipeline. Notifications are received by FAX machine and maintained in the Office requesting gas maintenance personnel to locate and mark gas facilities. Personnel locate facilities and mark those facilities in accordance

with the following paragraph. Locating may include exposing gas facilities should the contractor or individual be digging within 18" of the gas facilities. A notice will be posted in the Maintenance Facility notifying contractors to call City of Carencro prior to digging. In addition, the Telephone, Company Utility Company and local plumbers will be notified to contact City of Carencro to locate lines prior to digging. The Operator of the City of Carencro Distribution System, prior to excavating will contact Louisiana One-Call and will notify citizens in the area of excavation that maintenance crews will be digging. City of Carencro is a member of the Louisiana One-Call system and will comply with the rules of the One-Call System. The number to call when using the Louisiana One-Call system is (800) 272-3020 or 811. A copy of the Louisiana One Call card is on the following page. . This damage prevention program requires:

1. Identify persons who engage in excavating.
2. Provide notification to the public in the One-call area
3. Provide means for receiving and recording notifications of pending excavations
4. Provide notification of pending excavations to the members
5. Provide means of temporary marking for the pipeline in the vicinity of the excavations
6. Provides for inspection of the pipeline where there is reason to believe the pipeline could be damaged

**LOUISIANA GUIDELINES FOR UNIFORM TEMPORARY MARKING OF UNDERGROUND FACILITIES**

**PROPOSED EXCAVATIONS**

Use white marks to show the location, route or boundary of proposed excavation. Surface marks used on roadways should not exceed 1.5" by 18" (40 mm by 450 mm). The facility color and facility owner identity may be added to white flags or stakes.

**USE OF TEMPORARY MARKINGS**

Use color-coded surface marks (i.e., paint or chalk) to indicate the location and route of buried lines. To increase visibility, color-coded vertical markers (i.e., stakes or flags) may supplement surface marks. Marks and markers may indicate the name, initials or logo of the company that owns or operates the line, and width of the facility if greater than 2" (50 mm). Multiple lines in common trench may be marked in tandem. If the surface over the buried line is to be removed, supplementary offset markings are used. Offset markings are on a uniform alignment and clearly indicate the actual facility is a specific distance away.

LA One Call

1 800 272-3020
State law requires notification 48 hours before you dig.

**TOLERANCE ZONES**

Any excavation within a tolerance zone is performed with non-powered hand tools or non-invasive methods until the marked facility is exposed. The width of the tolerance zone is specified in law. The tolerance zone includes the width of the facility plus at least 18" (450 mm) measured horizontally from each side of the facility.

LOC9076 2/01

1 800 272-3020
• Call before you dig
• Wait 48 hours
• Respect the marks
• Dig with care

LA One Call

RED ..... Electric Power Lines, Cables, Conduit and Lighting Cables
YELLOW ... Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE ... Communication, Alarm or Signal Lines, Cables or Conduit
PURPLE ... Reclaimed Water, Irrigation and Slurry Lines
GREEN ..... Sewers and Drain Lines
BLUE ..... Potable Water
PINK ..... Temporary Survey Markings
WHITE ..... Proposed Excavation

**WARNING:**
**Civil penalties of up to $25,000 for violations of the Louisiana Underground Utilities and Facilities Damage Prevention Law.**

TYPICAL MARKING

TOLERANCE ZONE 18" 24" 18" 600 mm
TOLERANCE ZONE 18" 18"

LARGE PIPE OR MULTIPLE DUCTS
SMALL PIPE OR CABLE(S)

Persons who engage in excavation activities have been provided with the Public Notice identified in Section 7.8 of this O&M Manual. P ersons who engage in excavation activities include but are not limited to the following:

- Bell South Telephone Company
- Fiber Optics Cable Companies
- Cable Television Companies
- Other Municipal Sewer Companies
- Other Municipal Gas Companies (Leonville)
- Other Municipal Water Companies (Leonville)
- Building Contractors
- Private Property Owners (Home Owners and Farmers)

**CITY OF CARENCRO**
**OPERATION AND MAINTENANCE MANUAL**
**MARKING OF GAS DISTRIBUTION SYSTEM MAIN LINES AND SERVICES**

This marking process provides for a universal use and understanding of the temporary marking of subsurface or underground facilities to prevent accidental damage or service interruption by contractors, utility companies or any others working on or near those underground facilities. Color-coded surface marking (yellow paint or similar coating) to indicate the location of and route of underground gas pipelines shall be used. In addition, to enable increased visibility, color-coded vertical markers (yellow flags or stakes) should be used to supplement surface marking. All markers should indicate the name/initials or logo of the company that owns or operates the gas line, the words, "Caution", "Warning" or "Danger", "Gas Line" and a daytime telephone number and 24 hour telephone number. S igns and markers for the Town of Carencro Gas Facilities are constructed of metal or fiberglass and have the word “Warning” or “Danger” and are black lettering on orange background. The City of Carencro is a member of the Louisiana One-Call System and complies with the color coded surface marking system. See the following page for examples of marking of different utilities.

Individuals in charge of the intended excavation shall be made aware of the type or kind of marking used to locate the pipeline, the danger of the material within the pipeline, the need for safe operation of equipment around the pipeline and informed that they will be held responsible for the cost of repairs associated with any damages to the pipeline.

Additionally, the operator is responsible for inspection of pipelines that he has reason to believe could be damaged by activities associated with excavation. Inspections of pipelines are conducted as frequently as necessary during and after the excavation activities to verify integrity of the pipeline. Inspections may be conducted subsequent to excavation activities.

Should any blasting such as oil and gas exploration seismographic blasting be conducted near or in the area of Gas Company Gas Distribution System, the gas system in that area will be leak surveyed for possible damage. S uch surveys will be conducted in accordance with Section 8.4 if this Operation and Maintenance Manual. Pictorial of the sign used by the City of Carencro to permanently mark its gas distribution mains is shown below.

The City of Carencro makes every attempt to maintain its gas pipeline markers and signs in good condition. These markers and signs are inspected during patrolling of the gas system and those signs and markers found missing are replaced as needed. Signs are located at the Purchase Point and at the two regulator station and line markers are place either over the gas line or as close as possible to the gas line where the gas lines cross creeks, ditches, highways and roads to warn individuals engaged in the excavation process that there are buried gas lines in the area.

## LINE LOCATING PROCEDURE

1. **Battery Check** Check status of batteries. If low, replace with proper replacement batteries verifying correct polarity.

2. **Attach Transmitter to Conductor** Turn Transmitter "OFF". Plug the Conductive Attachment into Transmitter Clamp red lead to target conductor. Stretch black lead 90 degrees away from conductor. Push ground rod into the earth. Clamp black lead to grounding rod. Turn Transmitter "ON". Select power output and frequency.
3. **Adjust Receiver Controls** Turn Receiver "ON" and select frequency.

4. **Sweep Area Around Transmitter** Circle Transmitter with Receiver at a distance of 10 feet (3m). Left/Right display. Receiver signal strength and current measurement will indicate location of buried conductors. The conductor with the highest current measurement is you target conductor.

5. **Locate Line** Follow your target conductor, sweeping left and right as you walk away from the Transmitter: Mark the centerline of the ground at the intervals required.

6. **Measure Depth** Hold the receiver over the centerline and push the arrow button once. The LCD will display the depth and current measurement.

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**UNDERGROUND PIPELINE LOCATING PROCEDURE**

| | Action | Information |
|---|---|---|
| **1.** | Connect the transmitter cable to a metal riser pipe or to a locator wire buried with the pipe. | Place the transmitter as far from the pipe as the connecting cable will allow. |
| **2.** | Insert the ground rod (or plate) as far from the transmitter as the other connecting cable will allow. | Make sure the ground rod is to one side and away from the pipe. |
| **3** | To get a stronger signal, you may do one of the following:<br>• Pour a small amount of water at the ground site to increase conductivity<br>• Use an impact probe bar instead of a ground rod to provide better ground. | **Soil condition** is an important factor in getting a strong signal. Dry, sandy, or loosely packed soil is a poor conductor. |
| **Locate the Pipe** | | |
| **4** | To help you get an accurate reading, start with the receiver sensitivity control set to the **low** range. | Keep the receiver on low when working close to the transmitter. You may need to set it on **medium** or **high** as you get further away from the transmitter. |
| **5** | Hold the receiver parallel with (along) the pipe and in a vertical position. | When you hold the receiver **vertically** (straight up and down), the signal enters one side of the antenna before the other. |
| **6** | Sweep the receiver back and forth, close to the ground.<br>Use short, smooth moves, being sure to keep the receiver vertical (90 degree angle to the ground). | To avoid an inconsistent signal, hold the handle of the receiver with three fingers, allowing it to hang, rather than grasping it firmly and swinging or rocking the unit. |
| **7** | Find the general location of the pipe by listening for the loudest signal.<br>• Mark the ground directly under the receiver. | When the pickup antenna is directly **above** the pipe, the signal sound in the earphones or speaker is l**oudest**. |
| **Pinpoint Center of Pipe** | | |
| **8** | Hold the receiver face-up in horizontal (flat) position. | When you hold the receiver **horizontally**, the signal enters both sides of the antenna at once. |
| **9** | Adjust the sensitivity control to **medium** or **high**. | Increasing the sensitivity tunes the signal for maximum accuracy. |
| **10** | Sweep the receiver back and forth over the general location of the pipe.<br>• Make your sweeps perpendicular (crosswise) to the pipe. | When you sweep with the receiver, be sure to keep it level.<br>• Avoid a rocking motion, so you keep it the same distance above the ground. |
| **11** | Look and listen for the null.<br>• Watch the meter needle for the lowest reading.<br>• Listen to the audible tone on the speaker (or headphones). | When the pickup antenna is directly **above** the pipe, you hear a "null" or **soft** signal noise, because the signal entering one side of the antenna cancels the signal entering the other side. |
| **12** | Mark this location with a flag, paint, or stake. | The **center** of the receiver is the pinpoint center of the pipe. |

## 7.7 EMERGENCY PLANS (192.615)

The official emergency plan for the City of Carencro is in a separate binder for easy use and distribution to all personnel, employee, supervisors and officials who have a need for these plans during emergency situations. The emergency plan included in this Operation and Maintenance Manual meets the minimum requirements of Pipeline Safety Regulation 192.615 but may not have detailed specific information that may be needed during emergencies. The primary concern during emergency situations is first for the safety of the public followed by protection of property. In order to accomplish this goal, copies of this Emergency Plan has been provided to the Carencro Fire and Police Department with telephone numbers of essential personnel including names and telephone numbers of potential outside assistance from neighboring communities. These names and telephone numbers are valid either during or after working hours. However, should events occur after hours the City of Carencro Police Department dispatcher should be contacted.

The National Response Center will be contacted at (800) 424-8802 as soon as practical but no later than as soon as an emergency is under control should the emergency event include fire, explosion, serious injury or death. Information such as the date, time, location, and extent of injuries and / or property damage will be provided to the National Response Center. Within three working days, a full written report detailing the event and known facts pertaining to the event will also be submitted.

### EMERGENCY CONDITION DESCRIPTION

An emergency condition exists when it has been determined that due to circumstances extraordinary procedures, equipment, manpower and/or supplies must be utilized to protect the public from existing or potential hazards. These hazards may include but are not limited to the following system failures of:

- Gas Distribution System Over Pressure
- Gas Distribution System Under Pressure
- Large Amounts of Escaping Gas
- Fire or Explosion Near or Directly Involving a Pipeline Facility
- Any and all Leaks Considered Hazardous
- Imminent Danger to Section(s) of the Gas Distribution System
- Natural Disasters such as Floods, Hurricanes, Tornadoes, Earthquakes, etc.
- Civil Disturbances such as Riots

### 7.7.1 RECEIVING, IDENTIFYING AND CLASSIFYING EMERGENCY (192.615(a)(1)

In the event of an emergency relating to the Gas Company gas distribution system that has the potential to cause or causes injury to any individual, loss of or damage to property, the Gas Superintendent (Operator) for City of Carencro is to be notified immediately. Receiving, identifying and classifying emergency notices of leaks that require immediate response is the first actions taken to mitigate any emergency situation.

It remains the responsibility of the Operator of City of Carencro to verify that gas department personnel are familiar with procedures concerning calls associated with gas leaks and reports of gas leaks. Those gas department personnel should be knowledgeable of the following requirements:

1. Any employee receiving a report of a gas leak should get as much information as possible from the reporting source to allow completion of the leak report form
2. All reports of leaks on customer premises get priority and unless otherwise directed will be first to be corrected.

## RESPONSE TO REPORTED GAS LEAKS

### LEAK CALLS RECEIVED DURING WORK HOURS

1. Leak calls during working hours will be handled by gas office at 1 (337) 896-8481.
2. Upon notice of leak, gas office personnel will document the time, location, description of leak, etc.
3. Gas office personnel will then dispatch servicemen immediately documenting time and person dispatched.
4. Servicemen will respond immediately to location of leak.
5. Upon arriving at leak, serviceman should assess the severity of leak.
6. Take necessary actions to prevent the flow of gas and make repairs.
7. If repair cannot be made or flow of gas cannot be stopped, notify dispatcher and your supervisor.
8. If a gas leak is suspected on the customer's service line, or the customer complains of a gas smell, a natural gas pressure test should be performed. If this test fails, meter should be locked immediately. The gas service is not to be reinstated until repair has been made and a pressure test performed.
9. Information on leak and repairs made should be recorded on Leakage Inspection form in Section 8.4.11, "Documentation" of this Operation and Maintenance Manual.

### LEAK CALLS RECEIVED AFTER WORK HOURS

1. All after hours leak calls will be received through the 24 hour number 1 (337) 896-6132
2. Employee will respond immediately. He may contact an employee nearer to the reported leak, but it is the responsibility of the employee on call to respond. Us common sense: saving human life and property is the first consideration.
3. Upon arriving at leak, serviceman should assess the severity of leak.
4. Take necessary actins to prevent the flow of gas and make repairs.
5. If repairs cannot be made or flow of gas cannot be stopped, notify dispatcher and your supervisor.
6. If a gas leak is suspected on the customer's service line, or the customer complains of a gas smell, a natural gas pressure test should be performed. If this test fails, meter should be locked immediately. The gas service is not to be reinstated until repair has been made and a pressure test performed.
7. Information on leak and repairs made should be recorded on Leakage Inspection form in Section 8.4.11, "Documentation" of this Operation and Maintenance Manual.

## 7.7.2 ESTABLISHING AND MAINTAINING COMMUNICATION (192.615(a)(2)

Communication with appropriate public officials regarding possible emergency situation must be established and maintained. In the event of a major gas leak, explosion or fire, the St. Landry Parish and/or the St. Martin Parish Sheriff's Department should be notified immediately. The Sheriff's department personnel/officers should clear the area of all non-essential personnel such as pedestrians and bystanders and stop all vehicular traffic within the area. The Sheriff's department should continue to police the area until the leak has been completely stopped and isolated and the explosive mixtures are no longer present in the atmosphere. Depending on the emergency, the fire department, mutual assistance partners and other public officials will be notified and a line of communication will be opened and maintained.

## 7.7.3 PROMPT RESPONSE TO TYPES OF EMERGENCIES 192.615(a)(3)

The City of Carencro Gas Department and others as deemed necessary will provide prompt response to each of the following emergencies.

In the event of a major gas leak, explosion or fire, the City of Carencro Gas Superintendent, Fire Department and local law enforcement should be notified immediately. The law enforcement department personnel/officers should clear the area of all non-essential personnel such as pedestrians and bystanders and stop all vehicular traffic within the area. The law enforcement department should continue to be policed until the leak has been completely stopped and isolated and the explosive mixtures are no longer present in the atmosphere.

Gas Maintenance personnel shall be instructed to close appropriate gas line valves in order to isolate the leaking or blowing gas line. Once the isolated section of gas piping has bled down and gas is no longer escaping, repairs to the affected section of gas piping should be made in accordance with Section 8, "Repairs of Gas Distribution System Leaks". Gas system customers affected by the disruption of service shall be notified and the gas service valve turned off below the gas meter. Once the affected section of gas piping has been repaired and the gas pressure has been restored to the system, only those customers who are in their residences or can be reached so that they can return home will have their service restored.

### 7.7.4 GAS DETECTED INSIDE A BUILDING/HOUSE/STRUCTURE 192.615)(a)(3)(i)

**LEAKS REPORTED INSIDE BUILDINGS**

- Evaluate the premises immediately with Combustionable Gas Indicator (CGI) or Flame Ionization Unit to determine concentration of gas and source of leak.
- Evacuate premises if necessary
- Do **NOT** turn on or off any electrical equipment including light switches.
- Do **NOT** ring doorbells or use telephone inside the house, building or structure.
- Do **NOT** light matches or cigarette, etc.
- Shut off gas service valve if necessary
- Ventilate building if necessary
- If necessary notify fire and police departments
- Cordon off area by blocking off street as necessary
- Notify gas Operator or other responsible persons.
- Bar test for gas leak next to building or house foundation.
- Check neighboring buildings for indication of gas.
- Implement check list for major emergency if necessary
- Repair leak
- Once leak has been repaired and all gas has been vented from building allow occupants to return to building or house.

### 7.7.5 FIRE LOCATED NEAR OR DIRECTLY INVOLVING A PIPELINE FACILITY 192.615(a)(3)(ii)

Should a fire occur near a pipeline facility such as the Main Line, Service Line, Purchase Point or Metering Station or District Regulator Station the following actions are to be implemented.

a) Dispatch appropriate emergency personnel.
b) Remain in contact with fire and police departments.
c) Consult maps for key valves or other valves that may be used to isolate system.
d) Have personnel standing by to isolate system.
e) Have fire department ready to saturate area of endangered pipeline with water to prevent damage to integrity of pipeline.
f) After fire has been extinguished and area is cleared, pipeline should be visually inspected for damage before restoration of service.
g) Leak survey of area should also be done as soon as possible within limits of leak survey equipment.

## 7.7.6 EXPLOSION NEAR OR DIRECTLY INVOLVING A PIPELINE FACILITY 192.615(a)(3)(iii)

Should an explosion occur near a pipeline facility such as the Purchase Point, Metering Station or District Regulator Station, the Main Line, Service Line or Customer Meter Set, the following actions are to be implemented.

- Dispatch appropriate emergency personnel.
- Contact fire departments.
- Consult maps for key valves or other valves that may be used to isolate system.
- Close appropriate valves to isolate that segment of system.
- After explosion/fire threat has been cleared by commanding authorities, a visual inspection of the pipeline should be done before restoration of service.
- Make necessary repairs.
- Leak survey of area should also be done as soon as possible within limits of leak survey equipment.

## 7.7.7 NATURAL DISASTER (192.615)(a)(3)(iv)

Natural disasters include such events as floods, hurricanes, tornadoes, earthquakes, etc. In the event that a natural disaster is declared, actions may be required to shut down the gas distribution system. Should shut down of the gas distribution system be required, adherence to instructions titled "Interruption of Gas Supply" is required.

a) Remain in contact with civil defense, police, and fire departments.
b) Keep emergency response personnel on standby.
c) Dispatch if necessary to handle emergencies on a priority basis (protect life then property).
d) After conditions are safe for employees, enter area to re pair damages.

## 7.7.8 EQUIPMENT, INSTRUMENTS, TOOLS & MATERIALS 192.615(a)(4)

The operator for City of Carencro is responsible for the availability of personnel; adequacy, availability and condition of equipment, instruments, tools and material required at the scene of an emergency. The location of this equipment necessary to meet emergency conditions such as valve keys, maps, records, shutoff tools, backhoe, trenching machine, leak repair equipment and hand tools are in the City of Carencro Maintenance Facility located on Andre Street in Carencro, La. Periodic checks of this equipment should be made to ensure continuous operability in the event of an emergency.

## 7.7.9 PROTECTION OF PEOPLE AND PROPERTY 192.615(a)(5)

First and foremost, City of Carencro will take the necessary actions to make safe actual or potential hazard to life or property and to protect the lives of its residents and customers first. This starts at the time a leak call comes in to the office or dispatcher. All personnel employed by the City of Carencro have been trained and qualified to MEA Modules 101, Characteristics of Natural Gas and 102, Potential Ignition Sources: Indoor and Outdoor and have been trained to provide important information to the public when receiving leak calls. This training includes the following as a minimum:

**ANY LEAK REPORTED INSIDE OF A HOUSE, BUILDING OR STRUCTURE (ENCLOSED AREA) RECEIVES TOP PRIORITY.**

1. Once all information is obtained from the reporting source and determined that a hazardous leak exists inside a building, **INFORM** the caller/customer of the following information:
   - Do **NOT** turn on or off any electrical equipment including light switches.
   - Do **NOT** ring doorbells or use telephone inside the house, building or structure.
   - Do **NOT** light matches or cigarette, etc.
   - Extinguish all open flames
   - Ventilate house, building or structure by opening windows and doors.
   - Turn off gas supply if possible.
   - Evacuate house, building or structure and proceed to safe place.
   - Remember; Do **NOT** start automobile or any engine.
2. Dispatch necessary personnel to the location of the reported leak.
3. Duties of the first gas department employee on the scene:
   - Take all corrective actions necessary to protect life and property from danger
   - Set up communication
   - Coordinate operations until relieved of duty by supervision
   - Make appropriate decisions concerning emergency valves, isolation of areas and the use of emergency equipment
   - Implement the checklist for a major emergency.

## LEAKS REPORTED OUTSIDE BUILDINGS

- Assess danger to public surrounding building, occupants, property and evacuate as necessary
- Extinguish all open flames including cigarettes.
- If necessary notify fire and police departments
- Cordon off area by blocking off street as necessary
- Notify gas Operator or other responsible persons.
- Bar test for gas leak next to building or house foundation.
- Check neighboring buildings for indication of gas.
- Implement check list for major emergency if necessary
- Repair leak
- Once leak has been repaired and all gas has been vented from building allow occupants to return to building or house.

## 7.7.10 EMERGENCY SHUTDOWN OR PRESSURE REDUCTION 192.615(a)(6)

In emergency situations it may become necessary to shutdown or reduce the gas pressure in any section of the Gas Distribution System to minimize potential hazards to life of property. This is accomplished by closing key valve, squeeze of PE as appropriate or shutting down regulator stations as a last resort. The City of Carencro has identified key valves and pressure reduction devices and their locations within the gas distribution system to accomplish this task. These valves and pressure limiting devices are identified in Section 8.9 of this Operation & Maintenance Manual. See "Interruption of Gas Supply" for proper procedures. The most important pressure limiting devices are identified is Section 8.10 of this Operating & Maintenance Manual.

# INTERRUPTION OF GAS SUPPLY

An interruption of a gas supply line or service line may be the result of the following:

1. Water freezing in the regulator orifice
2. Gas line rupture or break
3. Sabotage
4. Gas cut off by supplier

In the unlikely event that this should happen, the following steps should be taken:

1. Dispatch appropriate emergency personnel to the following locations in affected areas immediately
   (a) Affected meter station
   (b) Meter Station that gas supply could be diverted from to affected station.
   (c) Far end of meter station affected to monitor pressure.
   (d) Standby personnel to close valves at residents and businesses
   (e) Standby personnel at key valves or valves to isolate system
2. Notify Pipeline Supplier (transmission company or natural gas supplier company
3. Locate gas leak and inform supplier of the location of the leak if possible
4. Take appropriate actions to route alternate gas to site, or secure system for shutdown.
5. Depending on the severity of the interruption, it may be necessary to shut off all services and invoke procedure for relighting
6. All of the above should be quickly or simultaneously performed to avoid and possible danger to the public. Director of Operations will decide to divert gas or shutdown system
7. Implement Checklist for Interruption of Gas Supply as appropriate.

# CHECKLIST FOR INTRUPTION OF GAS SUPPLY

1. ___Has fire department been called?
2. ___Have persons been evacuated and area blockaded?
3. ___Has police department been notified?
4. ___Has repair crew been notified?
5. ___Has company call list been executed?
6. ___Has communication been established?
7. ___Has outside help been requested?
8. ___Have ambulances been called?
9. ___Has leak been shut off or brought under control?
10. ___Has civil defense been notified?
11. ___Have emergency valves or proper valves to shut down or reroute gas been identified and located?
12. ___If an area has been cut off from a supply of gas, has the individual service of each customer been cut off?
13. ___Is the situation under control and has the possibility of recurrence been eliminated?
14. ___Has surrounding area, including buildings adjacent to and across streets, been probed for the possibility of further leakage?
15. ___Has proper tag been put on meter?
16. ___Has telephonic report to the state been made?
17. ___Has telephonic report to DOT/RSPA been made?
18. ___Has radio stations been given instructions (if necessary)?

Date:_____Signed By:_____

### 7.7.11 MAKE SAFE ACTUAL OR POTENTIAL HAZARD TO LIFE AND PROPERTY 192.615(a)(7)

The City of Carencro will make safe any actual or potential hazard to the lives of its customers and those living adjacent to its pipeline facilities. The operator will consider the possibility of leaks in multiple locations caused by excavation damage and underground migration of gas into nearby buildings. This will be the first action taken and once this has been accomplished the City of Carencro maintenance personnel will provide every means necessary to protect the property of the general public.

Gas maintenance personnel shall be instructed to close appropriate gas line valves in order to isolate the leaking or blowing gas line. Once the isolated section of gas piping has bled down and gas is no longer escaping, repairs to the affected section of gas piping should be made in accordance with Section 8, "Repairs of Gas Distribution System Leaks". The operator will check piping on both ends whenever a line becomes impacted or pulled. Gas system customers affected by the disruption of service shall be notified and the gas service valve shall be turned off and locked below the gas meter. Once the affected section of gas piping has been repaired and the gas pressure has been restored to the system, only those customers who are in their residences or can be reached so that they can return home will have their service restored.

City of Carencro gas service customers and other residents living near the gas distribution system shall be informed through official publications, such as information contained on billing cards that gas leaks and other activity which could cause gas leaks are potential safety hazards and could constitute an emergency. Instructions should be provided in this official publication to contact the system Operator of the City of Carencro gas distribution system immediately upon recognizing an emergency. Anyone providing notification of an emergency condition should provide information as to where the emergency situation is located and the severity of the emergency.

### 7.7.12 NOTIFICATION OF APPROPRIATE PUBLIC OFFICIALS (192.615(a)(8)

Once the notification of public officials such as the Police and Fire Departments have been notified and arrive on the scene it is important to coordinate and plan the actual response with those officials. In most cases the Fire Department assumes command of the scene however since the gas maintenance personnel are most familiar with the gas distribution system there must be close communication between all agencies on the scene. A logbook for documenting activities and individuals involved in the process of mitigating the consequences of a emergency is often very helpful after the situation has been corrected to provide accurate information to the National Response Center for completing the Incident Report.

### 7.7.13 RESTORATION OF GAS SERVICE AFTER OUTAGE 192.615(a)(9)

Should the supply of gas be cut off to any area of the gas distribution system, gas should **NOT** be restored to the affected area until the all individual services to each customer has been turned off and locked out at the service valve. Allowing service to be restored to a section of gas distribution system piping without turning off individual services may result in unsafe conditions. In-effective safety devices on appliances may allow gas to escape through the appliance.

House to house investigation by gas department personnel to turn off and lock out the gas service valve is mandatory. The individual service of each customer meter must be turned off, either at the meter or at the service valve. City of Carencro personnel and/or mutual assistance personnel shall document the address and meter number and return that information to the office.

When restoring service to any affected area, all gas distribution system piping and meters must be purged of air and appliances relighted. Never turn on gas at the meter unless you have access to all appliances on the customer piping. In the event the customer is not at home, the service must be left off and a card or note must be left in a conspicuous location requesting the customer to call the gas company to arrange for restoration of service.

## CUSTOMER "TURN ON" PROCEDURE

1. Customer should be home at time of turn on and must verify that all pipes and appliances have valves installed and that they are in the off position.
2. If gas valve has a red seal installed, which indicates a leak on the customer's service line, customer must be notified of leak and leak must be repaired. If gas valve has a yellow seal installed, which indicates meter was turned off for non-payment, serviceman should contact office to check status of that location.
3. An acceptable natural gas pressure test must be done. If test is found to be unacceptable, meter cannot be turned on.
4. Turn gas valve meter installation on very slowly.
5. Do soap test for leaks on meter installation.
6. Serviceman must then witness the customer light all pilot lights on appliances.
7. After pilot lights have been lit, the customer must sign a form provided by the serviceman saying that the pilot lights were lit.
8. Serviceman must then record information off of meter, (meter number, beginning reading) record results of pressure test on appropriate form, and turn information into office.

## 7.7.14 INVESTIGATING ACCIDENTS AND FAILURES AFTER EMERGENCY 192.615(a)(10)

Investigation of any accident or failure shall be conducted as soon as possible once the emergency situation is corrected and declared over. This investigation is to be conducted in accordance with Section 7.12, Investigation of Accidents and Failures. The National Response Center will be contacted at (800) 424-8802 as soon as practical but no later than as soon as an emergency is under control if the emergency event included fire, explosion, serious injury or death. Information such as the date, time, location, and extent of injuries and/or property damage will be provided in the notification. Within three working days, a full written report detailing the event and known facts pertaining to the event will also be submitted.

### 7.7.15 DISTRIBUTION OF EMERGENCY PLAN TO PERSONNEL (192.615(b)(1)

Notification of such emergencies cannot be predetermined, so the Lafayette Parish Sheriff Department, Carencro Fire Department and other public officials must be aware of how to handle and report all emergencies associate with the gas distribution system. The Lafayette Parish Sheriff's Department, Fire Departments and public officials will be provided with a copy of Emergency Procedures. All departments will review these procedures in order to become familiar with them prior to the need for the utilization of such procedures. When any of these groups are notified of an emergency situation, the department being notified is responsible for notifying the other departments affected. Should the emergency be of magnitude that outside assistance is required, a mutual assistance plan formulated by the appropriate governmental departments will be placed into effect. Mutual assistance partners are identified in the City of Carencro Operator Qualification Program Manual. City of Carencro officials will be notified as soon as practical and actions required to mitigate the emergency will be discussed and determined.

### 7.7.16 TRAINING OF APPROPRIATE EMPLOYEES FOR EMERGENCIES 192.615(b)(2)

The operator is responsible for training appropriate employees as to the requirements of the emergency plan and verifying the effectiveness of training. This training may be accomplished by meeting with Council Members, Gas Maintenance personnel, Law Enforcement and Fire Department personnel and emergency medical personnel. All training to this Emergency Plan will be documented on an attendance list identifying the title of the training, date of training, personnel in attendance and name of instructor. After any emergency situation has been concluded and activities return to normal, the emergency activities are to be reviewed to determine the effectiveness of the actions taken during the emergency.

### 7.7.17 EFFECTIVENESS OF PROCEDURES AFTER EMERGENCY 192.615(b)(3)

After the emergency has been declared over and the investigation in accordance with 192.617 is either in progress or has been completed, the emergency procedures and the activities required by the emergency procedures will be reviewed to determine effectiveness. The effectiveness review should include feedback from all persons involved in the mitigation of the emergency including gas maintenance personnel, law enforcement personnel, fire department personnel, management of all organizations and selected public officials. Any improvements to procedures associated with the emergency plan will be revised to include those enhancements.

### 7.7.18 ESTABLISH AND MAINTAIN LIAISON 192.615(c)

The operator of the City of Carencro shall establish and maintain liaison with appropriate fire, police and other public officials to learn the responsibility and resources of each government organization that may respond to a gas pipeline emergency. The lines of communication should also include acquainting public officials and fire and police department with the gas operators ability to respond to gas pipeline emergencies, identify the types of gas pipeline emergencies the operator will notify officials and plan how the operator and officials can engage in mutual assistance to minimize hazards to life and property. Departmental responsibilities should be developed prior to emergencies so that all personnel involved will be familiar with their responsibilities during emergency situations associated with pipeline facilities.

## 7.7.19 OVER PRESSURIZATION OF SYSTEM

Should over pressurization of the gas distribution system occur due to malfunction of regulating equipment or malfunction of pressure relief devices, the following actions are to be implemented.

a) Dispatch appropriate emergency personnel.
b) Take necessary actions, including but not limited to closing of gas supplies and a controlled release of gas under safe conditions to relieve over pressurization of the system.
c) Make repairs to equipment (regulators, relief valves).
d) Resume normal operations.

Response Center. Within three working days, a full written report detailing the event and known facts pertaining to the event will also be submitted.

## 7.8 PUBLIC AWARENESS PROGRAM (192.616)

# SEE PUBLIC AWARENESS PROGRAM IN SEPARATE BINDER

## 7.9 INVESTIGATION OF ACCIDENTS AND FAILURES (192.617)

City of Carencro is committed to conducting investigation of accidents and failures in accordance with the requirements of Pipeline Safety Regulation 192.617. Investigation of any accident or failure shall be conducted as soon as possible once the emergency situation is corrected and declared over. Follow instruction in Section 2.2 for documenting and reporting the incident to OPS. Should the Operator not be able to determine the failure or cause of the failure, he may turn over the failed portion of the gas facility or equipment such as piping, metering equipment, regulator, relief valve, etc. for laboratory examination for the purpose of determining the cause of the failure and minimizing the possibility of recurrence. The analysis will be documented.

When an accident or failure of the gas distribution pipeline facility occurs, time is of the utmost importance. Once the situation is under control the documentation of what, when, where, why and how the accident or failure occurred should begin. Important facts are fresh in the mind of the individual(s) documenting the incident if the documentation process begins early. The longer the documentation process is delayed the more likely important facts will be either overlooked or forgotten.

"Human factors" or "human error" plays a major role in accidents and failures of pipeline facilities. The causes of most accidents and failures, in fact are due to human error. Human error or failure to follow procedural requirements is the most likely cause of many accidents and failures although some incidents are related to material or component failure. Regardless whether or not the accident or failure was caused by human error or material failure, in either case, the results could be catastrophic. As a result, it is most important to document the incident immediately and begin conducting a thorough investigation into the incident to determine the cause and to initiate corrective action to preclude the incident from recurring.

### INVESTIGATION OF HOUSE, BUILDING OR STRUCTURE FIRES AND EXPLOSIONS

Should the incident involve fire or explosion of a house, building or structure, the first priority would be to protect life and property, "make the area safe" and to initiate the Emergency Plan depending on the situation. These actions are detailed in the City of Carencro Emergency Plan. (See fires indoors) Should the incident involve a fire the investigation will include the following:

1. Protect life and property
2. Make the area safe.
3. Evacuate the area depending on the circumstances.
4. Contact Fire Department and Police Departments.
5. Conduct a gas leak detection survey in the area in accordance with procedural guidelines established in Section 8 of this O&M Manual. The leak survey will include:
   a. A flame ionization survey of the area along the service lines and main lines in the area of the incident.
   b. A bar-hole test of the area along the service lines and main lines in the area of the incident and around the building, home or structure where the incident occurred.

   c. A check for proper concentrations of odorant in the gas stream by conducting a "sniff test" in accordance with Section 7 of the O&M Manual.
   d. A check for proper pressure on the service line upstream of the regulator and the pressure downstream of the regulator (house line pressure) in accordance with Section 4 and Section 6 of this O&M Manual.
4. Review Gas Company work history for the specific address or immediate area to determine if:
   a. Work had been performed at the location prior to the incident.
   b. If work was performed, was the work performed a covered task?
   c. Was individual performing the work/covered task qualified to perform the covered task?
   d. If work was performed, was the work performed in accordance with procedural requirements?
5. Examine burn and/or debris pattern (as applicable).
6. Question persons or witnesses on the scene.
7. Have Fire Officials examine the burn area and gather evidence to assist in determining if the incident was caused by accidental ignition (Human Error) or other causes.

## INVESTIGATION OF FIRES AND EXPLOSIONS ASSOCIATED WITH THIRD PARTY DAMAGE

Should the incident involve fire or explosion of the pipeline facility due to third party damage associated with excavation the first priority is to protect life and property, "make the area safe" and to initiate the Emergency Plan depending on the situation. These actions are detailed in the City of Carencro Emergency Plan. Should the incident involve a fire or explosion the investigation will include the following:

City of Carencro, depending on the specific situation, would react and investigate the Accident or Incident in accordance with the following:

1. Protect life and property:
2. Make and keep the area safe:
3. Contact Fire Department and Police Departments
4. Was there a One-Call Ticket on file
5. Was the gas line facilities marked and were the facilities marked accurately (within tolerance)
6. Question persons or witnesses on the scene
7. Investigate to determine if the third party damage was caused by:
   a. Human Error
      - Failure of third party to request line locates
      - Failure of Gas Company to locate underground gas facilities
      - Failure of Gas Company to locate underground gas facilities accurately
      - Failure of third party to observe marked underground gas facilities
      - Careless operation of excavation equipment by third party
8. Initiate corrective action based on results of accident investigation.

## INVESTIGATION OF INCIDENTS AND ACCIDENTS CAUSED BY MATERIAL FAILURE

Should the incident involve the failure of a pipeline or pipeline appurtenance due to material failure the investigation would include a detailed examination of the failed component or pipe. Depending on the specific component failure, an investigation must be conducted either in-house (City of Carencro) by qualified personnel or by an outside X-ray or NDE laboratory. The root cause of the failure must be determined, documented and analyzed to provide the proper corrective action to prevent recurrence. Procedures for conducting the accident analysis and the root cause of the material failure in-house are to be conducted in accordance with this Section 7.12 of this O&M Manual. Analysis should include at least the following:

## IN-HOUSE INVESTIGATION

1. Internal Pressure to which the material component was exposed.
2. Was the MAOP exceeded and was the internal pressure enough to cause the failure.
3. If the MAOP was exceed, what cause the over pressurization?
   a. Failure of the Pressure Regulator
   b. Failure of the Pressure Relief Device
   c. Failure of Monitor Regulator
4. Was the Pressure Regulator or Pressure Relief Device damaged or inoperable?
5. Had the Pressure Regulator or Pressure Relief Device been inspected within the past 12 months not to exceed 15 months in accordance with Section 8 of this O&M Manual
6. Was there an obstruction in the regulating equipment that caused the over pressurization?
7. Was the upstream valve to the Relief Device in the Open or Closed position?
8. Initiate corrective action based on results of accident investigation.

## OUTSIDE LABORATORY INVESTIGATION

Procedures for conducting the accident analysis and the root cause of the material failure by an outside laboratory shall be employed and followed by the laboratory conducting such investigations. As a minimum the analysis should include:

1. Material or component chemical and physical tests and analysis
2. Material or component fatigue
3. Any other analysis deemed necessary by the analysis laboratory.
4. Report detailing the root cause of the failure and any recommendations for corrective action to prevent recurrence.

On the following pages are “Post Incident Reports” that are to be used to document the incident for internal use. If the cause of the Incident is apparent or obvious, completion of the following documentation is not required. Section 2.1 of this operation and Maintenance Manual detail the procedural requirements for reporting and submitting Incident Reports.

# POST INCIDENT REPORT

**LOCATION OF INCIDENT:** _____

_____

_____

**DATE OF INCIDENT:** _____

**WEATHER CONDITIONS:** _____

**APPROXIMATE COST OF DAMAGES INCLUDING LOST GAS: $**_____

**INJURIES:** _____ **FATALITIES:** _____

(# OF INDIVIDUALS IN EACH CATEGORY)

ANY INJURY NECESSITATING IN-PATIENT HOSPITALIZATION
IS REPORTABLE TO STATE & FEDERAL AGENCIES

| **TIME** | **NAME OF PERSON TAKING EMERGENCY ACTION** | EMERGENCY RESPONSE **ACTIVITY** UNDERTAKEN |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

**SECTIONALIZATION:** ☐ **YES** ☐ **NO** (IF YES, LIST VALVE LOCATIONS)

_____

_____

**THIRD PARTY INVOLVEMENT:** ☐ **YES** ☐ **NO**

**NAMES OF WITNESSES:** _____ _____

**VICTIMS NAMES:** _____ _____

**CAUSE:** _____

_____

_____

**WAS PIPE CUT OUT & MARKED (TOP/BOTTOM FOR PLACEMENT ORIENTATION** ☐ **YES** ☐ **NO**

IF YES, STATE THE PHYSICAL LOCATION OF STORAGE: _____

**WAS METER REMOVED:** ☐ **YES** ☐ **NO**

IF YES, STATE THE PHYSICAL LOCATION OF STORAGE: _____

# POST INCIDENT REPORT – CONTINUED

1. **WAS THERE AN INDICATION OF A GAS EXPLOSION?**

   ☐ **YES** ☐ **NO**

2. **IF YES, WERE ANY SURROUNDING STRUCTURES DAMAGED?**

   ☐ **YES** ☐ **NO**

3. **WAS INTERIOR BURNING GENERALLY HIGH OR LOW?**

   ☐ **HIGH** ☐ **LOW**

4. **WERE PETROLEUM OR ANY OTHER UNUSUAL ODORS PRESENT?**

   ☐ **YES** ☐ **NO**

5. **WAS THERE ANY INDICATION OF AN EXPLOSIVE FORCE UNDER THE SLAB?**

   ☐ **YES** ☐ **NO**

6. **ANY BURNING FROM AROUND THE SLAB?**

   ☐ **YES** ☐ **NO**

7. **WAS THERE ANY INDICATION OF BURNING AROUND DRAIN OPENINGS, SEWER OPENINGS OR SEWER STACKS?**

   ☐ **YES** ☐ **NO**

8. **WAS THE METER AND/OR REGULATOR INSTALLATION INVOLVED IN THE FIRE?**

   ☐ **YES** ☐ **NO**

9. **WAS WORK PERFORMED AT THE LOCATION PRIOR TO THE INCIDENT?**

   ☐ **YES** ☐ **NO**

10. **HAVE HUMAN ERROR AND/OR HUMAN FACTORS BEEN CONSIDERED AND WERE THEY A CONTRIBUTING FACTOR?**

    ☐ **YES** ☐ **NO**

# POST INCIDENT REPORT – CONTINUED

## HUMAN FACTORS INVESTIGATION

1. **WERE THERE APPROVED WRITTEN PROCEDURES FOR PERFORMING THE TASK?**

   ☐ **YES** ☐ **NO**

2. **WERE PROCEDURES ACCURATE AND/OR ADEQUATE FOR PERFORMING THE TASK?**

   ☐ **YES** ☐ **NO**

3. **WAS PERSONNEL PERFORMING THE TASK FAMILIAR WITH THE PROCEDURE(S)?**

   ☐ **YES** ☐ **NO**

4. **WERE PROCEDURES COMPLIED WITH BY PERSONNEL PERFORMING THE TASK?**

   ☐ **YES** ☐ **NO**

5. **DID THE PROCEDURE CONTRIBUTE TO THE ACCIDENT OR INCIDENT?**

   ☐ **YES** ☐ **NO**

6. **WERE PERSONNEL PERFORMING THE TASK QUALIFIED TO PERFORM THE TASK?**

   ☐ **YES** ☐ **NO**

7. **DID PERSONNEL PERFORMING THE TASK INTENTIONALLY OR INADVERTANTLY SKIP OR BYPASS PROCEDURAL REQUIREMENTS?**

   ☐ **YES** ☐ **NO**

8. **WERE PERSONNEL PERFORMING THE TASK PROPERLY TRAINED IN THE TASK PERFORMANCE?**

   ☐ **YES** ☐ **NO**

9. **WERE THERE ANY EXTENUATING CIRCUMSTANCES THAT MAY HAVE CONTRIBUTED TO THE ACCIDENT OR INCIDENT? i.e. SLEEP DEPRIVATION, ALCOHOL, DRUGS, PSYCHOLOGICAL PROBLEMS, PHYSICAL DEFFICIENCIES, ECT.**

   ☐ **YES** ☐ **NO**

# POST INCIDENT REPORT – CONTINUED

**COMPANY PERSONNEL NOTIFIED:**

NAME:_____ TIME: _____ BY WHOM: _____

NAME:_____ TIME: _____ BY WHOM: _____

NAME:_____ TIME: _____ BY WHOM: _____

NAME:_____ TIME: _____ BY WHOM: _____

**LEGAL ADVISE SOUGHT:** ☐ **YES** ☐ **NO**

(IF YES) DATE & TIME LEGAL NOTIFIED: _____

NAME OF ATTORNEY NOTIFIED: _____

**CONTACTED OUTSIDE CONSULTANT:** ☐ **YES** ☐ **NO**

(IF YES) DATE NOTIFIED: _____NAME: _____

**REPORTABLE:** ☐ **YES** ☐ **NO**

*($50,000.00 DAMAGE: REPORTABLE TO FEDERAL AND STATE)*

## TELEPHONE NOTIFICATION

**SEE COMPANY O&M MANUAL, SECTION 2.1 "TELEPHONIC NOTICE OF CERTAIN INCIDENTS**

☐ FEDERAL ☐ STATE ☐ CITY ☐ COMPANY ☐ OTHER (SPECIFY) _____

☐ OPS ☐ POLICE ☐ CLAIMS DEPARTMENT ☐ DEQ ☐ FIRE

| DATE | TIME | OFFICIAL'S NAME & AGENCY NOTIFIED | COMPANY PERSONNEL CONDUCTING NOTIFICATION | REPORT NO. |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

**WERE PHOTOGRAPHS TAKEN:** ☐ **YES** ☐ **NO**

IF YES: BY WHOM: _____ BY WHOM: _____

DATE: _____ DATE: _____

TIME: _____ TIME: _____

# POST INCIDENT REPORT – CONTINUED

**FOLLOW-UP WRITTEN NOTIFICATION WITHIN 5 DAYS:**

☐ FEDERAL ☐ STATE ☐ CITY

**HISTORY OF PIPE INSTALLATION AND REPAIRS:**

**MAOP:**_____*p.s.i.g* **ACTUAL:** _____*p.s.i.g.*

**MAINS** (ATTACHED) ☐ YES ☐ NO **SERVICES** (ATTACHED) ☐ YES ☐ NO

**CATHODICALLY PROTECTED PIPE:** MAINS ☐ YES ☐ NO SERVICES ☐ YES ☐ NO

**ATTACH COPY OF:** CORROSION PROTECTION RECORDS OF AREA OF INCIDENT

**UNACCOUNTED FOR GAS – FORM COMPLETED** ☐ YES ☐ NO

(IF YES) COMPLETED BY WHOM: _____

DATE COMPLETED: _____

BY WHOM: _____

(FORM ATTACHED)

**ODORANT LEVEL AFTER INCIDENT:** _____

TYPE TEST: _____

**METER DIAL READING AT TIME OF INCIDENT:** _____ **DATE:** _____

**LAST DIAL READING PRIOR TO INCIDENT:** _____ **DATE:** _____

**GAS USAGE:** _____ C.C.F

**METER & REGULATOR CHECKS**

**METER TESTED** ☐ YES ☐ NO **LEAK TEST PRESSURE:** _____

**LEAK TEST RESULTS:**_____

**REGULATOR**

**SETTING @ 100CFH** _____ **LOCK UP PRESSURE**_____ **RELIEF PRESSURE**_____

# POST INCIDENT REPORT – CONTINUED

**ORIGIN OF THE INCIDENT :**

PIPE ☐ CAST/DUCTILE IRON ☐ STEEL ☐ PLASTIC: TYPE:_____

SPECIFIC DIMENSIONS OF PIPE:_____

VALVE: _____

METER:_____ NUMBER: _____

OTHER: _____

**ATTACH COPY OF:** FIRE DEPARTMENT REPORT

**POST-LEAK SURVEY RESULTS:** _____

**DATE OF LEAK SURVEY PRIOR TO INCIDENT:**_____

**LEAK SURVEY INSTRUMENT CALIBRATED:** ☐ YES ☐ NO **DATE:** _____

**PRESSURE TEST**

| | **MAIN** | **SERVICE** |
|---|---|---|
| **TEST PRESSURE** | _____ | _____ |
| **LENGTH OF TEST** | _____ | _____ |
| **RESULTS** | _____ | _____ |

**ATTACH COPY OF:** LEAK SURVEY REPORT

**INSPECTION/REVIEW TEAM:** **DATE:**_____

**NAMES:** _____ _____ _____

_____ _____ _____

**SYNOPSIS OF INCIDENT:** _____

_____

_____

**PIPE/COMPONENT ANALYSIS:** ☐ YES ☐ NO ☐ N/A (IF YES, BY WHOM:_____)

**RECOMMENDED CORRECTIVE ACTION:** _____

_____

_____

**IMPLEMENTATION DATE FOR CORRECTIVE ACTION**: _____

**FOLLOW-UP DATE TO ENSURE IMPLEMENTATION:**_____

## ROOT CAUSE ANALYSIS

When determining the root cause of any accident or failure it is important that the actual root cause be identified and not simply the symptoms or clues relating to the accident or failure. T he basic reason for investigating and reporting causes of occurrences is to enable identification of corrective actions adequate to prevent recurrence and thereby to protect the health and safety of the public, the workers and the environment. To determine the root cause, the investigative team must drill down to and identify the one item or items that caused the accident or failure. There may be more than one root cause that developed into the incident or accident. It is extremely important not to overlook the human factors element or human error. As stated earlier in this section and in the AOC modules presented by Midwest Gas Association, human error is the one element that causes most problems or non-conformances to occur. There are numerous techniques that may be employed to make the final determination as to the root cause of any incident or accident.

Every root cause analysis investigating and reporting process should include the following five phases.

1. Data Collection – Should be accomplished as soon as possible to ensure that date is not lost or compromised.

2. Assessment – 1. Identify the problem, 2. D etermine the significance of the problem, 3. Identify the causes (conditions or actions) immediately preceding or surrounding the problem, and 4. Identify the reasons why the causes in the preceding step existed; working back to the root cause or fundamental reason, which if corrected will prevent recurrence of similar occurrences.

3. Corrective Action(s) – Implementing corrective to each root cause reduces the probability that the problem will recur and improves reliability and safety.

4. Reporting – Provide a detailed written analysis of the incident or accident based on the assessment phase including recommended corrective actions.

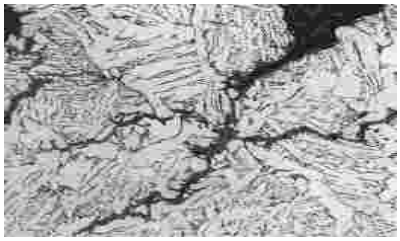
5. Follow-up – This is to determine if the recommended corrective actions has been effective in resolving the problem. An effectiveness review is essential to ensure that corrective actins have been implemented and are preventing recurrence.

Some of the major causes of accidents are failures are due to:

1. Equipment/Material Problems
2. Procedure Problem
3. Personnel or Human Error
4. Design Problem
5. Training Deficiency
6. Management Problem
7. External Phenomena

Gas and oil pipelines have established an impressive safety record over the years. However, failures have occurred for an assortment of reasons. Some of the causes of failure are identified in this commentary.

Since the 1940s, all of the oil and gas transmission lines have been built by welding. In general, American Petroleum Institute (API) 5L specification steels are used in pipelines. Pipeline wall thicknesses are established on the pressure in the line and on the allowable hoop stress levels for the material. The allowable stress levels for gas pipelines vary based on the location of the pipeline and are regulated by the U.S. Department of Transportation (DOT).



Pipelines are pressure tested in addition to nondestructive testing prior to being put into service. Normally, pipelines are hydrostatically stressed to levels above their working pressure and near their specified minimum yield strength. This pressure is held for several hours to ensure that the pipeline does not have defects that may cause failure in use. This proof test of pipelines provides an additional level of confidence that is not found in many other structures.

## Pipeline Failure Analysis

Some of the causes of pipeline failures are listed below:

- Mechanical damage
- Fatigue cracks
- Material defects
- Weld cracks
- Incomplete fusion
- Improper repair welds
- Incomplete penetration
- External or internal corrosion
- Hydrogen blistering

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**ROOT CAUSE ANALYSIS REPORT** **REPORT NUMBER:_____**

## Descriptive Information

| Subject – Short description of the incident: | Date & Time of Incident |
|---|---|
| Location of incident: | Duration of Service Interruption |

**Executive Summary**

**Enter a brief description of incident, the cause, the consequences, and required corrective action.**

**Risk if Condition is Not Corrected**

| Consequence of reoccurrence could be: | Probability of reoccurrence is: |
|---|---|
| ☐ Minor ☐ Moderate ☐ Major | ☐ Low ☐ Moderate ☐ High |

**Cost Information** ☐ Actual Loss ☐ Potential Loss

| **INJURY** | | **PROPERTY DAMAGE** | |
|---|---|---|---|
| Injured Person's Name: | | Property Damaged: | |
| Nature of Injury: | | Nature of Damage: | |
| Days Lost ☐ Estimate ☐ Actual | Cost ☐ Estimate ☐ Actual | Cost ☐ Estimate ☐ Actual | |

**SERVICE IMPACT**

| Number of Customers: | Number of Complaints: |
|---|---|

**Approval & Tracking**

Prepared by:_____
Date: _____
Approved by:_____
Date: _____

**Actions to prevent reoccurrence completed (date & initials)**

_____ _____ _____ _____
_____ _____ _____ _____
_____ _____ _____ _____

**ROOT CAUSE ANALYSIS REPORT** **REPORT NUMBER:**_____

**Narrative**

| **Chronological Description of Incident or Accident Including Comments:** |
|---|
| |
| **Root Cause(s)** |
| 1.<br>2.<br>3.<br>4.<br>5.<br>6.<br>7. |
| **Corrective Action Taken** |
| |

## 7.10 MAXIMUM ALLOWABLE OPERATING PRESSURE (192.619(a)(b)(c) & 192.621)(a)(b)

No segment of steel or plastic pipeline is allowed to be operated at pressures that exceed the design pressure of the weakest element in the segment. Additionally, the City of Carencro will not operate any segment of steel or plastic pipeline unless overpressure protective devices are installed on the segment in a manner that will prevent the maximum allowable operating pressure from being exceeded. The MAOP cannot exceed the lowest test pressure divided by the Class Location Factor or the highest actual operating pressure to which the segment of line was subjected during the 5 years preceding the affidavit if an affidavit was used to determine the MAOP.

The maximum allowable operating pressure (MAOP) for the City of Carencro Gas Distribution Systems is designed to comply with the requirements of 192.619 and is established so that it is commensurate with the class locations. The MAOP for the gas distribution system is based on pressure test records for those segments of pipelines installed after July 1, 1970. A pipeline in satisfactory condition, considering its operating and maintenance history may be operated at the highest actual operating pressure to which a segment of pipeline was subjected to during the five (5) years preceding July 1, 1970.

Section 6.5 of this O&M Manual describes the process and procedures used by City of Carencro for Uprating sections of the Gas Distribution System. The Maximum safe operating Pressure (MAOP) for piping was determined by the operator based on system history, known corrosion and the actual pressure. System history indicates that the MAOP selected for these gas distribution systems provides customers with an adequate supply of natural gas with little or no requirement to manipulate pressure-regulating devices during extreme temperature variations. MAOP for piping installed after 1970 for which recorded pressure test records are not available are determined by uprating procedures. The MAOP for the City of Carencro has been established as follows and were established based on the following factors:

1. The highest actual operating pressure to which a segment of pipeline was subjected to during the five (5) years preceding July 1, 1970. (Affidavit)
2. Actual pressure test records for piping installed after July 1, 1970.
3. Regulator and Pressure Relief Valve pressure settings.
4. Sworn affidavits by retired Gas Superintendent.

| AREA OF SYSTEM | ESTABLISHED MAOP |
|---|---|
| **University Purchase Point (La. 182) Between Purchase Point and the City Gate Station** | **60psi** |
| **Prejean Road Purchase Point Between Purchase Point and the City Gate Station** | **60psi** |
| **Downstream of the City Gate Station** | **25psi** |

The City of Carencro shall not subject the system to pressures that exceed these maximum allowable operating pressures in the course of normal operations. Relief valve settings shall be maintained at a setting so that the pressure may not exceed the maximum allowable operating pressure plus ten (10%) percent during emergencies. Increases in the maximum allowable operating pressures may be permitted only if made in strict compliance with Subsection “K”.

## 7.11 MAXIMUM ALLOWABLE OPERATING PRESSURE (192.621)(a)(b)

No person may operate a segment of a high pressure distribution system at a pressure that exceeds the lowest of the following pressures, as applicable:

- The design pressure of the weakest element in the segment, determined in accordance with C and D of this part.
- 60 p.s.i. (414 kPa) gage, for a segment of a distribution system otherwise designated to operate at over 60 p.s.i. (414 kPa) gage, unless the service lines in the segment are equipped with service regulators or other pressure limiting devices in series that meet the requirements of §192.197(c).
- 25p.s.i. (172 kPa) gage in segments of cast iron pipe in which there are unreinforced bell and spigot joints.
- The pressure limits to which a joint could be subjected without the possibility of its parting.
- The pressure determined by the operator to be the maximum safe pressure after considering the history of the segment, particularly known corrosion and the actual operating pressures
- No person may operate a segment of pipeline to which the above bullet applies, unless overpressure protective devices are installed on the segment in a manner that will prevent the maximum allowable operating pressure from being exceeded, in accordance with §192.195.

Note: DF =0.32, or = 0.40 for PA-11 pipe produced after January 23, 2009 with a nominal pipe size (IPS or CTS) 4 -inch or less, and a SDR of 11 or greater (i.e. thicker pipe wall), PA-11 design criteria in 192.121 & .123, ( Final Rule Pub. 24 December, 2008)

## 7.12 ODORIZATION OF GAS 192.625)(a)(b)(c)(d)(e)(f)

Natural gas that has been purchased by the City of Carencro Gas Distribution System shall be odorized. To assure the proper concentration of odorant in accordance with this section, the operator must conduct sampling of combustible gases on a quarterly basis using an instrument capable of determining the percentage of gas in air at which the odor becomes readily detectable. The City of Carencro uses a Bacharach Odorometer or other type Odorometer. The operator will conduct sampling on a quarterly basis using an instrument capable of determining the percentage of gas in air at which the odor becomes readily detectable.

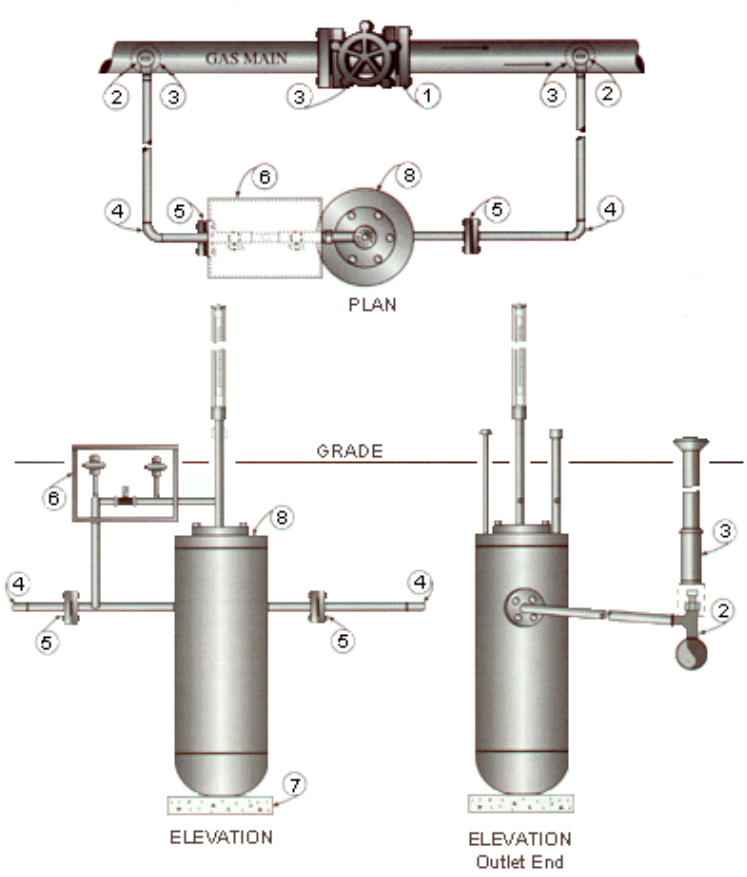
The level of odorization is controlled by the reading on the odorometer and by using the control valve on the odorizer. Odorant must be readily detectable by person with normal sense of smell at a concentration in air of 1/5 of the lower explosive limit. For the most part, between summer and winter months odorization levels are not changed. However, when concentration levels require adjustment, the control valve on the odorizer unit is used to make required adjustments. Odorant must be detectable by a person with normal sense of smell at a concentration in air of 1/5 of the lower explosive limit. Wicks of these odorizers will be checked periodically to ensure proper odorization. Care must be taken to ensure that the odorant and its products of combustion is not toxic to humans, or harmful to components that make up the gas distribution system. Odorant in the system cannot be soluble in water to an extent greater than 2.5 parts to 100 parts by weight.

City of Carencro has two (2) gas purchase points, which are located on University Drive (La. 182) south of Carencro and on Prejean Road also south of the City of Carencro. At least one odorizer is located at each purchase point ensuring that all gas purchased by City of Carencro for customer consumption is odorized. There are four (4) odorizer test stations on the City of Carencro gas distribution system. These test station have a ¼" valve installed to allow easy access. On the following page is typical installation drawing of a King Tool Odorizer Unit.

### SETTING DIFFERENTIAL VALVE

For the King Tool Odorizer to inject the proper amount of odorant into the gas stream, setting the differential valve is crucial. A small amount of gas is directed through the odorizer which picks up a measured amount of odorant off of the wicks and allows that odorized gas to enter the gas stream downstream of the odorizer unit. Set the differential valve as follows:

1. The optimum differential across the differential valve should be 9" water column or 1 psig.
2. The differential is measured at the two valves on either side of the needle valve on the top of the odorizer unit.
3. Open the inlet and outlet valves to the odorizer unit to the full open position.
4. Install pressure gauges on the two valves on either side of the needle valve. OR install a differential gauge across these two valves.
5. Adjust the main line differential valve so that there is a 1 psig difference on the two gauges. (Example valve on high or upstream side of needle valve must read 1 psig higher than the valve on the low side or downstream side OR should read 9" water column.)
6. Turn off the two valves on either side of the needle valve and remove the two gauges or the differential gauge. Leave the inlet and outlet valves to the odorizer open.
7. Once the differential valve is set in the proper position, the fine adjustment odor injection is accomplished by adjusting the needle valve. Turn valve to left to open or increase amount of odorant and turn valve right to reduce the amount of odorant entering the gas stream.




Quarterly tests will be documented on a Quarterly Report as required by Pipeline Safety and identified on the next page of the Operation and Maintenance Manual. This report shall include the following information:

- The kind or kinds of malodorant agents introduced into the gas distribution system during the calendar quarter.
- The quantity of each kind of malodorant agent used during each quarter
- The quantity of gas odorized by each malodorant agent used during each quarter.

On the following page is a typical Quarterly Report that will be maintained by the City of Carencro for inspection as required by Pipeline Safety Inspectors.

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**QUARTERLY REPORT**

**STATE OF LOUISIANA**
**OFFICE OF CONSERVATION**
**PIPELINE SAFETY**
**P.O. BOX 44275**
**BATON ROUGE, LOUISIANA**
**70804**

**Odorizer Report for Quarter Ending_____**

**Firm:_____Signature:_____**

**Street:_____Name:_____**

**City/State:_____Title:_____**

**Area Code/Telephone:__(____)_____Date:_____**

STATION NO._____Area:_____

**Odorizer Location:_____**

Type Odorizer:_____ Tank Capacity:_____Gal./Lbs.

**Brand Name of Odorant Used:_____**

**ODORANT USAGE**

1. **Odorant in Tank First of Quarter_____**
2. **Odorant Added During this Quarter_____**
3. **Total Odorant to Account for (Item 1 + 2)_____**
4. **Odorant in Tank End of Quarter_____**
5. **Odorant Used During Quarter (Items 3 - 4)_____**
6. **Gas Delivery this Quarter _____ MMCF**
7. **Rate of Odorization in Lbs. or Gal./MMCF_____**

**Odorant Used in Lbs./Gal = (Item 5) =_____Lbs. or Gal./MMCF**
**Gas Delivery in MMCF (Item 6)**

**MMCF = Million Cubic Foot**

**GAS SUPPLIER:_____**

The Operator for the gas distribution system for City of Carencro is responsible for assembling and maintaining designated test points throughout the system where samples may be collected by the Department of Natural Resources at unspecified intervals. Four (4) test stations have been selected through out the gas distribution system that provides a valve where these samples can be taken. City of Carencro uses a Bacharach to check concentrations of odorant in gas. Instructions and procedures are on the inside front cover of the odorometer and are also included on the following pages. Records should be maintained of the samples collected and the results of testing. Below is a listing of the locations of each odorization test station and a procedure for changing wicks in King Tool 2B Odorizer Units.

## GAS DISTRIBUTION SYSTEM
## ODORIZATION TEST STATIONS

### TEST POINT LOCATIONS

1. Koch & Florida Gas
2. 102 Dupliex
3. Hector Connolly Road
4. Birdsong Road

## ODORIZATION EQUIPMENT MAINTENANCE

Odorizers and associated fittings and piping must be inspected annually. The inspections are conducted in late spring after the peak winter load. During the winter peak season however, if there is reason to believe the unit may not be working properly or if there is indication that hydrocarbon liquids may be present in the gas the odorizers are to be inspected for presence of liquid hydrocarbons in the tank. The following procedure should be used to inspect the odorizer tank and station.

1. Visually inspect the odorizer and the surrounding area for evidence of leaks or damage.
2. Remove odorizer tank top and inspect condition of wicks and for contamination in the tank.
   - Close inlet and outlet valves of odorant tank.
   - Relieve pressure in tank by removing plugs from ¼ inch valves and slowly open ¼ inch valves.
   - Remove top flange bolts to remove top.
   - Inspect wicks. Remove plugs and replace wicks as necessary.
   - If odorant is contaminated with hydrocarbon, pump contaminated odorant into a closed container. Clean tank with varsol and swab out with rags.
   - Place old wicks, cleaner, and rags in the same container in which the contaminated odorant was placed and seal tightly.
   - Sealed container is to be disposed of by and environmental waste company.
3. Install top flange on tank with new gasket and tighten bolts. Pressure check flange and plugs for leaks. After determining that there are no leaks, bleed tank of pressure as described above.
   - Fill tank to desired level.
4. Open inlet and outlet valves of tank for service.
5. Adjust differential valve as needed to produce the proper odor.

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# ODOROMETER
# PORTABLE ODORANT LEVEL INDICATOR

## FEATURES

1. Automatic motor-speed control
2. Reduced operator adjustments provide a constant reference air flow.
3. On/Off switch with high visibility LED indicates working status and battery life.

## CONDENSED SPECIFICATIONS

1. Gas detected and range:  Gas Odorant 0.04% to 1.2%
2. Power Source: 5-D Alkaline Batteries (approx. 200 hours of operation)
3. Gas Pressure: 2 to 5 psig maximum
4. Gas Connection: Plastic (tygon) or aluminum tubing (included)

## ORDERING INFORMATION

Part Number 5110-0200 – Odorometer, standard range with 6 foot inlet hose

# OPERATING AND MAINTENANCE INSTRUCTIONS

**For The**

# ODOROMETER

## 1. APPLICATION

The ODOROMETER is a portable instrument that can be used by gas companies to check the odorization of the gas being distributed. The instrument provides an easy method of determining the odor intensity of a gas stream at any convenient point in the gas distribution or transmission lines, and is a faster method of determining odor levels at high or low gas-air concentrations than the room-test method. The range of testing on the standard instrument is from one-twentieth of 1% to slightly over 1% gas in air. This range enables the operator to check the accepted gas concentrations for the detection of an odorant in natural gas.

The ODOROMETER may also be used to perform natural gas odor intensity tests in accordance with ASTM D 6273-98. (ASTM is the American Society for Testing and Materials.)

## 2. DESCRIPTION

The ODOROMETER uses a constant-speed motor-driven blower to produce a constant flow of air, which is discharged from a glass SNIFFING FUNNEL through an opening in the top of the case, where the operator can sniff it conveniently for the presence of detectable odor. The gas to be tested is supplied to the instrument under its own pressure and metered by a FLOWMETER (also known as a Rotameter) and needle valve. The concentration of gas in the effluent air is determined from the FLOWMETER reading by reference to the calibration chart on the inside of the front cover.

The instrument components are mounted on an anodized aluminum panel which, in turn, mounts inside an anodized aluminum case. All metal and instrument surfaces have been chosen so that no outgas problems will occur. Make sure not to use any chemicals on the instrument that would give off residual odors.

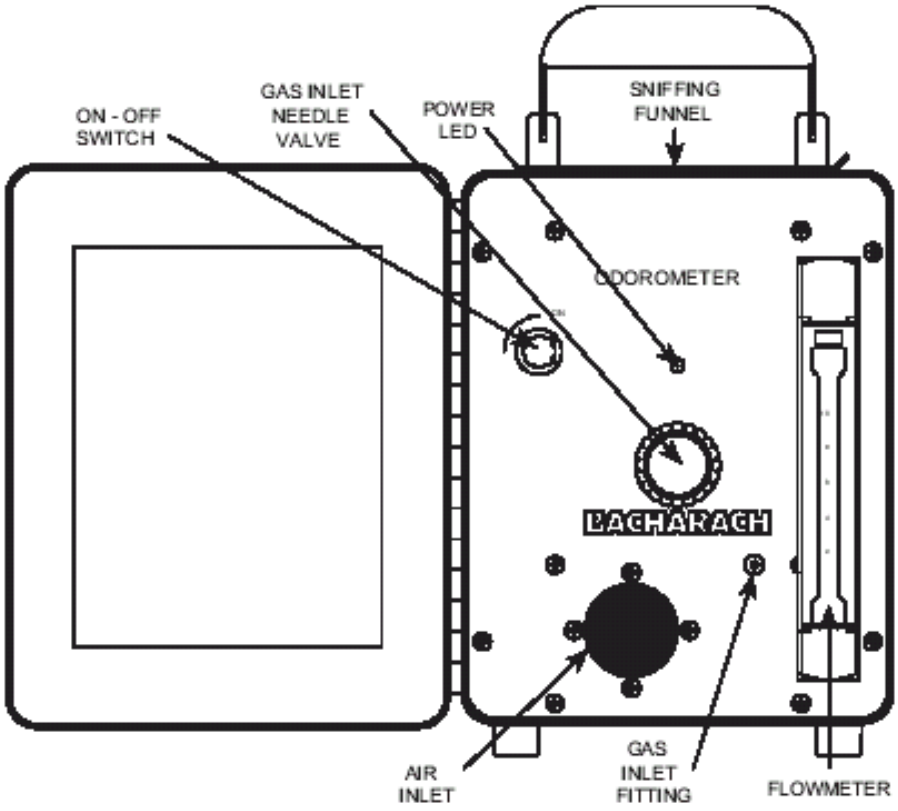
The ODOROMETER is a DC model completely independent of the power line and takes power from a battery pack consisting of five size-D Alkaline cells. This model is adjusted at the factory for proper blower speed and contains a front panel POWER LED which indicates that the unit is working properly.

> **NOTE:** *Two older versions of the ODOROMETER, an AC and DC model are still in use, and supported by Bacharach Inc. The AC model uses a shaded-pole constant-speed motor to drive the blower, and the instrument is equipped with a line cord for convenient connection to any 115 volt 60 cycle power source. The blower speed of the DC model is controlled by a rheostat and is set using the reading of the built-in milliammeter.*
>
> *Because there are slight differences in the three models, the older models will be referred to in Appendix A, which only needs to be referenced when using one of these older models.*

## 3. OPERATING INSTRUCTIONS

1. Make sure batteries are in place (See Appendix A-1 for AC models).
2. The gas supply should be connected to the inlet fitting on the front panel, and pressure should be below 5 psig. Connection should be made with aluminum or plastic tubing only; do not use copper or rubber, as these tend to remove odorant compounds. A 6 foot length of suitable plastic tubing is supplied with the instrument.
3. Where possible, tests should be run in an odor and draft free area.
4. Set the instrument on a level bench or desk. Swing the handle down, and the top cover open. Switch the unit "ON" (Clockwise), the green POWER LED should light (See Appendix A-2 for older models).

   **NOTE:** *If the LED goes out after a few seconds, replace the batteries.*
5. The GAS INLET NEEDLE VALVE is located in the center of the panel. Open the valve slowly while sniffing the air being discharged from the SNIFFER FUNNEL opening in the top of case.




**ODOROMETER**

6. The observer must be careful to hold his nose within one inch of

the SNIFFING FUNNEL to avoid dilution with the surrounding air (placing the upper lip on the handle will allow the nose to be centered about one inch above the SNIFFING FUNNEL).

7. Odor level rating must be based on the first sniff or two because the olfactory senses fatigue rapidly with continued exposure to an odor.

8. Between sniffs the observer should breathe deeply but slowly through his nose to "regenerate" his perception.

## 4. THRESHOLD ODOR DETERMINATION

1. Have the observers sniff the unodorized air stream.

2. Adjust the gas flow rate to the estimated threshold value and let the observers sniff again to see if they can smell any foreign odor.

3. Adjust the gas concentration upward or downward, as indicated by the above test, and have the observers sniff again.

4. Repeat this procedure until the threshold value is obtained for each observer. It is best to take several readings on both sides of the threshold and to run an occasional blank using air with no added gas.

5. Calculate the average threshold value of each observer. Then calculate the total average value, using these individual averages. This procedure is advisable because considerable variation is found among individuals in detecting threshold value. Thus, if the observers take different numbers of readings, a "straight" average of all these values would give more weight to the observer with the larger number of readings.

6. It is essential for this type of determination that the odor level rating be based on the first sniff only, because fatigue is very rapid in this range.

## 5. ODOR CHARACTERISTICS AT STANDARD CONCENTRATION

1. Have the observers sniff the unodorized air stream.

2. Adjust the gas rate to the desired concentration.

3. Have the observers sniff the effluent air stream, rating the odor intensity as (1) absent, (2) barely detectable, (3) readily detectable, (4) strong, (5) very strong (obnoxious).

4. If desired, a description of the character of the odor, such as onion, garbage, refinery, etc., can also be obtained.

5. Repeat the test after a short time to check the first determination.

The instrument has two ranges, obtained by using a lightweight glass and

## 6. RANGE OF MEASUREMENT

a heavier metal float, both in the same metering tube. Take readings on the glass float when both are within the range of measurement; take readings on the metal float when the glass float reaches the top of the tube. Useful ranges are approximately 0.04 to 0.4% for the glass float, and 0.2 to 1.1% for the metal float.

When taking readings, observe the FLOWMETER graduation corresponding to the bottom of the ball float. Find the gas concentration corresponding to this reading by looking at the calibration chart on the inside of the front cover. This chart has been drawn to give the percent gas concentration over the useful ranges for natural gas with a specific gravity of 0.620 relative to air. Concentrations of gases of other densities may be read using the correction factors shown on the graph below the calibration chart.

## 7. MAINTENANCE

The FLOWMETER tube and floats must be kept clean to prevent sticking of the floats in the tube. To disassemble, press the sides of the plastic cover and pull out. Remove the spring lock clip at the top of tube, lift the tube connector and pull tube out, by lifting from the bottom connectors. Tube and floats can be washed in alcohol, trichloroethylene or other solvent.

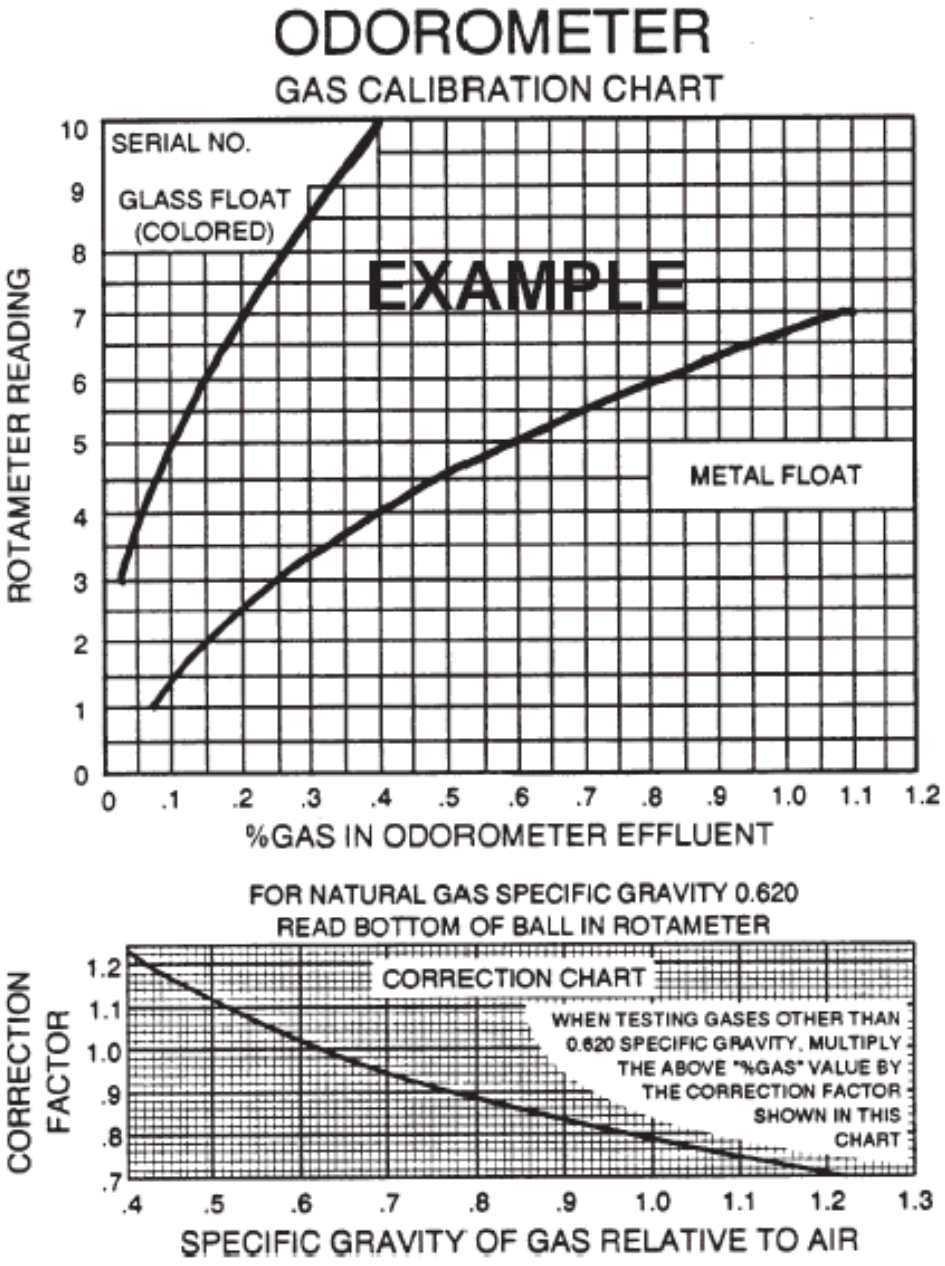
## 8. HOW TO USE THE ODOROMETER GAS CALIBRATION CHART

When the odor (mercaptan) in gas has been detected, observe the reading indicated by the FLOWMETER float. Depending on the range required, use either the upper glass float (colored) for values 0.04 to 0.4% or lower metal float (silver) for values 0.2 to 1.2%.

EXAMPLE: FLOWMETER (silver float) indicates 7; use second curve and observe that percent gas indicated by the chart is 1.1% (% GAS IN ODOROMETER EFFLUENT). If specific gravity of gas under test is 0.620, the correct percentage of gas is as noted on the curve (1.1%). If specific gravity differs, use the CORRECTION CHART below.

EXAMPLE: Specific gravity of gas under test is 0.55, the correction factor noted on the chart is 1.06. The correct gas concentration is obtained by multiplying the following:

1.1% x 1.06 = 1.166% (Gas in ODOROMETER Effluent).




**ODOROMETER GAS CALIBRATION CHART**

This chart is intended as an example only and does not reflect the calibration of your instrument. See actual calibration graph on your instrument.
Your ODOROMETER was calibrated against standards traceable to

## 9. SERVICE

the National Institute of Standards and Technology (NIST) prior to its shipment from the factory. To ensure the instrufment's continued accuracy and reliability, Bacharach recommends periodic calibration by an authorized Bacharach Service Facility. For best results, the instrument should be initially calibrated after no longer than one year of service. Thereafter, the calibration interval should be set as needed to ensure continued reliability. If calibrated by a Bacharach Service Facility, the assigned interval will be based upon the instrument's condition as received, in or out-of-tolerance and degree of drift since the last calibration.

Bacharach recommends that service on portable instruments, in or out of warranty, be performed at one of our Service Centers. Should service be required, please pack the instrument carefully, include all necessary identifying papers (with description of service needed), and ship prepaid to one of the below:

**California**
7281 Garden Grove Blvd.,
Suite H
Garden Grove, CA 92841
Phone: 714-895-0050
Fax: 714-895-7950
E-mail: calservice@bacharach-inc.com

**Indiana**
8618 Louisiana Place
Merrillville, IN 46410
Phone: 219-736-6178
Fax: 219-736-6269
E-mail: indservice@bacharach-inc.com

**New Jersey**
7300 Industrial Park
Rte. 130, Bldg. 22
Pennsauken, NJ 08110
Phone: 856-665-6176
Fax: 856-665-6661
E-mail: njservice@bacharach-inc.com

**Pennsylvania**
621 Hunt Valley Circle
New Kensington, PA 15068
Phone: 724-334-5051
Fax: 724-334-5723
E-mail: help@bacharach-inc.com

**Texas**
5151 Mitchelldale, B-4
Houston, TX 77092
Phone: 713-683-8141
Fax: 713-683-9437
E-mail: txservice@bacharach-inc.com

**Canada**
Bacharach of Canada, Inc.
151 Bentley Street Unit #6
Markham, Ontario L3R 3X9 Canada
Phone: 905-470-8985
Fax: 905-470-8963
E-mail: bachcan@idirect.com

**México**
Bacharach de México
Playa Regatas No. 473 Tercer Piso
Col. Militar Marte
Delegación Iztacalco, 08830
México D.F.
México
Phones: 011-5255-5634-7740
011-5255-5634-7741
FAX: 011-5255-5634-7738
E-mail: bacharach@prodigy.net.mx

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**
**INSTRUCTIONS FOR CONDUCTING ODORANT SNIFF TEST**

City of Carencro has installed 1/4 inch plugs on the outlet side of the meter sets identified in the list of Odorization Test Stations in this section of the O&M Manual. These odorization test stations are strategically placed throughout the gas distribution system in order collect odorant samples. The Operator for City of Carencro conducts this process. Samples shall be collected as follows:

**PROCEDURE FOR CONDUCTING ODORANT SNIFF TEST**

| | Action | Information |
|---|---|---|
| 1. | Make sure batteries are in place. | |
| 2. | Prior to connecting hose to 1/4" valve on meter outlet, connect hose to the inlet fitting on the front panel of the Odorator and turn on instrument. | Green LED light should be illuminated indicating that pump motor is operational and operating at correct speed. |
| 3. | Open top panel at handle and with unit running, sniff un-odorized gas. | Individual should not be able to smell gas at this point. |
| 4. | Turn unit off. | |
| 5. | Remove the ¼" inch plug on the **outlet side** of the gas meter. | Sniff locations should have a ¼" plug valve to allow for sniff test equipment. |
| 6. | Connect the gas supply to the 1/4" valve on the **outlet** side of the gas meter. | Pressure should be below 5 psig and connection should be with aluminum or plastic. Do not use Copper or rubber. |
| 7. | Switch the unit on. | For DC models, start motor by turning switch clockwise to "ON" and rotating the knob clockwise until air-flow is achieved. Set ammeter to red mark for proper amount of air flow. |
| 8. | Turn the 1/4" valve on the **outlet side** of the gas meter to the open position. | This action allows gas to enter the unit to the point of the inlet gas needle valve located in the center of the panel. |
| 9. | Open the inlet gas needle valve, located in the center of the panel **slowly** while sniffing the air being discharged from the sniffer funnel opening in the top of the unit. | Observer should hold nose within one (1) inch of the sniffer funnel to avoid dilution with the surrounding air. Odor rating must be based on the first sniff or two because the senses fatigue rapidly with continuous exposure to odor. (**Note**) the observer should breathe deeply but slowly through the nose in odor free air to regenerate his perception. |
| 10. | Begin sniffing the odorized air stream | Upon initial opening of the inlet gas needle valve you will probably not detect gas odor. |
| 11. | Slowly continue turning the inlet gas needle valve toward the left. | This allows more gas to enter the unit. |

| | Action | Information |
|---|---|---|
| 12 | Have the observer(s) continuously sniff the effluent air stream until the first indication of odorized gas is detected. | When odorized gas is detected, immediately stop turning the inlet gas needle valve. |
| 13. | Observe the silver ball in tube on the right side inside the unit. | The green ball is the glass ball and will be higher in the tube than the silver ball. The silver ball is used to determine the gas effluent. |
| 14. | Note the number on the tube closest to where the silver ball stops. | The tube is located on the right side inside the unit and is number from 0 to 10 in 1/2 increments. |
| 15. | On the inside door, left side is an Odorometer Gas Calibration Chart. | Along the left side of the Odorometer Gas Calibration Chart are number 0 through 10 called the "Rotameter Reading". |
| 16. | Use the number identified in step 14 above to determine the effluent gas. | Example: If the number in step 14 is "5", go up the Rotameter Reading (left side of the scale) to "5". |
| 17. | Follow the line at "5" right across the chart to where that line intersects with the curved black line. | This give you the Rotameter Reading. |
| 18. | Next, follow the line where it intersects down to the bottom of the scale. | Using the same example in item 16 above, following the line down where it intersects and following it down give a % Gas in Odorometer Effluent of .9 |
| 19. | % Gas in Odorometer Effluent readings below 1.0% provides evidence that the proper amount of odorant is being added to the gas distribution system. | % Gas in Odorometer Effluent readings between .8% and 1.2% is where a person with a normal sense of smell detects the smell of natural gas, however, to meet Pipeline Safety Requirements the Effluent reading must be 1.0 % Gas in Air or below |
| 20. | Repeat the test after a short time to check the first determination. | |
| 21. | Document the results of the Odorant Sniff test on the “SNIFF TEST” and/or “ODOROMETER TEST” ODORIZATION CHECK REPORT. | See next page for the “SNIFF TEST” and/or “ODOROMETER TEST” ODORIZATION CHECK REPORT |
| 22. | The "Sniff Test" Report should have the following information completed. (1) absent (2) barely detectable (3) readily detectable (4) strong (5) very strong (obnoxious). The % Gas in Odorometer Effluent reading should also be documented under "Remarks". | |

Odorant sniff test and/or Odorometer test shall be documented on an “Odorization Check Report”. (See a typical copy of this report on the next page.)

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**
**"SNIFF TEST" and/or "ODOROMETER TEST"**
**ODORIZATION CHECK REPORT**

Location: _____

Date: _____ Time: _____

Odor Level:
_____ Nil
_____ Barely Detectable
_____ Readily Detectable
_____ Strong

List other odors present: _____

_____

Remarks: (Odorometer Reading) _____

_____

Observed by: _____

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

Location: _____

Date: _____ Time: _____

Odor Level:
_____ Nil
_____ Barely Detectable
_____ Readily Detectable
_____ Strong

List other odors present: _____

_____

Remarks: (Odorometer Reading) _____

_____

Observed by: _____

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

Location: _____

Date: _____ Time: _____

Odor Level:
_____ Nil
_____ Barely Detectable
_____ Readily Detectable
_____ Strong

List other odors present: _____

_____

Remarks: (Odorometer Reading) _____

_____

Observed by: _____

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

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**
**INSTRUCTIONS FOR ADDING ODORANT TO**
**CITY OF CARENCRO ODORIZERS**

1. Read the liquid level on the odorizer tank to determine the amount of odorizer present in the tank. NOTE: This information will also be used to determine you odorization rate at the end of the month.
2. Close inlet and outlet valves #1 and #2, i.e. isolate the odorizer from the pipeline. Open valve #8A and #8B, light flare, and burn-off pressure in the odorizer tank.
3. Hook up orange liquid hose valve #12 to the liquid fill tube on the odorizer #13 and the liquid valve #10 on the cylinder with the tee assembly valve #11. Make sure that valve #14 on tee assembly is closed.
4. Connect regulator assembly to gas source valve #7 WITH THE other end connected to gas side of cylinder #9.
5. Open gas supply valve #7 and set regulator on 20 psig. Open gas valve on cylinder #9 to proper blanket pressure for unloading odorant.
6. Open liquid valve on cylinder #10, hose #11 and #12 and storage tank #13 to begin filling.
7. When proper liquid level is obtained shut off fill valve on odorizer #13 and close the liquid valve on the cylinder #10.
8. Close the gas supply valve #7. Close the gas valve on the cylinder #9.
9. Disconnect gas supply hose from cylinder #9 and reconnect gas pressure hose to liquid tee assembly #14.
10. Open gas supply valve #7 and gas valve #14 at the tee assembly to put pressure on the orange hose. Open liquid fill valve on the storage tank #13 and listen for liquid. When all liquid has stopped and only gas pressure is flowing, walk the hose from the cylinder to the storage tank to insure that all liquid has been removed.
11. Close the valve on the storage tank #13, then close valves #12 and #11 on the orange hose.
12. With the gas supply valve #7 still open, quickly crack open and close the liquid valve on the cylinder #10. This will allow any liquid left in the tee assembly back into the cylinder.
13. Close the gas supply valve #14 and #7. All valves should be closed a this point.
14. Disconnect all hoses. Plug all openings with Teflon taped plugs. Put appropriate ends of hose together. Optional – bleed gas pressure off orange hose using masking agent.
15. Open valves #1 and #2.
16. Record the new liquid level and calculate the odorization rate for the last week or month.

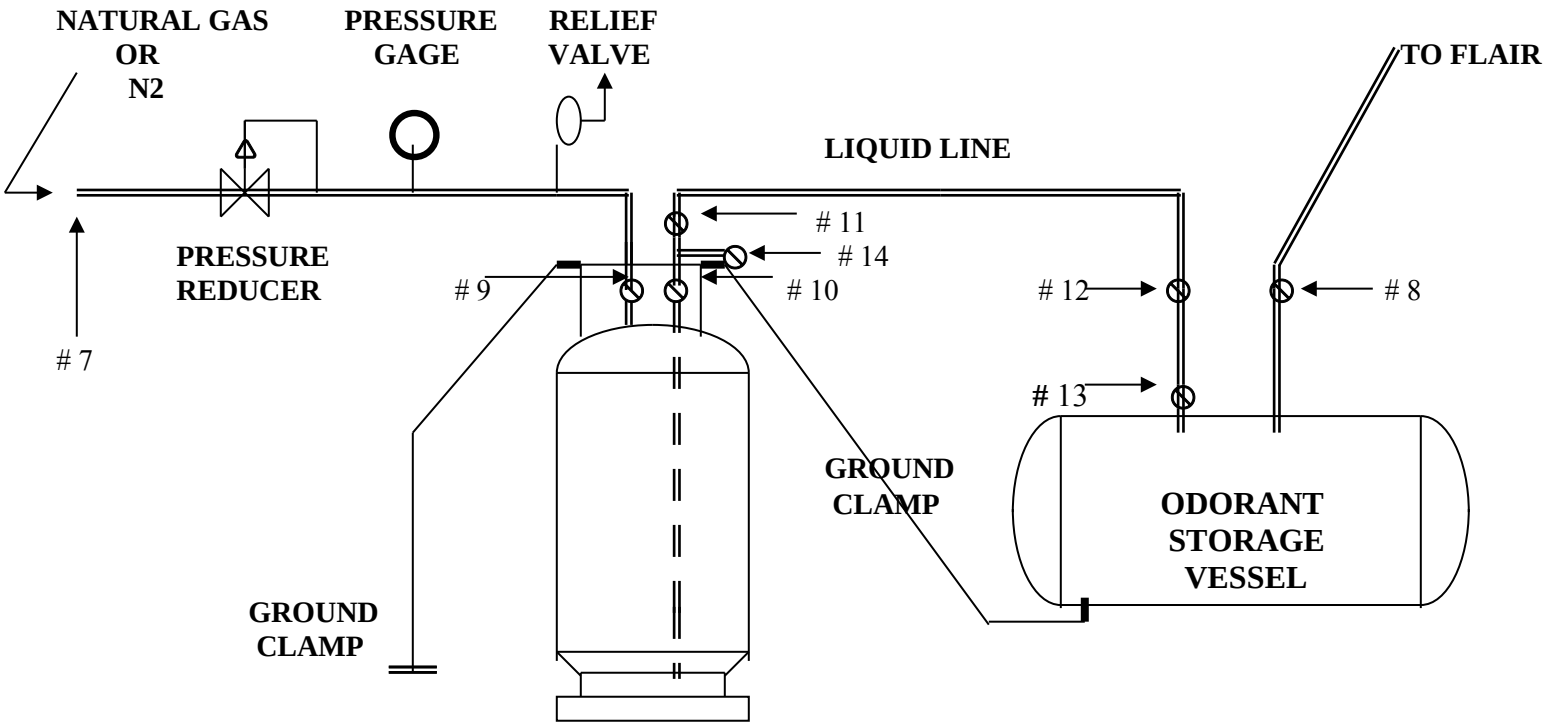
**Example:**

$$\frac{\text{Odorant used}}{\text{Gas purchased 20,000 mcf}} = \frac{15 \text{ lbs.}}{20 \text{ mmcf}} = .75 \text{ lbs. Per mmcf}$$

**NOTE:**
**ODORANT IS TO BE ADDED BASED ON THE AMOUNT OF ODORANT REMAINING IN THE TANK AND/OR THE RESULTS OF THE SNIFF TEST**

**ATTEMPT WILL BE MADE TO MAINTAIN**
**A READING OF 1/5 DETECTABLE ON THE LEL SCALE**

## CYLINDER HOOKUP



The City of Carencro will use the procedure below for changing wicks in its King Tool Odorizers. Used wicks or wicks that have been replaced are burned to prevent the remaining odorant in the replaced wicks from contaminating the area with smell.

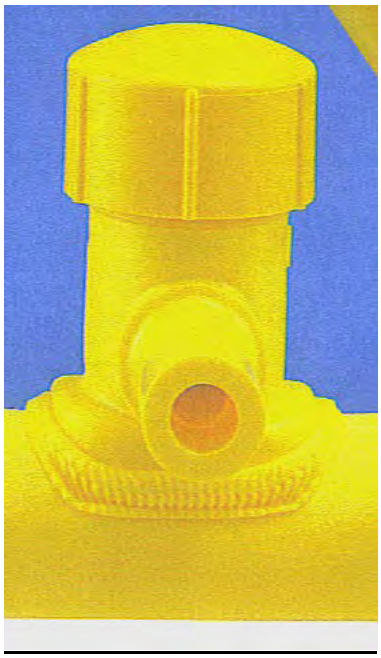
## PROCEDURE FOR CHANGING WICKS

| | | |
|---|---|---|
| 1. | Turn off inlet and outlet supply valves on odorant tank. | This action isolates the odorizer unit. |
| 2. | Slowly open valve on flare line and light flare. Control flame with valve. | This is to burn off gas and odorant in tank. Keep manned fire extinguisher up wind. |
| 3. | Once all pressure from tank is removed, begin loosing wick stabilizer holders. | |
| 4. | After stabilizer holders are free, pull upward slowly to remove old used wicks. | Make sure wicks remain in holders and do not fall into tank. |
| 5. | Continue process until all wicks have been removed from the odorizer. | After all old wicks have been removed from the odorizer place them in a sealed container to be burned to eliminate as much odor as possible |
| 6. | Screw new wicks into the wick stabilizer holders until fully inserted into the holders and secured. | Check by exerting slight downward pressure on new wicks to assure that they will not come loose and fall into the tank.<br>Tops of new wick may require trimming to allow them to be inserted fully into the holders. |
| 7. | Once new wicks have been installed and secured in the wick stabilizer holders, apply pipe dope or Teflon tape to the outside threads. | |
| 8. | Re-insert the new wicks into the odorant tank slowly until the entire wick is inside the tank and the holding nut is in contact with the tank. | |
| 9. | Tighten the nuts. | |
| 10. | Close flare line valve and slowly open the inlet and outlet valves on the odorizer tank. | Pressure will equalize. |
| 11. | Soap test the threads on the wick stabilizer holders to check for leaks. | Repair leaks immediately if applicable. |
| 12. | Return odorizer to service. | |

## 7.13 TAPPING PIPELINES UNDER PRESSURE (192.627)

City of Carencro performs hot taps on steel gas mains in the gas distribution system to install new gas service to customers. Hot taps are also made to extend or run new gas distribution lines. The method used to make these hot taps complies with regulatory requirement 192.627. In the past, qualified personnel who had been trained in the process by other qualified personnel made hot taps. Beginning in October 2002 all personnel, both existing and new will be trained and qualified or have been trained and qualified and will have attended and completed the Operator Qualification Training, Module 441 "Tapping/Stopping 1.25" Through 4"Pipe" and Module 442 "Tapping Steel and PE Pipe". Primarily hot taps on cast iron piping are made using the steel bolt-on service saddles supplied by Continental Industries, Inc. On the following pages is the procedure for installing and tapping steel pipe using bolt-on saddles.

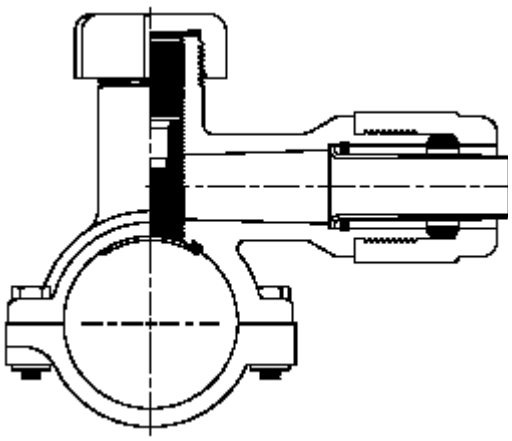
Hot taps on polyethylene piping are made using the Central or Plexco Fuse-on saddle-tapping tee or the PVC Eliminator manufactured by Continental Industries, Inc. as described in Section 3.2.4. Hot taps made on steel gas distribution lines are made using steel service punch saddle tees with seal plug cap manufactured by Continental Industries, Inc. See typical Plexco Fuse-on Saddle Tapping Tee and Central Fuse-on Saddle Tapping Tee below.



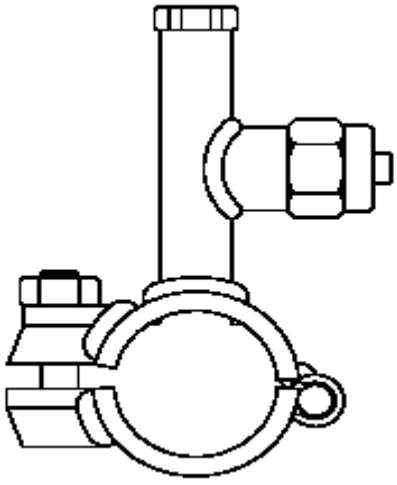
**PLEXCO FUSE TAP**

**CENTRAL FUSE TAP**

Presently the City of Carencro has elected to use bolt-on saddles to make taps on steel mains and cast iron mains. Below are two drawings of commonly used saddles used to make hot taps, one that is used on steel gas distribution systems and the other that would be used on PE mains. This activity has a high potential to result in an abnormal operating condition. Because of this potential for an AOC to occur, special precautions should be taken such as having a fire extinguisher manned upwind from the tapping process.



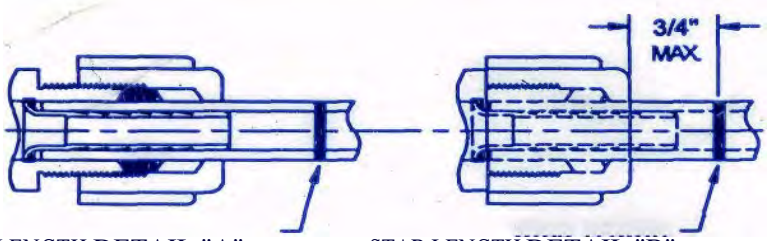
**PVC COATED BOLT-ON SELF TAPPING TEE FOR PE PIPE**



**BOLT–ON SELF TAPPING TEE FOR PE PIPE**

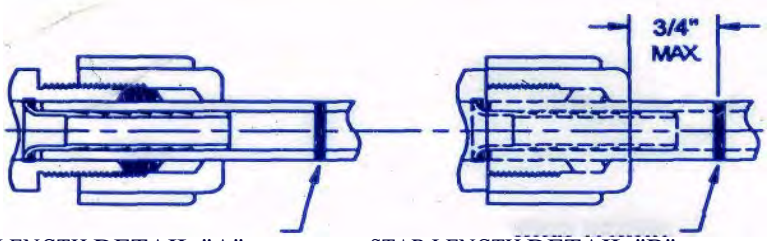
On the following pages are two procedures for the installation of both type of bolt-on tapping tees. You will notice very little difference in the two procedures. The actual tightening and tapping process is the same. The major difference in the two is the preparation for cleaning the two different type mains and the safety concern when handling polyethylene pipe. The tapping processes detailed in the following procedures are also used to tap into steel and PE piping. Use the sidewall fusion process in Section 3.2.1 to fuse the saddle onto the PE Main and use Section 3.1 for welding the Muller steel tapping tees on steel mains.

## PROCEDURE FOR TAPPING STEEL MAINS USING BOLT ON SELF TAPPING TEES

| | Action | Information |
|---|---|---|
| **1** | Remove all wrapping and coating in immediate area where the self tapping tee is to be installed. | Failure to remove wrapping and coating will likely result in a bad seal and will result in leakage. |
| | **MOUNTING FITTING ON MAIN** | |
| **2** | Place the top and bottom half of saddle on the steel main. | Saddle and pipe must be clean and free of dents gouges and tar. |
| **3** | Insert the bolts and tighten until the flanges of the saddle come together | |
| **4** | Cut the pipe ends of the polyethylene service line square and deburr outside and inside ends. | Clean all areas thoroughly to assure there is no dirt, tar etc. on the ends of the polyethylene service line. |
| **5** | Measure and mark the stab length on the PE Pipe | This assures that the coupling will be centered over the joining ends of the PE Pipe. (**See examples below for correct pipe or tubing size and corresponding stab length**) |
| | 3/8" OD, 5/8" OD.<br>7/8" OD, ½" IPS<br>2" STAB LENGTH<br><br>1-1/8" OD, 3/4" IPS, 1" IPS<br>2-3/8" STAB LENGTH<br><br>**NOTE: THESE MEASUREMENT ARE NOT PRECISE, USE TAPE MEASURE** | |
| **6** | Loosen compression nut until seal ring is no longer compressed, then insert pipe until it bottoms in outlet.<br>(SEE Detail "A") | Failure to loosen the compression nut may lead to damage of the O-Ring. |
| **7** | Tighten compression nut until it shoulders against the outlet. **DO NOT OVERTIGHTEN**<br>(SEE DETAIL B") | Line marked for stab length should be no more than ¾" from face of nut. |
| |  <br>STAB LENGTH DETAIL "A" STAB LENGTH DETAIL "B" | |
| | **TAPPING PROCESS** | |
| **8** | Remove the "O" ring and cap from the fitting, then insert drive key into punch. | Guide bushing should be seated in top of saddle after beginning tap. |
| **9** | Screw punch down until stop on drive key contacts the top of the tee. | This completes the tap. |

| | | |
|---|---|---|
| **10** | To allow flow through the service, back the punch up until the top of the punch is flush with the top of the tee. | It is important that the punch does not protrude above the tee. |
| **11** | Replace the "O" ring and cap screw down tight. | Do **not** use wrenches on the "O" ring cap. |
| **12** | Check fitting and adjacent piping for leakage with soap suds. | Repair or stop leaks if any. |
| **13** | Remember, always pressure test the new or replacement service line to 50 psi or 1.50% times the intended MAOP, whichever is greater. | Maintain test records. |

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**
**PROCEDURE FOR TAPPING POLYETHYLENE PIPING USING BOLT ON TAPPING TEES**

| | Action | Information |
|---|---|---|
| | **MOUNTING FITTING ON MAIN** | |
| **1** | Prior to beginning the tapping tee mounting process, discharge the static electricity from the PE piping by placing wet soapy rags around the piping letting them come in contact with the surrounding soil. | Failure to discharge static electricity will likely lead to fire. |
| **2** | Clean the immediate area of the PE piping where the bolt-on tapping tee is to be mounted on the pipe surface. | Failure to clean the pipe and inside of the saddle will likely lead to leakage. |
| **3** | Place the top and bottom half of saddle on the polyethylene main. | Saddle and pipe must be clean and free of cuts, scratches and oils or lubricants. |
| **4** | Insert the bolts and tighten until the flanges of the saddle come together | Do **not** to rotate the saddle on the polyethylene pipe. |
| **5** | Cut the service line pipe ends square, deburr outside and inside ends of the polyethylene pipe. | Clean all areas thoroughly to assure there is no dirt, grease, oil, etc. on the assembly area of the polyethylene pipe. |
| **6** | Measure and mark the stab length on the PE Pipe | This assures that the coupling will be centered over the joining ends of the PE Pipe. (**See examples below for correct pipe or tubing size and corresponding stab length**) |
| | 3/8" OD, 5/8" OD.<br>7/8" OD, ½" IPS<br>2" STAB LENGTH<br><br>1-1/8" OD, 3/4" IPS, 1" IPS<br>2-3/8" STAB LENGTH<br><br>**NOTE: THESE MEASUREMENT ARE NOT PRECISE, USE TAPE MEASURE** | |
| **7** | Loosen compression nut until seal ring is no longer compressed, then insert pipe until it bottoms in outlet. (SEE Detail "A") | Failure to loosen the compression nut may lead to damage of the O-Ring. |
| **8** | Tighten compression nut until it shoulders against the outlet. **DO NOT OVERTIGHTEN** (SEE DETAIL B") | Line marked for stab length should be no more than ¾" from face of nut. |
| |  <br>STAB LENGTH DETAIL "A" STAB LENGTH DETAIL "B" | |
| | **TAPPING PROCESS** | |

| | | |
|---|---|---|
| **9** | Remove the "O" ring and cap from the fitting, then insert drive key into punch. | Guide bushing should be seated in top of saddle after beginning tap. |
| **10** | Screw punch down until stop on drive key contacts the top of the tee. | This completes the tap. |
| **11** | To allow flow through the service, back the punch up until the top of the punch is flush with the top of the tee. | It is important that the punch does not protrude above the tee. |
| **12** | Replace the "O" ring and cap screw down tight | Do **not** use wrenches on the "O" ring cap. |
| **13** | Check fitting and adjacent piping for leakage with soap suds. | Repair or stop leaks if any. |
| **14** | Remember, always pressure test the new or replacement service line to 50 psi or 1.50% times the intended MAOP, whichever is greater. | Maintain test records. |

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**
**PROCEDURE FOR TAPPING STEEL MAINS USING CONTINENTAL STEEL PUNCH TEES**

| | Action | Information |
|---|---|---|
| **1** | Remove all wrapping and coating in immediate area where the steel punch tee is to be installed. | Failure to remove wrapping and coating will likely result in a bad weld and will not pass inspection |
| **2.** | Clean the gas main of rust and dirt in the area where the weld is to be made. | Failure to remove wrapping and coating will likely result in a bad weld and will not pass inspection |
| **3** | Weld the tapping tee onto the gas main. Using approved procedure. | Verify that the size of the tapping tee weld end is compatible in size to the main to be tapped. |
| **4** | Pressure test after welding tee to gas main and making service connection. | Pressure test to Section 6 of this O&M Manual. |
| **5.** | Make PE pipe service connection to compression coupling before tapping gas main. Follow OPE coupling joining procedures. | Pressure test polyethylene service and riser to Section 6 of this O&M Manual. |
| **6.** | Remove o-ring cap and insert punch and screw at least two turns by hand to avoid cross threading. | Be careful not to cross thread punch. |
| **7.** | Use ratchet wrench with 'Continental adapter key and bushing to make the tap. Apply a liberal amount of lubricant to the internal threads of the service tee to increase the tapping efficiency of the punch. Run the punch down until it seats onto the main. | Be careful not to run punch through bottom of main. |
| **8.** | Back punch up until it protrudes 2 to 3 threads above top of tee. | |
| **9.** | Insert the hex drive of the o-ring plug cap into the socket of the punch valve and run it down until it is leak tight. Take care as the threads of the o-ring plug cap engage the threads of the tee body to prevent cross threading. Replace o-ring cap. | Check o-ring to verify that it is not damaged. Damaged o-rings will nor make a good seal and will result in leakage. |
| **10.** | Clean uncovered pipe and tapping tee. Coat area with water proof mastic or Tape Coat Tape. | See Section 5.11 of this O&M Manual for application of wrapping/coating. |

## HOT TAPS & LINE STOPPERS

Work on natural gas pipelines sometimes requires you to tap into a live main in order to stop the gas flow temporarily. It should go without saying that this is an operation that requires the most extreme caution. On occasion, Muller Tapping equipment is used to tap and stop gas flow

Tapping and stopping a main may be necessary in any of the following situations:

- Repair
- Replacement
- Abandonment
- Installing new pipelines
- Installing other system devices

Procedures and equipment used to tap into a main and stop the flow of gas can vary quite a bit, based on the:

- Pressure in the line
- Type of material the pipe is made of
- Location of the job.

Because of the possible hazards of blowing gas, you must follow all proper procedures to help reduce the potential for personal injury and property damage. The first thing you must determine to maintain gas flow is whether the main has a one-way feed or a two-way (loop) feed.

### DETERMINING FEED

On a main with one-way feed, you know for sure that stopping the gas flow will cut off service to customers downstream. O n a main with two-way feed, service should be unaffected, unless there is an unknown blockage in the line.

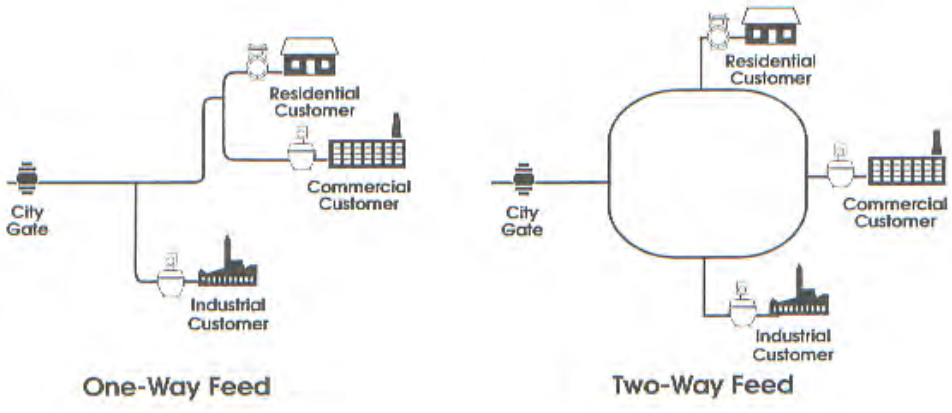


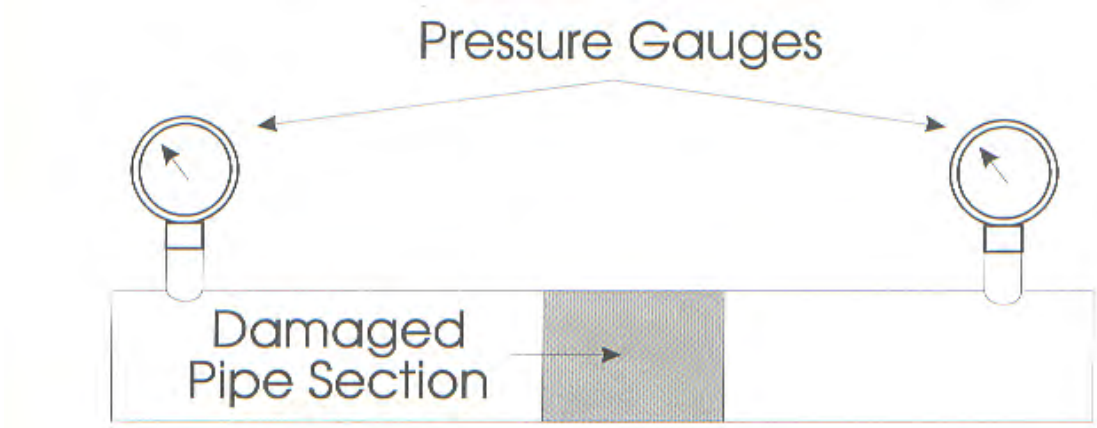

**Figure 1: One-way and Two-way Feed**

Whenever you need to stop gas flow to a section of a pipeline, it is important to maintain service to as many customers as possible. Interruption of service is more than an inconvenience. If customers are cut off and appliance pilots go out, gas may flow through the unlit appliances when service is restored, creating a hazardous condition.

## Bypassing and Monitoring

When stopping a line with one-way feed, you first may want to install a bypass around the section you will isolate, if conditions permit.

When stopping a line with two-way feed, you can install pressure gauges on both sides of the section you will isolate to monitor pressure in the rest of the system. Watch the gauges after you place the first bag or stopper. If there is any unknown blockage in the line, or if a valve is closed, flow will be cut off and pressure will drop.

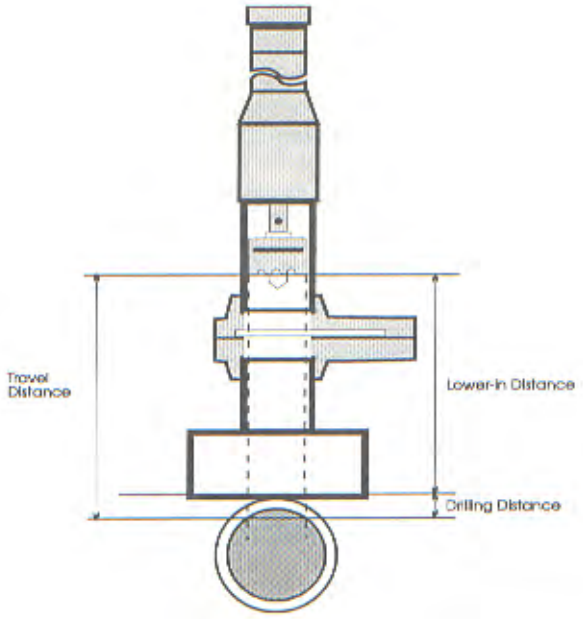



## HIGH PRESSURE TAPPING AND STOPPING

High-pressure tapping and stopping equipment is designed to cut off gas flow without releasing any gas from the line. There are different kinds of equipment, but in general, these are the general operations that you must follow. More detailed instructions are on the following pages.

**Select Proper Equipment:** Ensure that equipment, saws, adapters, and fittings are the right size for the pipe you will be tapping.

- **Install Equipment:** Weld any fittings or nipples to the pipe and securely attach the appropriate valve.
- **Determine the Travel Distance:** Determine the distance the drill must travel to tap through the top of the pipe without boring into the bottom (See Figure 4).
- **Attach the Drilling Machine:** Install the drilling machine to the tap fittings.
- **Make the Tap:** Drill through the pipe to the required travel distance.
- **Remove the Drilling Machine:** Safely remove the drilling machine while containing the gas flow inside the pipe.
- **Sweep Away Chips:** Clear away pipe chips and debris from the drilling operation to allow a good seal.
- **Stop Gas Flow:** Install a stopper or plug into the line to stop the gas flow.
- **Attach the Completion Plug (if used):** Attach the completion plug to close off the tap for future use.



# MUELLER®

# OPERATING INSTRUCTIONS
## FOR
## B-101™ AND B-100™
## DRILLING AND
## TAPPING MACHINE

**⚠ WARNING**

1. Read and follow instructions carefully. Proper training and periodic review regarding the use of this equipment is essential to prevent possible serious injury and/or property damage.

2. Do not exceed the pressure ratings of any components or equipment. Exceeding the rated pressure may result in serious injury and/or property damage.

3. Safety goggles and other appropriate protective gear should be used. Failure to do so could result in serious injury.

MUELLER® Drilling Machines and Equipment have been carefully designed and engineered to work together as a unit. The use of equipment manufactured by someone other than Mueller Co. may cause excessive wear or a malfunction of the MUELLER Machines.

Mueller Co. will assume no responsibility or liability, either expressed or implied, for any malfunction or damage caused by or to a MUELLER machine when the use of shell cutters or equipment manufactured by someone other than Mueller Co. is involved.

Mueller Co.

**MAIN OFFICE and PLANT**
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Decatur, Illinois 62522

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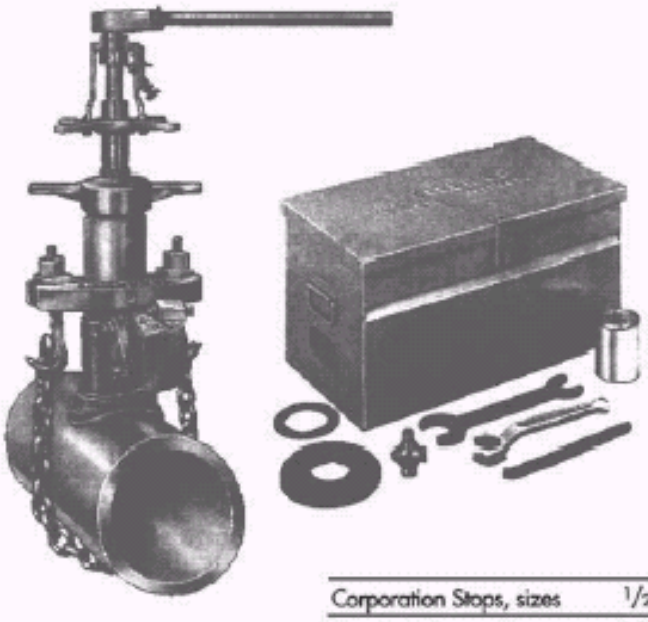
# B-101™ AND B-100™ DRILLING AND TAPPING MACHINE



## CAPACITY AND USE:

The B-101 drilling and tapping machine drills and taps mains, and inserts stops, tees or plugs into the tapped hole in the main under pressure.

The B-101 machine has a special mechanism that permits the boring bar to be locked to the feed nut and yoke to prevent the drill from spiraling into the hole before the hole is completely drilled. It also prevents the drill from dropping to the threaded section of the combined drill and tap. This design eliminates unnecessary tool damage and is recommended for low pressure drillings.

Tools and equipment for the B-101 and earlier B-100 machines are the same. The following items can be inserted with the B-101 or B-100 machine.

See notice on page 14 regarding use of Blow-off Valve.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Corporation Stops, sizes | 1/2" | 5/8" | 3/4" | 1" | | | | |
| Gas Main Stops, sizes | 1/2" | | 3/4" | 1" | | | | |
| NO-BLO Machine Inserted Valve Tees, size | | | 3/4" | | | | | |
| Pipe Plugs, sizes | 1/2" | 5/8" | 3/4" | 1" | 1 1/4" | 1 1/2" | 2" | 2 1/2" |

## B-101 AND B-100 MACHINE AND EQUIPMENT FURNISHED

Shipped in Metal Case.
Total Shipping Weight 113 Pounds.

## EQUIPMENT FURNISHED WITH EACH MACHINE:

- Ratchet Handle
- Small Saddle Gasket
- Large Saddle Gasket
- Round Link Chain
- Chain Hooks and Nuts
- Chain Washers
- Blow-off Valve
- Chain Hook Nut and Tool Retaining Screw Wrench
- E-Z Release Screw Plug Wrench
- Body Cleaning Chisel
- Cutting Grease

## MAXIMUM WORKING PRESSURE

90 p.s.i. without power clevis
250 p.s.i. with power clevis

Tools and saddles are offered for use with cast iron, steel, and asbestos-cement pipe in sizes from 2" to 48" inclusive.

## RECOMMENDED MINIMUM SIZE OF CAST IRON MAIN FOR EACH SIZE OF TAPPING FOR SERVICE CONNECTION*

| Size of Tapping | 1/2" | 5/8" | 3/4" | 1" | 1 1/4" | 1 1/2" | 2" | 2 1/2" |
|---|---|---|---|---|---|---|---|---|
| Smallest Size of Main | 3" | 3" | 3" | 4" | 6" | 6" | 8" | 10" |
| Approximate Number of Full Threads | 5" | 4 3/4" | 4 1/2" | 4 1/2" | 4 1/4" | 4" | 4" | 4" |

* Corporation Stops, Service Tees, and Gas Main Stops with MUELLER Compression Joint Inlet may be used with smaller sizes of pipe.

# FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

# MAINTENANCE INSTRUCTIONS

**NOTICE: The machine used to illustrate this manual may differ somewhat in appearance from currently produced machines. If one of these differences is of significance, it will be referred to in the instructions.**

**BEFORE USE**

Clean and lubricate all wearing and bearing surfaces and threads EXCEPT the boring bar thrust collar which requires no lubrication.

**NOTE: If lubricated, service life of boring bar thrust collar may be shortened.**

Boring bar is lubricated between upper and lower "O" ring seal in feed sleeve and cap by a reservoir containing light machine oil. Remove oil plug in feed sleeve near lower end and occasionally fill with light oil.

Inspect and clean all tools, particularly the shank ends, and remove any burrs or scale which would prevent proper alignment with the boring bar.

Inspect and clean the socket in the end of the boring bar and remove any burrs or scale which would prevent the tool from seating properly.

**AFTER USE**

Thoroughly clean the entire machine and all tools, and lubricate all machined surfaces.

Remove all chips from inside of body, including the flap valve recess. A special body cleaning chisel is furnished for this purpose. If chips are permitted to accumulate in the machine, they will rust and become caked and will interfere with the operation of the flap valve.

**NOTE: Do not bump machine on hard surface to shake chips out of body. Saddle gasket surface is damaged by this type of operation.**

The machine and all tools and equipment should be stored in the machine chest. Carefully, place tools in their individual compartments to prevent damage to threads or cutting edges.

**BORING BAR PACKING**

Machine is equipped with "O" ring packings, which are nonadjustable. When leakage occurs, replacement is necessary.

These packings are replaced in the following manner:

1. Remove ratchet handle and feed nut and yoke from boring bar.
2. Punch out boring bar thrust collar retaining pin. Slide collar off bar.
3. Unscrew feed sleeve and cap from cylinder and slide feed sleeve and cap off bar.
4. Remove wiper ring and "O" rings from recess in top and bottom of feed sleeve and cap.
5. Check wiper ring and "O" ring packing recesses to be sure they are clean before placing new rings in these grooves. New wiper ring and "O" ring packings should be lubricated with machine oil or light cup grease before they are placed in the feed sleeve and cap.
6. Be sure the top end of boring bar at squared end has no rough edges or burrs that would damage the new wiper ring and "O" ring packings as the feed sleeve and cap are replaced on the boring bar. Screw feed sleeve and cap back on cylinder.
7. Replace boring bar thrust collar and replace retaining pin.
8. Remove oil hole plug in feed sleeve and fill recess between "O" rings with light machine oil. Move bar up and down while filling to remove air pockets.
9. Replace oil hole plug.

**AUTOMATIC FEED DRILLING ATTACHMENT**

The only maintenance required for the automatic drill feed gear case (furnished with the H-603 Electric Power Operator, or H-604 Air Power Operator) is the occasional check to see that it has sufficient lubrication.

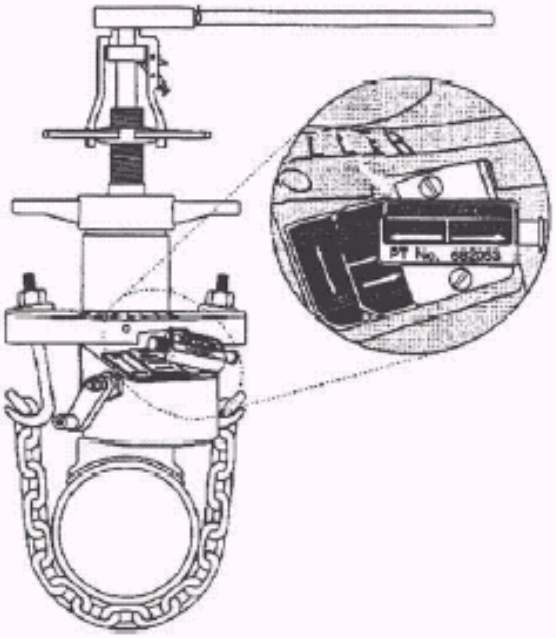
The gear case contains one pint or one pound of SAE 90 gear oil (multipurpose grease). The oil level may be checked by removing the small oil plug located on the side of the gear case when the gear case is positioned level with the driving sockets on the bottom. Oil should be level with this plug hole. Oil may be added through the plug located on top of the gear case.

# MAINTENANCE INSTRUCTIONS

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

**BY-PASS VALVE – FIGURE 1**

A push-pull type valve is used on B-101 Machines for by-passing and relieving pressure. (The valve is available as a separate part to replace the ground-key style valve used on older B-101 and B-100 machines.) The valve is attached to the machine by two screws and can be removed easily for cleaning the valve or machine body passages.



**A. OPERATION**

1. Bypass: push the knurled knob in all the way against the by-pass valve body.
2. Relief: pull the knob out all the way until it stops, away from the valve body.

**B. MAINTENANCE**

The spool should be periodically removed and cleaned

1. Remove retaining ring.
2. Pull spool out of by-pass valve body.
3. Clean the spool and O-rings of old lubricant and foreign matter.
4. Clean the bore inside the valve body and examine for deep scratches that could cause leakage or abrade the O-rings. Replace the entire valve and its sealing gasket if necessary. (Gasket is supplied attached to valve body.)
5. Examine the O-rings for damage and replace if necessary. Lubricate the O-rings with a silicone grease.
6. Reassemble the spool and retaining ring.

**NOTE: It is recommended that a spare Repair Kit, part number 682078, be kept available for timely repairs.**

# FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

# OPERATING INSTRUCTIONS

## A. SELECT THE EQUIPMENT REQUIRED

1. Select the proper combined drill and tap according to:
   a. Size and type of inlet thread on stop, tee, or plug to be inserted.
   b. Material from which the pipe to be tapped is made.
   c. Size and class of pipe to be tapped.
2. Select the proper saddle according to the size and type of pipe to be tapped.
3. Select the proper screw plug.
   a. For corporation stops according to the size and type of outlet.
   b. For tees according to the size of the outside thread at the top of the tee.
   c. For plugs according the size.
4. Select the proper extracting tool.
   a. For corporation stops according to the size and type of outlet.
   b. For tees according to the size of the outside thread at the top of the tee.
   c. For plugs according to the size.
5. Select the items of special equipment which may be required because of special operating conditions.

## B. ATTACH THE MACHINE TO THE PIPE

1. Thoroughly clean the pipe at the location for the tap; include an area greater than the large saddle gasket.
2. Place the large saddle gasket on top of the pipe even with the location for the tap, with the raised projection up away from the pipe.
3. Place the saddle on the large saddle gasket.
4. Place the small saddle gasket in the recess in the top of the saddle. FIGURE 2.
5. Unscrew the feed sleeve and cap containing the boring bar assembly from the cylinder of the machine (2½ turns).
   **NOTE: This can be done more conveniently if the boring bar is in the retracted position.**
6. Place the body and cylinder of the machine on top of the small saddle gasket. Position the machine so that the by-pass valve is on the upper side, if the machine is to be operated in any position other than vertical. Flop valve lever handle will be on the lower side of machine.
7. Unscrew nuts on chain hooks until nuts are flush with end of threaded stem.
8. Hang chain hooks and washers in chain yoke.

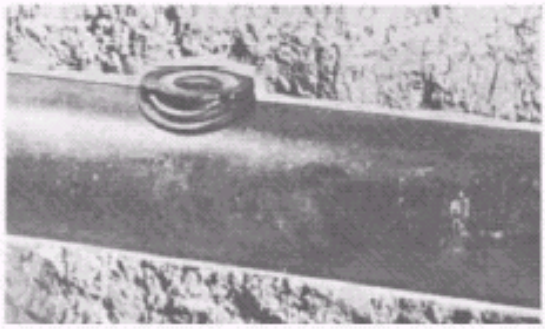


FIGURE 2

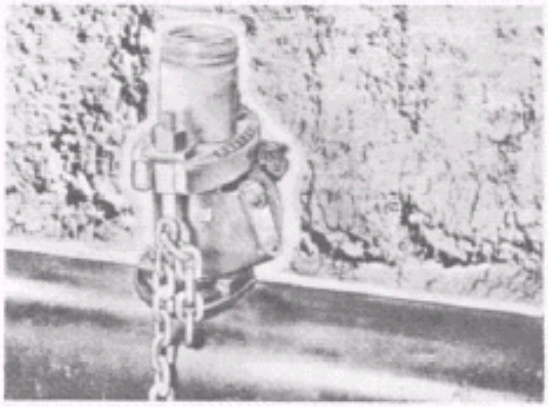


FIGURE 3

9. Attach chain to chain hooks. Hook chain into one hook and bring under the pipe and hook to nearest link. FIGURE 3.
10. Tighten chain hook nuts evenly hand tight.
11. Slide machine on pipe to desired position or angle.
12. Tighten the chain hook nuts evenly, using wrench furnished with machine. A "cheater" or extension handle should not be used on this wrench. Hammer the chain around the pipe to remove any twist in the chain and continue tightening both chain hook nuts until the machine is bearing solidly against the pipe. New type chain hooks and washers prevent rotation of chain hooks and provide a better grip for round link chain.
    **IMPORTANT: Do not tighten chain hook nuts after starting to drill as it will throw the machine out of alignment.**

# OPERATING INSTRUCTIONS

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

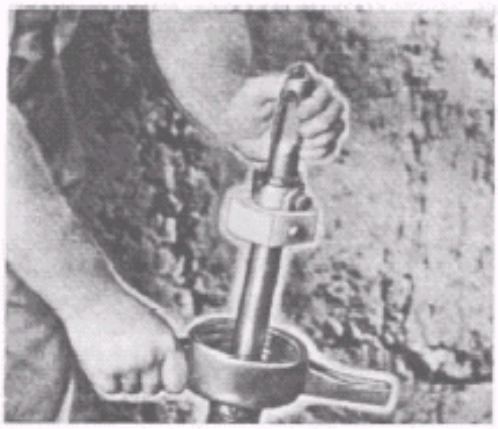


FIGURE 4

FIGURE 5

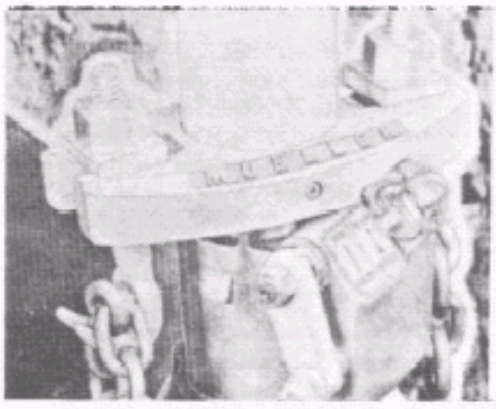


FIGURE 6

**NOTE: Use chain spreader (Part No. 40321) when tapping pipe 3" in size and smaller to spread the chain so that it will clear the lower edge of the body of the machine.**

B-101 and B-100 Machine chain is for use on pipe up to12" in size.

Use the proper length and type of extension chain when tapping pipe in larger sizes.

### C. ATTACH TOOL TO BORING BAR

1. Slide knockout pin in boring bar socket to its outward position using pin extending through bottom of boring bar bearing as a handle.
2. Insert shank end of combined drill and tap into boring bar socket aligning driving pins on tool with slots in end of boring bar. FIGURE 4.
3. Strike tool on drill end with a block of wood to be sure it fits tightly in socket.
4. Tighten tool retaining screw in boring bar using small socket end of chain hook nut and tool retaining screw wrench. FIGURE 5.
5. Retract boring bar to its rearmost position in feed sleeve and cap.
6. Coat drill end and tap threads with Mueller cutting grease. Do not use cutting grease when drilling or tapping asbestos-cement or concrete pipe.

### D. ASSEMBLE THE MACHINE

1. Open flop valve to its wide open position by pushing lever handle down. If desired, handle screw may be engaged into socket on side of body to retain flop valve in open position during this operation. FIGURE 6.
2. Attach boring bar, feed sleeve and tool assembly to cylinder of machine and tighten cap securely (2½ turns).
3. Push boring bar down by hand until tool contacts pipe.
4. When using B-100 machine, adjust feed nut and yoke on feed sleeve and cap so that the yoke engages thrust collar on boring bar.

   When using B-101 machine, adjust feed nut and yoke in the same manner and raise the pivot arm of locking mechanism on side of yoke so that it is positioned under the collar, then lock in place with operating screw and lock nut.

   **NOTE: Spring loaded detents in yoke will keep yoke from falling away from the bar.**

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

# OPERATING INSTRUCTIONS

5. Push by-pass valve to "by-pass" position. Arrow on by-pass valve body indicates valve position. See FIGURE 1.
   **NOTE: The socket in the end of the chain hook nut and tool retaining screw wrench may also be used to turn the handle on the by-pass valve.**

**E. DRILL AND TAP THE MAIN – HAND OPERATED METHOD**

1. Place ratchet handle on boring bar and set for **clockwise** rotation by pulling outward on ratchet detent knob and adjusting it for **clockwise** rotation.
   **NOTE: The standard ratchet handle length is 18 11/32". When making cuts larger than 1" an optional handle bar is available which increases the length to 30 11/32".**
2. Drill the main by operating the ratchet handle **clockwise** and turning the feed nut and yoke **clockwise** a little at a time. Use a light even feed at the start. If possible pull the ratchet handle in an arc parallel the the axis of the pipe thereby reducing the tendency of the machine to slip on the pipe. It will be found convenient to turn the feed nut as the boring bar is being turned. FIGURE 7.
   **NOTE: See instructions and illustration on page 14 for removing drilling chips from the main while drilling and tapping.**
3. Continue the drilling operation until the boring bar feeds easily and rotates easily, indicating the drill portion of the tool is through the pipe.
4. Rotate ratchet handle clockwise and rotate feed nut clockwise to engage tap part of tool into main. Continue to rotate feed nut until tap is securely started into main and feed yoke is no longer needed to take thrust of boring bar. At this point, the feed yoke may be removed from contact with the thrust collar and allow the tool to feed itself. When using the B-101 machine, turn the operating screw on locking mechanism counter-clockwise to unlock the pivot arm and remove the feed yoke from contact with the thrust collar.
   **NOTE: Feed yoke should remain in contact with boring bar thrust collar and follow the thrust collar when machine is being used on high pressure mains, thin wall steel pipe, or asbestos-cement pipe.**
   **DO NOT OVERFEED FASTER THAN THE TAP IS CUTTING BECAUSE THIS WILL STRIP THE THREADS BEING TAPPED IN THE MAIN.**
5. Continue tapping operation until tapping line on boring bar is flush with the top of the feed sleeve part of the cap. FIGURE 9. When tapping asbestos-cement pipe, it may be advisable to tap about 1/8" beyond the tapping line to provide more engagement of corporation stop threads when using one piece Cem-Res® tools.

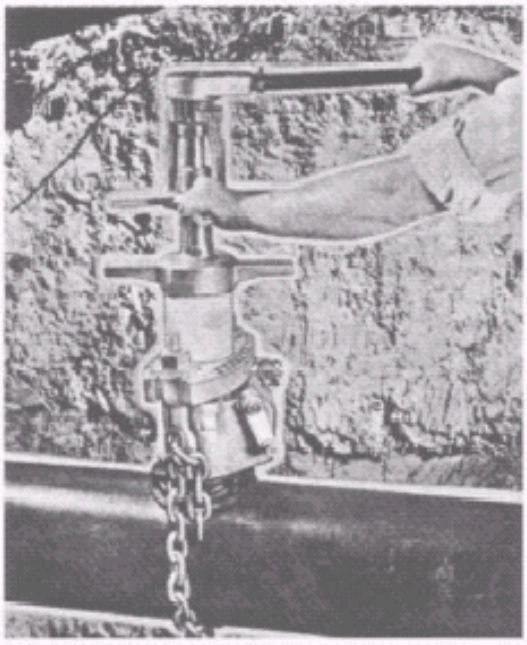


FIGURE 7

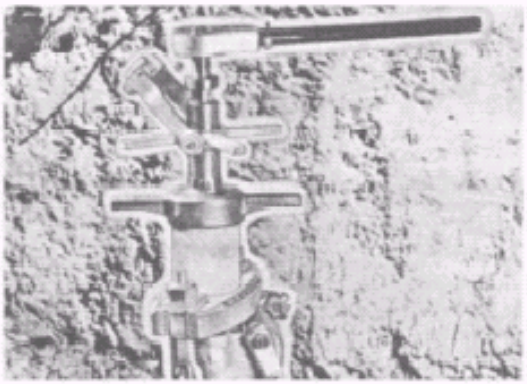


FIGURE 8

# OPERATING INSTRUCTIONS

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

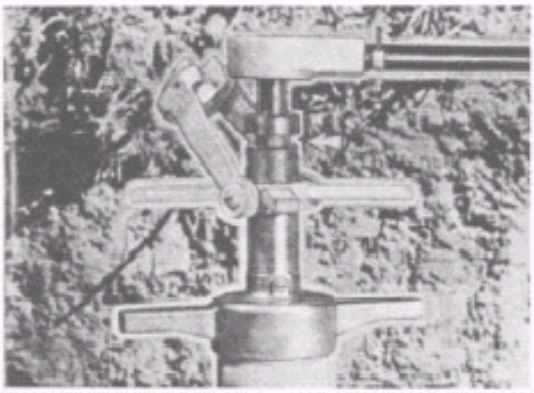


FIGURE 9

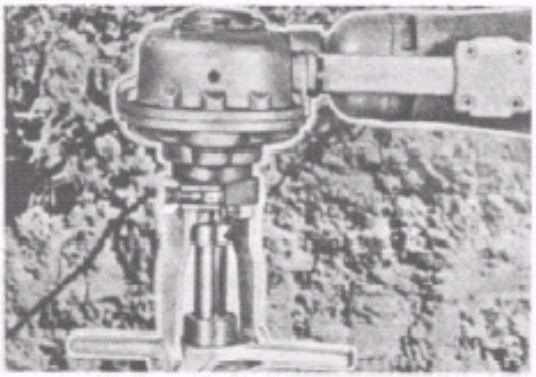


FIGURE 10

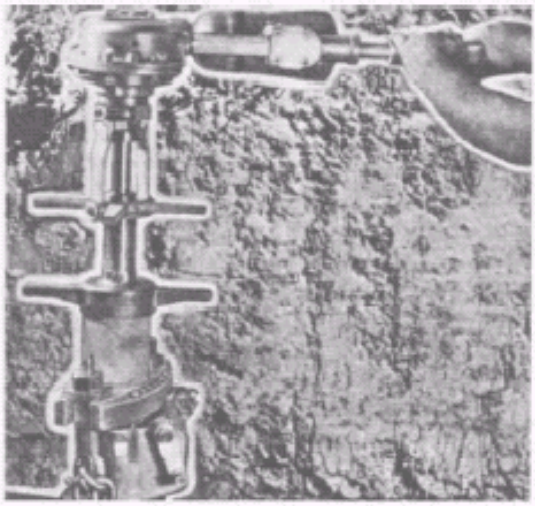


FIGURE 11

### E-A. DRILL & TAP THE MAIN – POWER OPERATED METHOD USING MUELLER H-603 ELECTRIC POWER OPERATOR, OR H-604 AIR POWER OPERATOR

The B-101 and B100 drilling and tapping machines have been designed to permit the addition of a power operator with no modification of the standard machine. The power operator will drive the combined drill and tap and provide automatic feed during the drilling operation.

Extra precautions are required when using a power operator with the B-100 machine and working on a pipe which is not under pressure. The power operator weighs approximately 35 pounds. Its weight bears directly on the boring bar tending to push the bar downward. Normally, the pressure in the machine counter balances this downward thrust caused by the extra weight and therefore does not adversely affect the operation of the machine.

This precaution is not necessary on the B-101 machine when the special locking mechanism is engaged with the boring bar, as this locking mechanism controls the downward motion of the boring bar.

The power operator consists of a gear case and motor using either an electric or air motor for the power source.

**IMPORTANT – WHEN USING H-604 AIR MOTOR POWER OPERATORS-MAINTAIN PRESSURE OF 90 P.S.I. WE RECOMMEND THE USE OF A GAUGE AT THE THROTTLE TO DETERMINE THE ACTUAL PRESSURE OF AIR AT THE AIR MOTOR.**

**NOTE: Either unit is suitable for:**

- **Power drilling with automatic feed 1/2" through 1 1/4" inclusive with combined drill and tap.**
- **Power cutting with automatic feed 1 1/4" through 2 1/2" inclusive with shell cutter and tap.**
- **Power tapping by hand feed.**

The gear case attaches to the machine by the means of two sockets. The inner or small socket drives the boring bar. The outer or large socket drives the feed yoke through a gear reduction as the boring bar is rotated. The resulting feed on the drill is .010" per revolution of the boring bar.

The operator takes the torque of the motor resulting from the drilling operation, so the motors are equipped with a squeeze type trigger throttle. If for some reason a drill should stick, the motor can be shut off quickly.

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

# OPERATING INSTRUCTIONS

1. Place the gear case and motor on the drilling and tapping machine aligning the sockets with the square shanks on the boring bar and feed yoke. Socket which contacts feed yoke should be closed and wing nut tightened securely. FIGURE 10.
2. Set position of air or electric motor switch to give clockwise rotation of boring bar.
   **NOTE: See instructions and illustration on page 14 for removing drilling chips from the main while drilling and tapping.**
3. Start drilling operation (FIGURE 11 shows the H-603 Electric Power Operator and FIGURE 12 shows the H-604 Air Power Operator) and continue drilling until drilling operation is completed. Completion of drilling operation can be easily detected by torque required to resist power unit and sound of power unit.
   **NOTE: The tapping line is located just below the thrust collar on the boring bar. A distance of 1 1/4" below the tapping line is limit for use of automatic feed. Actual drilling is always completed before this distance is reached.**
   When using the B-100 machine and drilling metal pipe, use extra precaution to control the downward movement of the boring bar just before the drilling operation is completed. This is necessary to prevent the drill point from breaking through into the pipe just before the hole is completely drilled. This is particularly important when drilling pipe with low pressure or no pressure. When using the B-101 machine, the locking mechanism will automatically control this downward movement.
4. Loosen wing nut on feed yoke drive socket and swing open socket. FIGURE 13.
5. Start motor and rotate feed nut clockwise by hand to engage top part of tool into main. Continue to rotate feed nut until tap is securely started into main and feed yoke is no longer needed to take thrust of boring bar. At this point, the feed yoke may be removed from contact with thrust collar (on the B-101, turn the operating screw counter-clockwise to unlock the pivot arm and remove the feed yoke) allowing the boring bar to move downward and the tool to feed itself. FIGURE 14.

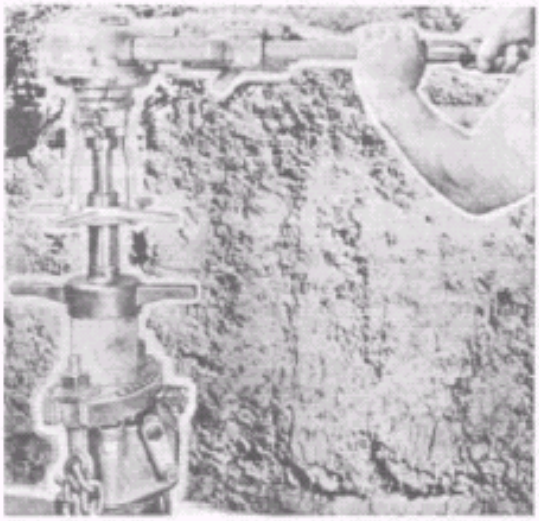


FIGURE 12

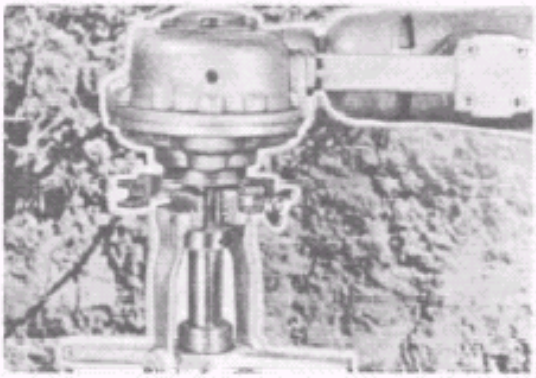


FIGURE 13

FIGURE 14

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

# OPERATING INSTRUCTIONS

A power clevis is used as follows to allow the upward movement of the boring bar to be done under controlled conditions. If a power drive unit has been used to tap the main, the power unit is removed and a hand ratchet used to replace the gear case.

a. Hook the bent hook ends of the standard over the cap handles of the machine.

b. With the ratchet handle in place on the boring bar, bring the center point of the control screw down into contact with the center hole in end of boring bar.

c. Rotate the ratchet handle **counter-clockwise** and the control screw on the power clevis at the same rate. As the tap backs out of the pipe, the power clevis controls the upward movement.

d. When the tap threads are out of the main, rotation of the ratchet handle can stop while the control screw is rotated to raise the boring bar to its uppermost position.

4. With the boring bar in its uppermost position, close flop valve by loosening handle screw (if lever handle was locked open) and raising upward on lever handle.
   If machine is being operated on low pressure, it is advisable to retain flop valve in closed position by use of handle screw on lever handle. The handle screw in lever handle is tightened against wedge on side of body. FIGURE 16.
5. With flop valve closed, pull by-pass valve to"relieve" position. See FIGURE 1. This relieves the pressure above the flop valve and allows the line pressure to keep flop valve closed, which is assisted by handle screw if it is used.
6. Retain boring bar in its uppermost position, while feed sleeve and cap and boring bar assembly is removed from cylinder of machine.
7. Remove combined drill and tap from boring bar by first loosening the tool retaining screw with the socket end of the chain hook nut and tool retaining screw wrench, but do not remove screw.
8. Strike the head of the knockout pin a light blow which loosens the combined drill and tap. FIGURE 17.
9. Remove combined drill and tap from boring bar socket.

**G. ATTACH STOP, TEE, OR PLUG TO BORING BAR**

**IMPORTANT: Check to be sure that the stop or tee to be inserted is full closed.**

1. Screw together the proper screw plug and the stop, tee, or plug to inserted. See instruction "A-3" page 5. Lubricate these threads and check to be sure these threads screw together freely without binding.
   When using an E-Z Release screw plug, also lubricate and check the acme threads between the two parts of the screw plug. FIGURE 18 and 18A.
2. Slide knockout pin in boring bar socket to its outward position using pin extending through bottom of boring bar bearing as a handle.
3. Insert shank end of screw plug into boring bar socket aligning driving pins on tool with slots in end of boring bar and firmly push screw plug and stop or tee assembly to its rearmost position.
4. Tighten tool retaining screw in boring bar using small socket end of chain hook nut and tool retaining screw wrench.

FIGURE 17

FIGURE 18

# OPERATING INSTRUCTIONS

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

5. Push the cap down on the boring bar as far as possible.
6. Coat the inlet threads of the corporation stop or tee with heavy grease or nonhardening pipe "dope" FIGURE 19 and 19A.
7. Replace feed sleeve and cap and boring bar assembly onto cylinder of machine and tighten cap securely so that a pressure tight joint is formed.

FIGURE 18A

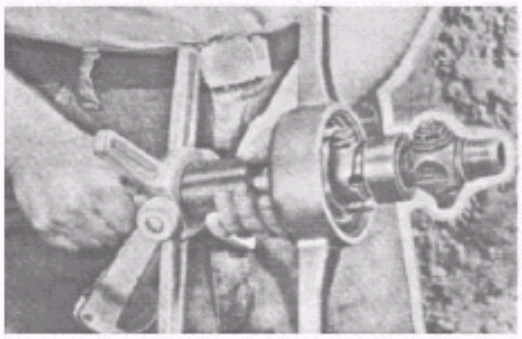


FIGURE 19

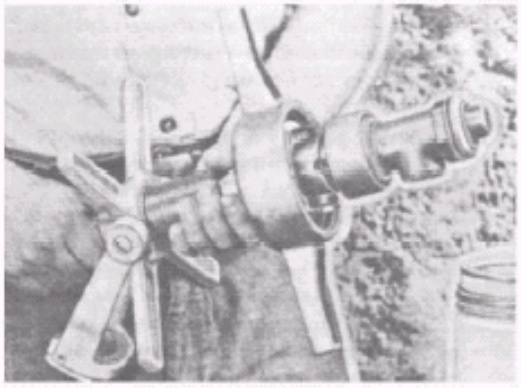


FIGURE 19A

### H. INSERT THE STOP, TEE OR PLUG

1. Hold boring bar assembly in uppermost position and push by-pass valve to "by-pass" position. See FIGURE 1.
2. Attach ratchet handle and set for **clockwise** rotation.
3. Open flop valve by loosening handle screw, if it was tightened, and pushing lever handle all the way down.
   If desired, handle screw may be engaged into socket on side of body to retain flop valve in open position during this operation. See FIGURE 6.
4. Push the boring bar down until the inlet threads of stop, tee, or plug contact the pipe. For pressures greater than 90 p.s.i. use a power clevis to force the boring bar down. Refer to instruction F-3.
5. Adjust feed nut and yoke and slip yoke over thrust collar on boring bar.
6. Rotate boring bar clockwise while feed nut is also carefully rotated clockwise.
   After the threads on the stop, tee or plug have engaged the tapped hole in the main, rotation of the feed nut may be stopped and the yoke removed from contact with the thrust collar, while the fitting is screwed into its seat. When the stop, tee or plug is being inserted in thin wall or asbestos-cement pipe or into pipe under high pressure, the feed yoke should be used to follow the collar all the way down.
7. Screw the stop, tee, or plug into the tapped hole until it feels solid. DO NOT ATTEMPT TO FORCE IT TO ITS PERMANENT TIGHTNESS WITH THE MACHINE.

### I. RELEASE THE SCREW PLUG

1. Pull out on ratchet detent knob and adjust it for **counter-clockwise** rotation.
2. Turn the ratchet handle **counter-clockwise** to take out the play and strike the end of the handle a sharp blow **counter-clockwise** with palm of the other hand. FIGURE 20. This will release the threaded connection between the screw plug and the stop, tee, or plug. If using an F-7 Release screw plug, this will release the threaded connection between the two parts of the screw plug.
3. Rotate ratchet handle **counter-clockwise** until screw plug is completely free.
4. Pull the by-pass valve to "relieve" position which will release the pressure from the machine and indicate the tightness of the connection between

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

# OPERATING INSTRUCTIONS

the stop, tee, or plug and the pipe. If there is full pressure flow from the by-pass valve, the screw plug has not released and the stop, tee, or plug should be screwed in again a little tighter than before and another attempt be made to release the screw plug.

**J. REMOVE THE MACHINE**

1. Loosen the chain hook nuts.
2. Unhook the chain and remove hooks and chain.
3. Remove machine, saddle and gaskets.
4. Tighten stop, tee, or plug to final tightness with a suitable wrench on the inlet side. FIGURE 21.
   **NOTE: If the fitting being installed is a machine inserted valve tee or corporation stop with compression type inlet gasket, clean chips from under gasket before tightening compression nut to a pressure tight joint on the main using wrench (Part No. 37137).**
5. If using an E-Z Release screw plug, remove the nut part from the stop or tee with the E-Z Release screw plug wrench furnished with the machine.

**K. TO REMOVE A STOP, TEE, OR PLUG INSTALLED IN PIPE UNDER PRESSURE**

1. Shut off the stop or tee.
2. Disconnect service line piping.
3. Slightly loosen the stop or tee using a wrench on the inlet side.
4. Separate the two parts of the extracting tool.
5. When using an extracting tool having inside threads, screw the nut into the outside threads of stop or tee very securely using the right hand thread. FIGURE 22. When using an extracting tool having outside threads, screw the plug into the inside threads of stop or plug very securely using the right hand threads.
6. Unscrew the feed sleeve and cap containing the boring bar assembly from the cylinder of the machine (2½ turns).
7. Open flop valve to its wide open position by pushing lever handle down. If desired, handle screw may be engaged into socket on side of body to retain flop valve in open position during this operation.
8. Assemble large saddle gasket, saddle, small saddle gasket, and the body and cylinder of the machine centrally over the installed stop, tee or plug.
9. Place chain hooks and washers into chain yoke and attach chain.
10. Tighten chain hook nuts hand tight. See instruction "B," page 5.

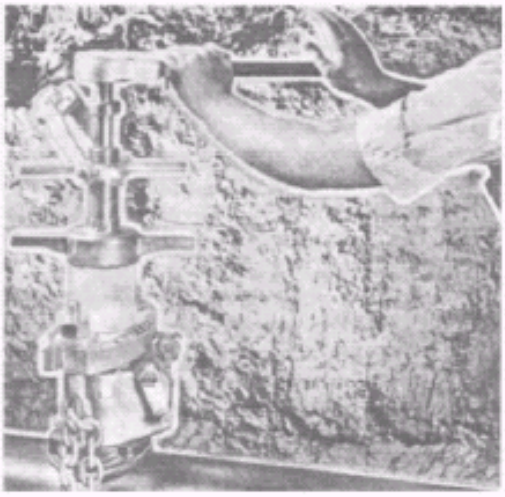


FIGURE 20

FIGURE 21

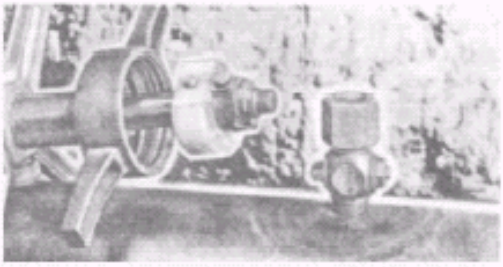


FIGURE 22

11. Attach the shank part of the extracting tool into the boring bar socket being sure the knockout pin is in its outward position and the drive pins align with slots in the boring bar. See FIGURE 22.
12. Tighten tool retaining screw in boring bar using small socket end of chain hook nut and tool retaining screw wrench.
13. Push the feed sleeve and cap down on the boring bar as far as possible.

# OPERATING INSTRUCTIONS

## FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

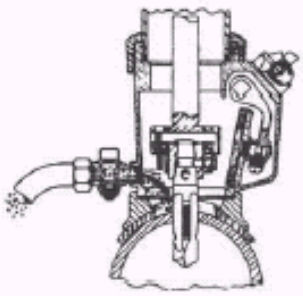
14. Attach boring bar, feed sleeve and tool assembly to cylinder of machine and tighten cap securely ($2^1/_2$ turns). Be sure boring bar is held in its upper position while cap is being attached.
15. Slowly move boring bar downward to engage left hand thread of extracting tool shank with mating thread in nut part attached to corporation stop or tee. Attach ratchet handle to boring bar, pull outward on ratchet detent knob and adjust it for **counter-clockwise** rotation.
16. As soon as the extracting tool shank contacts the nut part on corporation stop or tee, slowly rotate the ratchet handle **counter-clockwise** to engage the left hand threads. This is a very sensitive operation and extreme caution must be taken to be sure threads properly engage. It is very likely it will be necessary to slightly shift the machine during this operation to get proper alignment.
17. As soon as boring bar is permanently attached to extracting too, chain hook nuts can be tightened, but her also, considerable caution is required to bring the machine down evenly on the pipe. If machine is tightened down unevenly, a strain will be placed on boring bar and if old corporation stop or tee is removed under these conditions, the new one will not start in the old hole.
18. Push by-pass valve to "by-pass" position and rotate ratchet handle **counter-clockwise** to extract the stop or tee. Raise boring bar to upper position as soon as old stop or tee becomes disengaged from main.
19. Close flap valve and pull by-pass valve to "relieve" position.
20. Proceed with the use of the machine as described in previous instructions.

### NOTICE

The tapping machine body has a boss with $^1/_2$" I.P. tapping and is shipped with a brass plug installed. A blow-off valve is also shipped with each machine. The blow-off valve provides a means to prevent pipe chips and other drilling and tapping residue from entering the main during pressure taps.

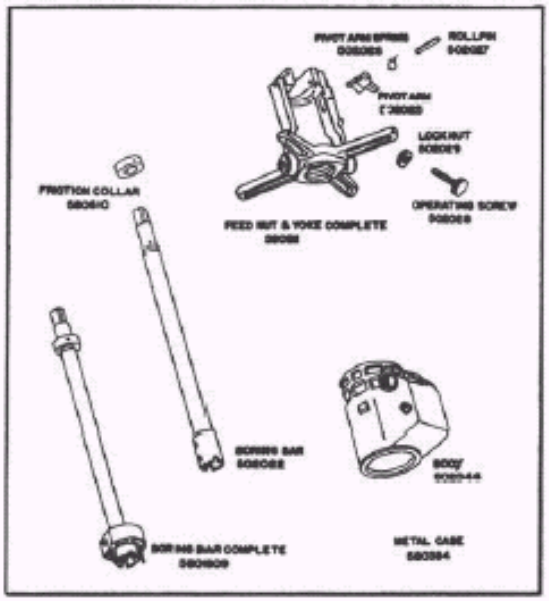
To properly use the blow-off valve, follow these instructions:

1. Remove the brass plug from the boss of machine body.
2. Apply non-hardening dope to the inlet threads of the blow-off valve and install the valve in the tapped boss of machine body. The valve should be tightened sufficiently to provide a pressure tight joint and then positioned so that the valve key does not interfere with the pipe saddle.
3. Attach a length of hose to the blow-off valve outlet. Valve outlet is $^3/_4$" National Hose Thread (regular garden hose coupling size).



4. When starting to drill and tap the main, open the valve. Main pressure will flush the chips out through the hose outlet.
5. Close the valve after the tapping operation has been completed.

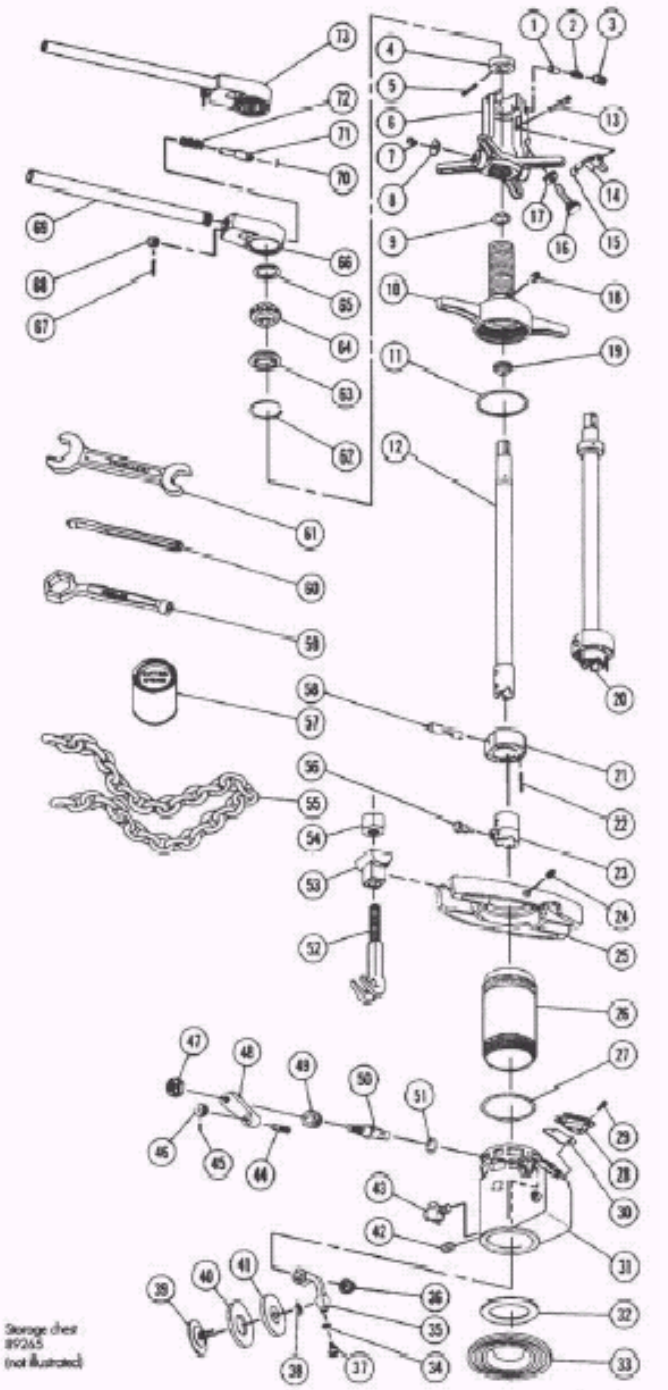
Parts for the B-101 machine (Model No. 1) are the same as the B-100 machine except for the parts shown below.



# FOR B-101™ AND B-100™ DRILLING AND TAPPING MACHINE

# PARTS

| Item No. | Part Number | Part Name |
|---|---|---|
| 1 | 500851 | Detent pin |
| 2 | 59810 | Spring |
| 3 | 305006 | Screw |
| 4 | 580610 | Friction collar |
| 5 | 48130 | Retaining pin |
| 6 | 580611 | Feed nut & yoke complete |
| 7 | 79745 | Yoke retaining screw |
| 8 | 50133 | Washer |
| 9 | 79269 | Boring bar O-ring |
| 10 | 500685 | Feed sleeve & cap |
| 11 | 500687 | Cap packing |
| 12 | 502022 | Boring Bar |
| 13 | 502027 | Rollpin |
| 14 | 502025 | Pivot arm |
| 15 | 502026 | Pivot arm spring |
| 16 | 502028 | Operating screw |
| 17 | 502029 | Lock nut |
| 18 | 500686 | Oil plug |
| 19 | 500887 | Wiper ring |
| 20 | 581286 | Boring bar complete |
| 21 | 500692 | Bearing |
| 22 | 48130 | Retaining pin |
| 23 | 500691 | Bearing sleeve |
| 24 | 97795 | Chain yoke retaining screw |
| 25 | 500683 | Chain yoke |
| 26 | 500682 | Cylinder |
| 27 | 500670 | Valve body O-ring |
| 28 | 682053 | By-pass valve complete (includes #29 & 30) |
| 29 | 501373 | By-pass valve screw |
| 30 | 311812 | By-pass valve gasket |
| 31 | 502046 | Valve body |
| 32 | 40066 | Small saddle gasket |
| 33 | 40067 | Large saddle gasket |
| 34 | 52165 | Lock washer |
| 35 | 500672 | Valve gate arm |
| 36 | 72527 | Spring |
| 37 | 500675 | Lock screw |
| 38 | 500676 | Lock nut |
| 39 | 500674 | Valve washer and stem |
| 40 | 500673 | Gate washer |
| 41 | 500671 | Valve gate |
| 42 | 50369 | Pipe plug |
| 43 | 581646 | Blow-off valve |
| 44 | 501061 | Handle screw |
| 45 | 302575 | Lock screw |
| 46 | 46280 | Handle knob |
| 47 | 500669 | Handle nut |
| 48 | 500668 | Lever handle |
| 49 | 500667 | Valve stem retaining nut |
| 50 | 500666 | Valve stem |
| 51 | 41301 | Valve stem O-ring |
| 52 | 500709 | Chain hook |
| 53 | 500707 | Chain hook washer |
| 54 | 500706 | Chain hook nut |
| 55 | 500780 | Chain |
| 56 | 500694 | Tool retaining screw |
| 57 | 88366 | Cutting grease |
| 58 | 500693 | Knock out pin |
| 59 | 500708 | Chain hook wrench |
| 60 | 40050 | Body cleaning chisel |
| 61 | 501579 | Inserting tool wrench |
| 62 | 79490 | Retaining ring |
| 63 | 500703 | Bushing |
| 64 | 40137 | Ratchet wheel |
| 65 | 302978 | Washer |
| 66 | 500699 | Ratchet handle body |
| 67 | 500702 | Operating pin |
| 68 | 500701 | Detent knob |
| 69 | 500704 | Ratchet handle bar |
| 70 | 51427 | Plug |
| 71 | 500700 | Ratchet dog |
| 72 | 37883 | Spring |
| 73 | 83846 | Ratchet handle complete |
| | 682078 | Key repair kit |
| | 306991 | Spare retaining ring |



Storage chest #9265 (not illustrated)

NOTE: These illustrations are for parts identification only. DO NOT use these illustrations for assembly or disassembly of machine. MUELLER CO. offers a machine repair service, and field tapping service. Contact MUELLER® Customer Service Center for details.

**TO ORDER SPECIFY QUANTITY, PART NUMBER AND PART NAME (include catalog number and model number of machine)**

## 7.14 PURGING OF PIPELINES (192.629)(a)(b)

Purging of pipelines must be done to prevent entrapment of an explosive mixture in the pipeline. When a pipeline is being purged of air by use of gas, the gas must be released into one end of the line in a moderately rapid and continuous flow. If gas cannot be supplied in sufficient quantity to prevent the formation of a hazardous mixture of gas and air, a slug of inert gas must be released into the line before the gas.

When a pipeline is being purged of gas by use of air, the air must be released into one end of the line in a moderately rapid and continuous flow. If air cannot be supplied in sufficient quantity to prevent the formation of a hazardous mixture of gas and air, a slug of inert gas must be released into the line before the air.

### Ignition Hazards

When conducting purging operations, all potential sources of accidental ignition must be eliminated. There are two specific areas of potential ignition hazard that must considered:

- Ignition of the purge discharge
- Ignition within the piping

### Preventing Ignition of the Purge Discharge

At some point in the purging process, a combustible gas-air mixture is released from the discharge riser. Depending on what and how you are purging, this mixture may exist for an extended period of time. If there is an accidental ignition when purging, it is most likely to occur at the discharge riser. That is why preventing accidental ignition at the riser is the most important safety consideration when purging.

### Preventing Ignition Within the Piping

Take every precaution to prevent ignition within the piping itself. Ignition within the piping can occur if the purge discharge is accidentally ignited. For this reason, never try to ignite even a small volume of purge discharge to test for gaseous concentrations. Although this method has been used in the past by some operators, it is not permissible. Instead, test the discharge continuously with a CGI.

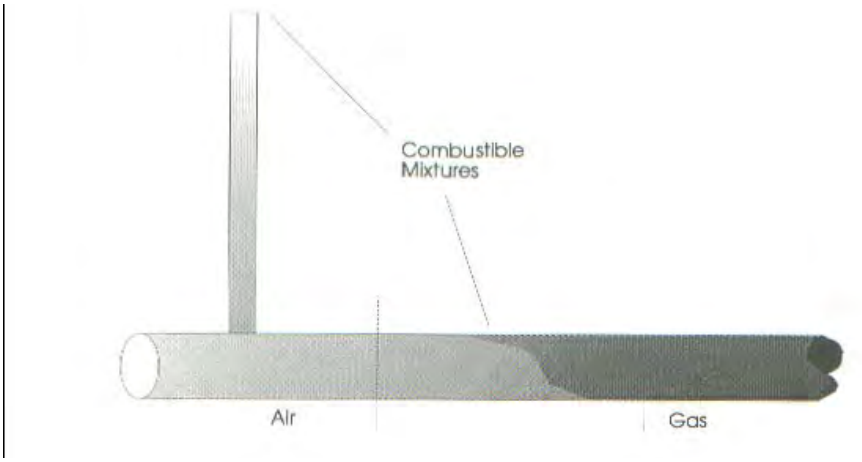



Figure 1: Ignition Hazards

## PURGING WITH NATURAL GAS

You cannot put a line into service if it contains air. Air pockets in a newly installed service line could lead to gas escaping into the house or structure. You must purge with natural gas before putting facilities into service, whenever you have either:

- Installed new or replacement facilities
- Purged a facility with air to make repairs.

| | ACTION | INFORMATION |
|---|---|---|
| **1.** | Purge by releasing a continuous and sufficient quantity of gas into one end of the piping system. | This will prevent the formation of a haz mixture of gas and air. |
| **2.** | Should a sufficient and continuous supply of gas become unavailable for the purging process, a slug of inert gas will be released into the gas system being purged prior to the gas. | |
| **3.** | Vent the purge discharge to a safe height the work area. | This should be higher than any worker's head to reduce the possibility of accidental ignition. |
| **4.** | When purging PE pipe always use a steel discharge riser. | |
| **5.** | Use a s maller discharge riser than the piping being purged. | This will produce enough discharge velocity to prevent flashback. |
| **6.** | Avoid discharging or purging near structures or in areas where the nearby structures have opening that would allow discharged gas to enter the structure. | |
| **6.** | Use a CGI to verify that all air has been vented from the piping that is being purged. | The CGI should read 100% gas when all air is purged from the line. |
| | | |

When a section of gas system piping is being purged of air using gas as the purge medium, the gas must be released into one end of the piping system being purged in a continuous and sufficient quantity to prevent the formation of a hazardous mixture of gas and air.

**Safety Precautions for Natural Gas Purging**

Vent the purge discharge to a safe height above the work area, higher than any worker's head. This reduces the possibility of:

- Accidental ignition
- Injury or damage, if ignition should occur.

In a large pipe, carefully control the purge gas flow rate. Too rapid or too slow a purge produces turbulence inside the pipe, which can create a combustible gas-air mixture.

**Always use steel pipe instead of plastic pipe for venting.** The friction of the purge discharge rubbing along the inside of the discharge riser creates static electricity. If the gas-air mixture is within flammable limits, a static electricity spark could ignite the purge discharge.

Be sure to get all air out of the pipe. You cannot put a line into service if it contains air because the air will interrupt service when you reconnect the customers.

Use a discharge riser smaller than the piping being purged. This will produce enough discharge velocity to prevent flashback.

## PURGING WITH AIR

When purging a section of gas system piping with air, the gas mixture is tested with a combustible gas indicator (CGI) to verify that the mixture is not an explosive mixture (CGI must read 0%). Air is forced into one end of the gas distribution line in sufficient and continuous volume. In the event that air cannot be supplied in sufficient volume, inert gas will be released into the piping system being purged prior to the air.

Purging with air is used to remove natural gas from a line whenever you are preparing either to:

- Make repairs to the line
- Abandon it in place.

Purging with air requires particular attention to safety details, since it can present more safety problems than purging with natural gas. As you know, the flammable limits of natural gas range from 4.5% to 14.5% gas-in air. Introducing large volumes of air into a gas line (low gas-air ratio) is more likely to create combustible gas-air mixture in the line than introducing large volumes of natural gas into an air-filled line (high gas-air ratio).

One way to eliminate much of the need for purging with air is the proper use of stopping equipment. Another way is to use joining materials that don't require welding. Normally, this is a safer procedure than welding an air-purged line, because:

- Sections of piping that need repair or replacement can usually be safely isolated.
- Sources of potential ignition from welding are eliminated.

## PURGING WITH INERT GAS

The additional use of inert gas improves the safety of either air or natural gas purging. The inert gas – usually carbon dioxide (CO2) or nitrogen (N2) - acts as a barrier between the air and the natural gas to prevent a combustible gas-air mixture.

The industry term for this process of creating a barrier between the air and natural gas is "slugging." The barrier itself is called a "slug." Here is a procedure for handling gas cylinders and slugging a line with inert gas.

| | Action | Information |
|---|---|---|
| **1.** | Treat cylinders of inert gas with the same care as any other compressed gas. | Pressurized gas escaping from a damaged valve or regulator can cause personal injury. |
| **2.** | Keep CO2 cylinders upright. | This is to ensure that gas, not liquid CO2 enters the pipe. |
| **3** | You can use N2 cylinders in any position, but it is best to lay them down. | This is so they do not fall over and damage the cylinders and/or fittings. |
| **4** | Ensure that all cylinders are properly grounded to the main or service before use. | This prevents electrical arcs that could ignite a combustible natural gas concentration. |
| **5** | Ensure that fresh air is always present. | N2 and CO2 do not disperse rapidly into the air. Neither gas is poisonous, but breathing either in concentration could cause oxygen starvation or suffocation. |
| **Slug the Line** | | |
| **6** | Install a pressure gauge as close as possible to the point of entry into the pipe to be purged. | Make sure the gauge is visible to the person controlling the flow of inert gas. |
| **7** | Introduce the inert gas into the pipe. | The amount of inert gas required depends on both the:<br>• Pipe diameter<br>• Length of pipe to be purged. |
| **8** | Introduce air or natural gas into the pipe immediately behind the slug. | Avoid delays longer than two minutes to both:<br>• Keep pressure on the system<br>• Avoid dilution of the slug. |

## DISCHARGE VENTING

To get rid of the purge discharge safely, always install proper discharge venting before purging. Vent piping must end in a vertical section – called the discharge riser or stack – attached to the main. The method of attachment depends upon pipe material and available equipment.

**WARNING! DO NOT use plastic pipe for discharge venting, since it can cause static electricity that may ignite the purge discharge**.

Proper flow rates and discharge riser dimensions are especially important when purging with gas on large diameter mains and long pipelines. The larger the diameter and the longer the pipe to be purged, the greater the chance of:

- Accidental ignition
- Injury or damage.

## VENT DIMENSIONS

Vent dimensions greatly affect the safety of purging operations. Specifically, the **diameter** and the **length** of discharge venting have a direct effect on the following two factors, respectively:

- Purging velocity
- Work area ventilation.

## PURGING VELOCITY

It is important to maintain the proper purging velocity at the point of discharge to prevent flashback into the piping when purging with air or natural gas

The factor that influences purging velocity is the discharge riser diameter. The riser diameter may vary, but it always must be smaller than the diameter of the piping to be purged. When a given volume of gas (in this case, the purge discharge) flows from one pipe to a pipe of smaller diameter, the rate of flow must increase in the smaller pipe in order to move the same volume of gas. The smaller the diameter of the pipe, the faster the gas must travel.

Sizing the discharge riser smaller than the pipe helps ensure that the discharge velocity is greater than the flashback velocity, so accidental ignition from outside can't travel back into the piping.

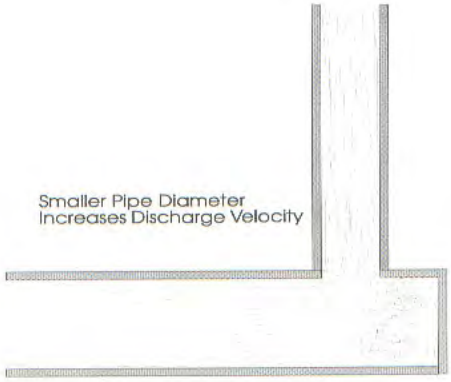



Figure 3: Discharge Velocity

## SECTION 8 - MAINTENANCE REQUIREMENTS (SUBPART M)

### 8.1 REPAIRS OF GAS DISTRIBUTION SYSTEM LEAKS (192.703)(b)(c)

Repairs to the City of Carencro gas distribution system are required as leaks are discovered and based on leak severity. Any segment of piping that becomes unsafe must be replaced, repaired or removed from service. All hazardous gas leaks will be repaired immediately. In addition, other repairs are made such as wrapping or coating steel piping when wrapping on exposed sections of piping has been damaged or when painting of exposed lines such as in regulator stations is necessary. Although welding in the preferred method of repairing steel mains and services, repairs of gas leaks on steel piping may be made using Smith Blair full circle redi-clamps for gas service lines and main lines ranging in nominal pipe size from 3/4" to 4". See Specifications, Drawings and Vendor Instructions on following pages. Other repairs to steel piping may be made by replacing that section of steel piping with plastic piping or dresser couplings. In the event that this method of repairs is used, the section replaced with steel must be bonded across to maintain cathodic protection as described in Section 5 of this manual.

Mechanical Leak Repair Clamps – Mechanical leak repair clamps installed after JANUARY 22, 2019 may not be used as a permanent repair method for plastic pipe.

#### TEMPORARY REPAIRS

Temporary repairs may be made on gas lines that have been severed or cut until such time as permanent repairs can be made. The following procedure is used for making temporary repairs with an expandable rubber plug.

1. This plug is used for a temporary repair on a gas line that has been severed or cut and has flow of gas.

2. Safety equipment such as safety glasses, earplugs, fire extinguishers must be present and upwind from the work area.

3. Plug must be inserted into open end of pipe.

4. Screw down on wing nut on plug. Flow should begin slowing until coming to a complete stop.

5. Make sure plug is completely tight and will not blow out.

6. Remember this is a temporary repair. Notify office so permanent repair can be made.

## PROCEDURE FOR REPAIRING STEEL PIPE

| | ACTION | INFORMATION |
|---|---|---|
| **1** | Check pipe diameter to insure that correct clamp is being installed. | Clamps that are too large or too small will not likely make a good 100% leak tight seal. |
| **2** | Thoroughly clean the pipe so that the surface is smooth and free of dirt, corrosion or other debris. | Failure to clean the pipe surface will like lead to leakage. |
| **3** | If conditions permit, place a reference mark on the pipe a measured distance from the center of the break or damaged area. | The leak clamp should be centered over the leak area. |
| **4.** | Apply soapy solution to the rubber gasket on the inside of the clamp. | |
| **5** | Loosen nuts so that they are flush with the top of studs and place the clamp half with fingers of both ends on the top of the pipe with gasket armored nearest the installer and centered over the damaged area. | |
| **6** | Pass the other clamp half underneath the pipe with the armored gasket end away from the installer. | |
| **7** | Tuck the gasket flap in place, mesh the fingers and snap the keeper bar lip over the finger weldment base. | |
| **8** | Pull up on the keeper bar nearest the installer and snap the lip over the other finger weldment base. | |
| **9** | Tighten the nuts, finger tight, and rotate the clamp to smooth out tampered ends of gasket. P otion nuts for convenient tightening. | The clamp may be assembled beside the break or damaged area and slid into position if the pipe surface is wet or has been lubricated. |
| **10** | Measure from the reference mark to the center of the clamp to insure that the clamp is centered over the damaged area. | |
| **11.** | Rotate the clamp to make a good seal between the gasket and the pipe surface. | |
| **12** | Tighten the nuts working from the center outward. C ompletely tightening the center nut will usually stop or retard the leakage to simplify completion of the installation.<br>**NOTE:**<br>**DO NOT EXCEED 70 FT./LBS. OF TORQUE** | **NOTE**<br>**Gaps between the lug bases should be maintained as equally as possible on each side. The gaps should be approximately 3/8" for pipe diameter near the bottom of the clamp O.D. range and 1-1/4" near the top of the O.D. range.** |

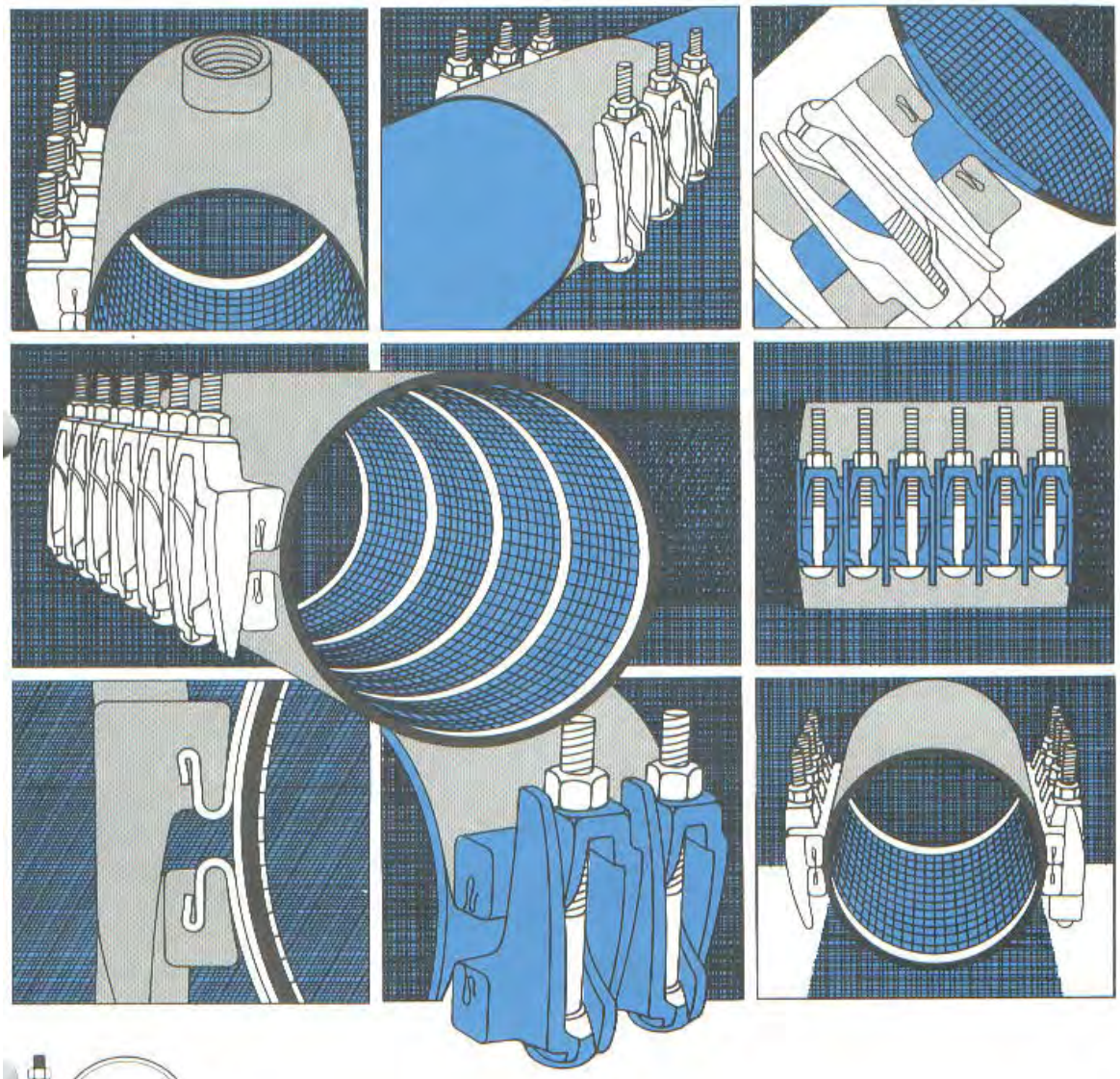
Smith-Blair GCC-200 9/94

# Clamp and Coupling products

## Full Circle® Clamp Coupling

225 234 235 258 259 266

For Gas Service



SMITH-BLAIR, INC.

## REPAIRS OF GAS DISTRIBUTION SYSTEM LEAKS/PLASTIC PIPELINES

The City of Carencro gas distribution system does not presently use plastic pipe it is required to repair leaks on s ections of polyethylene piping, which have been identified during gas leak surveys, continuing surveillances and leaks reported by the general public. Repairs to polyethylene gas distribution system piping will be made by eliminating that part of the piping system which has become damaged or ruptured and replaced with new tested polyethylene piping using compression couplings or butt fusion to join the new polyethylene piping to the existing polyethylene piping as described in section 3.2 of this Operation and Maintenance Manual. Repairs to plastic piping will be accomplished by digging a bell hole away from the leak or ruptured line and shutting down or isolating the leak area with squeeze off tools or valves. Both plastic pipe and the squeeze off tool shall be grounded to eliminate static electricity. Testing of repairs will be conducted in accordance with section 6.3 of this Operation and Maintenance Manual. Below is a pictorial of a typical squeeze tool used by the City of Carencro to squeeze polyethylene piping.

**CAUTION**

**BREATHING APPARATUS MUST BE WORN BY MAINTENANCE PERSONNEL WHEN REQUIRED TO ENTER UNDERGROUND SURFACE AREAS OR PLACE HEAD BELOW GROUND LEVEL WHEN REPAIRING GAS LEAKS ON BOTH STEEL AND PLASTIC GAS SYSTEMS**

Before using any squeeze tool, become familiar with its construction, operation, and design features. Operation instructions for mechanical and hydraulic-operated tools vary. Be sure to monitor system pressure at gauge points. This can be done by installing service tees in the squeeze area or using an existing service(s) to monitor at the meter set. F ollow your Company procedures.

## PROCEDURE FOR MAKING MECHANICAL SQUEEZE

| | Action | Information |
|---|---|---|
| 1. | Clean and check pipe for cuts, scrapes, and gouges | If cuts, scrapes, or gouges are present, move to another location to squeeze. |
| 2. | Discharge static using soapy water solution. | |
| 3. | Set mechanical gap to stop on the squeeze tool. | Set the tool for appropriate pipe size and wall thickness. Refer to SDR. |
| 4. | Ground the tool. | Use the grounding strap. |
| 5. | Place squeeze tool on pipe and engage locking pin to secure the bars (if tool has one).<br>• Turn the tool 1-2 turns to determine if the tool is off-center and needs to be adjusted | This keeps the lower bar from sliding out of the frame. |
| 6. | Slowly compress the pipe.<br>• Stop after a coup-le of turns to allow the pipe to cold flow. | Follow Company procedures or use the following:<br>• 1 min. x pipe diameter – above 32°<br>• 2 min. x pipe diameter - 32° and below. |
| 7. | Continue compressing until flow is controlled or stopped. | The squeeze tool can be compressed to the gap stops, if necessary.<br>• Remember to compress only as far as needed. Do not over-compress. |
| 8. | Engage the locking device if the unit has one. | |
| 9. | Keep the squeeze time to a minimum. | This will avoid pipe damage. |
| 10. | After completing the repair, slowly release the squeeze tool.<br>• Stop after ½ to 1 turn to allow the pipe to cold flow.<br>• Listen for gas flowing past the squeeze point | Compress and release rate:<br>• 1 min. x pipe diameter – above 32°<br>• 2 min. x pipe diameter - 32° and below<br>This indicates purging is taking place. |
| 11. | Continue release, 1- 2 turns at a time, until the squeeze tool is no longer compressing the pipe. | |
| 12. | Rotate the squeeze tool 90°, and compress the pipe to its original shape.<br>• This can also be done with a cold ring clamp, working slowly toward the cente of the squeezed area.<br>• A stainless steel band clamp can be used to help re-round the pipe or for reinforcement. | |
| 13. | Remove the squeeze tool and ground strap. | Keep the ground strap engaged until the squeeze tool is removed from the pipe. |
| 14. | Mark the squeeze area. | Wrap tape over the entire squeeze area. |
| 15. | Do not squeeze pipe in the same place that it has been squeezed previously. | |

## 8.2 LINE MARKERS FOR MAINS (192.707)(a)(c)(d)

Line markers are installed, maintained and labeled in accordance with §192.707. Line markers are installed on the City of Carencro Gas Distribution System at the following locations:

1. At each crossing of a public road and railroad in class 1 or 2 location
2. Wherever necessary to identify the location of the main to reduce possibility of damage or interference.
3. At each crossing of a public road and railroad in class 3 or 4 where a damage prevention program is not in effect
4. For each above ground main in area accessible to the public.
5. Where the gas distribution lines cross bayous, canals and large ditches.
6. At the purchase point(s) and at all district regulator stations.
7. The word "Warning", "Caution", or "Danger" followed by "Gas" or name of gas transported in letters at least 1 inch high with ¼ inch stroke except in heavily developed urban areas.
8. The name of the operator and telephone number (including area code) where operator can be reached at all times.

These markers are on orange background with black lettering that identifies Warning, Natural Gas Line, Carencro Gas System, and the telephone number (896-8481) of the City of Carencro Maintenance Department. Line markers are identified on the City of Carencro Gas Distribution System Mapping.

**TYPICAL LINE MARKER**

## 8.3 PATROLLING (192.721

The Gas Distribution System for City of Carencro is made up of steel mains and services and approximately 3 miles of cast iron main. The frequency of patrolling is determined by the severity of conditions that could cause failure or leakage and hazards to public safety. Mains in places or on structures where anticipated physical movement or external loading could cause failure or leakage must be patrolled in business districts, at intervals not exceeding 4 1/2 months, but at least four times each calendar year. The City of Carencro has no gas distribution lines presently located or attached to bridges or other structures where anticipated physical movement or external loading could cause failure or leakage. However, in the event that future construction requires gas pipelines to be located on or attached to bridges or other structures where anticipated physical movement or external loading could cause failure or leakage, these lines shall be patrolled quarterly or 4 times per year. Patrolling is conducted on that part of the gas distribution system outside the business district semi-annually or twice each year not to exceed 7 1/2 month intervals. Individuals performing the patrolling shall be aware of and report any work activities associated with excavation near existing facilities or construction of buildings over or near the gas distribution facilities. Pipelines that are exposed to the atmosphere, such as at canal and bayou crossings are included in the areas that require patrolling. Additionally, the cast iron piping was taken into consideration when determining frequency of patrols. Table identifying patrolling requirements is below:

| Class Location | At Highway and Railroad Crossings | At All Other Places |
|---|---|---|
| **1 and 2** | **2/yr (7½ months)** | **1/yr (15 mos.)** |
| **3** | **4/yr (4½ months)** | **2/yr (7½ months)** |
| **4** | **4/yr (4½ months)** | **4/yr (4½ months)** |

A Patrolling of Distribution System form as shown on the next page shall be completed. Personnel conducting patrolling activities must be observant while conducting patrolling activities for the following:

1. Unauthorized Usage of Gas
2. Unsafe Meter Sets
3. Broken or Missing Meter Lockout Devices
4. Broken Dial Glass
5. External Corrosion
6. Any Physical Objects That Could Cause the Meter to Fail
7. Areas where there appears to be a gas leak
8. Smell of gas in air.
9. Where exposed piping crosses canals and bayous
10. Support Piping Attachments to Bridges
11. Support Piping Attachments on Aerial Crossing
12. Missing line markers
13. Missing Locks on Gates to Metering and Regulator Stations
14. Missing Locks on Valves Below Relief Valves
15. Evidence of erosion near canals and on ditch banks.

## PATROLLING OF DISTRIBUTION SYSTEM

Period Covered: Began _____ Ended _____

Areas Covered:_____
_____
_____

Map Reference:_____

Leakage Indications Discovered (describe locations and indications, such as condition of vegetation) _____
_____

Leakage Indications Reported to:_____

Construction Activity Along Areas_____

Describe any unusual conditions at highway and railroad crossings:_____
_____
_____
_____

Other factors noted which could affect present or future safety or operation of the gas system:_____
_____
_____

Follow-Up (repairs, maintenance or tests resulting from this inspection:_____
_____
_____
_____
_____

COMMENTS:_____
_____
_____
_____
_____
_____

No. of persons in patrol party:_____

Date:_____ _____
Signature of person in charge of patrol party

One segment of the patrolling process is to observe and inspect exposed piping. This includes metering stations, regulator stations and exposed piping over canals, bayous and ditches. The City of Carencro has a limited number of such places where the gas main is exposed over crossing bayous and ditches overhead. Below is a picture of one of these crossings.

The City of Carencro employees routinely conduct inspections of these over-head crossing to ensure that the piping is in good condition, properly coated and that debris such as logs, limbs and other obstacles are not leaning on or making contact with the exposed pipeline. Exiting the ground, the pipeline is coated with mill wrapping from the manufacturer with yellow paint over the top of the wrapping.

## 8.4 LEAKAGE SURVEYS (192.723)

### BUSINESS DISTRICT(192.723)(a)

The type and scope of this leakage control program must be determined by the nature of the operations and local conditions. The City of Carencro will conduct a leakage survey with leak detector equipment in business districts, including tests of the atmosphere in gas, electric, telephone, sewer, and water system manholes, at cracks in pavement and sidewalks, and at other locations providing an opportunity for finding gas leaks once each calendar year at intervals not exceeding fifteen (15) months.

Business districts are defined as an area of two or more businesses within one-hundred (100) yard of each other and within 100 yards along the linear length of any gas pipeline. District will extend 100 feet past the defined boundaries of the last business in the district.

Areas with schools, churches, large concentrations of business, large downtown areas with cemented areas above the gas main or service, and any other area deemed necessary that may have high concentrations of people.

### OUTSIDE BUSINESS DISTRICT (192.723)(b)

A leakage survey with leak detector equipment will be conducted outside business districts as frequently as necessary, but at least once every 5 calendar years at intervals not exceeding 63 m onths. This will include residential areas and all other areas considered outside the business district as defined in the second paragraph of this section of the O&M. Approximately 20% of the gas distribution system excluding the business districts will be surveyed annually so that the entire gas distribution system is surveyed over a five (5) year period, not to exceed 63 m onths. A ll leaks will be graded in accordance with the ASME Leak Classification Guide and Action Criteria Guidelines and will be repaired accordingly.

### 8.4.1 PURPOSE

This document establishes the procedural requirements for conducting Natural Gas Leak Detection Surveys on the City of Carencro Natural Gas Distribution System.

### 8.4.2 SCOPE

To provide instructions for conducting gas leak detection surveys, the frequency of the surveys and documentation requirements for recording the results of these gas leak detection surveys.

### 8.4.3 REFERENCES

1. Part 191, Title 49 of the Code of Federal Regulations
2. Part 192, Title 49 of the Code of Federal Regulations, Subpart 192.723.
3. ASME Leak Classification Guide and Action Criteria

## 8.4.4 DEFINITIONS

1. Gas - Natural gas, flammable gas, or gas that is toxic or corrosive.
2. Distribution - Pipeline other than a gathering or transmission line.
3. High Pressure Distribution System - A distribution system in which the gas pressure in the main is higher than the pressure provided to the customer.
4. Main - A distribution line that serves as a common source of supply for more than one service line.
5. Operator - A person who engages in the transportation of gas.
6. Pipeline - All parts of those physical facilities through which gas moves in transportation, including pipe, valves, and other appurtenance attached to pipe, compressor units, metering stations, regulator stations, delivery stations, holders, and fabricated assemblies.
7. Customer Meter - The meter that measures the transfer of gas from an operator to a consumer.
8. Service Line - A distribution line that transports gas from a common source of supply to:
   a) A customer meter or the connection to a customer's piping, whichever is farther downstream, or
   b) The connection to a customer's piping if there is no customer meter
9. Business District.-. An area of two or more businesses within one-hundred (100) yard of each other and within 100 yards along the linear length of any gas pipeline. District will extend 100 feet past the defined boundaries of the last business in the district. Business district includes schools, churches, hospitals and other places where persons congregate.

Finding and pinpointing underground gas leaks is not an exact science and sometime are very difficult to find and repair. This is particularly true when there is variable winds blowing. However, the following clues make finding and pinpointing the leaks somewhat easier.

**Visual Clues** Things to look for when conducting gas leak detection surveys include but are not necessarily limited to, any of the following abnormal vegetation and soil conditions:

### *Unusual Vegetation Growth*

Because natural gas may at first stimulate soil bacteria that accelerate the growth of vegetation, the area of the surface spread is often a darker or richer green than surrounding vegetation.

### *Dead Vegetation Patches*

On the other hand, the continued presence or large quantities of natural gas eventually displaces oxygen needed for healthy root growth, so yellow, dying or dead vegetation may also mark the area of the spread.

### *Soil Discoloration*

Since natural gas dries soil, it can cause crusting and cracking on the surface. Darkening of the soil from bacteria growth, or white patches caused by mildew are also signs of the presence of natural gas in the soil.

## Other Indicators

Besides visual clues, there are also other physical indicators of natural gas in the soil. These include, but are not limited to:

- Gas odor
- Blowing dust particles
- Bubbles in standing water
- The sound of escaping gas
- The feel of gas flow at the top of a hole
- Diffraction or distortion of sunlight as gas vents to the atmosphere.

## 8.4.5 RESPONSIBILITIES

The operator for the City of Carencro Gas Distribution System is responsible for assuring that this procedure is being effectively implemented and for assuring that gas leaks are identified, documented and repaired in accordance with this procedure. The operator for the City of Carencro Gas Distribution System is responsible for documenting all repairs made to the gas distribution system.

## 8.4.6 REQUIRED EQUIPMENT

The following equipment shall be required for conducting Gas Leak Detection Survey for the City of Carencro:

- Flame Ionization Leak Detector
- Combustible Gas Indicator (CGI)
- Compact Probe Rod for punching bar holes to collect CGI samples
- Gas Distribution System Map or Guide

## 8.4.7 CALIBRATION REQUIREMENTS

Flame Ionization Unit (FIU) is calibrated at the factory and requires recalibration only during scheduled maintenance. The FIU should be turned in for maintenance at six-month intervals if it is used daily, annually if it is used less often per the attached instructions.

Combustionable Gas Instrument (CGI) used regularly shall be calibrated at the beginning of each leak survey. Under some conditions, the CGI may need calibration more often as described in the attached instructions.

## 8.4.8 REQUIRED FREQUENCY (192.723)(a)(b)

Periodic leak surveys must be conducted determined by the nature of the operations and local conditions. Leak detection surveys using leak detection equipment of business district(s), schools, churches, hospitals and other places where persons congregate will be conducted annually at intervals not exceeding 15 months. These leak surveys will including tests of the atmosphere in gas, electric, telephone, sewer, and water system manholes, at cracks in pavement and sidewalks, and at other locations providing an opportunity for finding gas leaks. City of Carencro will conduct leak detection surveys of the residential distribution systems with leak detector equipment at intervals once every five (5) years not to exceed 63 months. (20% of the total distribution system annually.) Other leak detection survey frequencies are evaluated and will be determined by the severity of the conditions that could cause failure or leakage such as oil and gas exploration seismographic blasting, and the consequent hazards to public safety. However, for cathodically unprotected distribution lines subject to §192.465(e) on which electrical surveys for corrosion are impractical, a leakage survey must be conducted at least once every 3 calendar years at intervals not exceeding 39 months. Leak detection surveys of business districts, schools, churches, hospitals and other places where persons congregate will be conducted annually at intervals not exceeding 15 months. Other leak detection survey frequencies are evaluated and will be determined by the severity of the conditions that could cause failure or leakage such as oil and gas exploration seismographic blasting, and the consequent hazards to public safety.

## 8.4.9 OPERATION OF FLAME IONIZATION UNIT

Gas leak detection surveys shall be conducted over the City of Carencro gas distribution system by patrolling or walking slowly over distribution main and each gas distribution service line with a flame ionization unit. Flame Ionization Units (FIU) measure gas by sampling the atmosphere above or adjacent to the gas lines and providing measurements in "parts-per-million" (PPM). The leak detection survey will include as part of the survey in addition to "over the pipeline" surveying, samples or tests of atmosphere in gas, electric, telephone, sewer and water system manholes, at cracks in pavement and sidewalks, and at other locations providing an opportunity for the accumulation of gas. In addition, the leak detection survey includes gas meter sets and the gas regulator and metering stations.

Once the gas line has been located, begin walking over the gas line at a normal or slightly slower than normal pace. The sample probe end of the FIU should be held approximately three (3) to eight (8) inches above ground level over the pipeline taking care to avoid the intrusion of moisture or liquid. The gas leak surveyor should take care to observe unusual or different than normal vegetation and/or ground in the vicinity of the gas line as he/she proceeds along gas line being surveyed. Average walking speed over gas lines that are not under concrete or pavement is approximately 150 to 250 feet per minute (FPM). Average walking speed over gas lines that are under concrete or pavement is approximately 100 to 200 feet per minute (FPM**)**. Set the selector switch on 10 PPM, this is the most sensitive setting and will allow identification of small gas leaks (under 10 PPM). The alarm should be set so that the audible alarm sounds when gas is detected at approximately 1 to 2 PPM. This will allow surveyor to patrol the gas line without having to constantly observe the PPM readout scale, thus concentrating on the general area over and around the buried pipeline.

Air movement or wind is critical and can alter or decrease the effectiveness of gas leak detection surveys. When wind or air movement is present, care should be taken to walk on the "down wind" side of gas lines when conducting leak detection surveys. Gas leak surveys will **not** be conducted when ground is too wet (water standing) on ground that is normally dry or when wind or air movement is ten (10) miles per hour or greater. Intrusion of moisture or liquid into Gas Leak Detection Instruments, FIU or CGI may cause damage

The following anomalies are indicators of potential gas leaks:

- Unusual discoloration of vegetation such as dark green patches of grass in vicinity of gas lines (caused by nitrogen in gas and is generally an indication of a leak which has recently started)
- Dead, dying or brown vegetation in vicinity of gas line
- Bare spots over the gas line where vegetation is conspicuously absent
- Areas over the gas line where dirt has turned a grayish or black color or appears different.

When any of the above observations are made, extra time should be taken to hold the sample probe end over the area as near ground level as possible for approximately 10 to 15 seconds.

Should audible alarm sound indicating a gas leak, adjust the PPM scale through the range to identify the highest concentration of gas. Once it has been determined that gas is in the area, the use of a Combustionable Gas Indicator (CGI) is required to pinpoint as accurately as possible and to determine the extent and severity/grade of the leak.

### 8.4.10 OPERATION OF COMBUSTIBLE GAS INDICATOR

Gas leaks detected and/or identified when conducting gas leak detection surveys for City of Carencro utilizing the Flame Ionization Unit will be pinpointed and their severity determined (GRADED) by use of a Combustionable Gas Indicator (CGI). The leak pinpointing and severity/grading determination is made using a Combustionable Gas Indicators (CGI) which measures gas by sampling the atmosphere in a probe hole strategically place over the gas line and providing measurements in Percent (%) of Lower Explosion Limits or Percent (%) of full scale or 0 to 100%

At a point identified as the area of highest gas concentration using the Flame Ionization Unit, a compaction rod or stiff rod is used to drive a hole in the ground taking care not to puncture the gas line. When bar testing along the gas main or service, probe holes should be drilled at approximately three (3) foot intervals.

**EXTREME CAUTION MUST BE TAKEN TO AVOID PUNCTURING THE GAS MAIN OR THE GAS SERVICE LINE. EXTRA CAUTION SHOULD BE TAKEN WHEN PROBING OVER PLASTIC GAS LINES**

The probe end or sample hose of the CGI is inserted into the probe hole and the bulb is compressed repeatedly (ten to twelve times) drawing into the chamber of the CGI a sample of gas (Measured in % of scale). The dial on the indicator will register in a positive direction until all trapped gas in the hole being tested has been pumped out. The remaining gas being registered on the dial indicator should be the amount of gas being lost from the system. Numerous probe holes are made along the gas line or service line (bar testing) in the area identified by the FIU and sampling each probe hole with the CGI is repeated until the leak is pinpointed. The probe hole with the highest concentration detected should be nearest the leak.
Once the gas leak has been pinpointed, the gas leak shall be classified or graded. Leaks may be classified in accordance with the attached "ASME Leak Classification Guide and Action Criteria". Grade 1 gas leaks will be repaired immediately or continuously monitored until repaired or downgraded.

A **Grade I** gas leak is defined as a leak that represents an existing or probable hazard to persons or property, and will be repaired immediately or continuously monitored until repaired or downgraded.

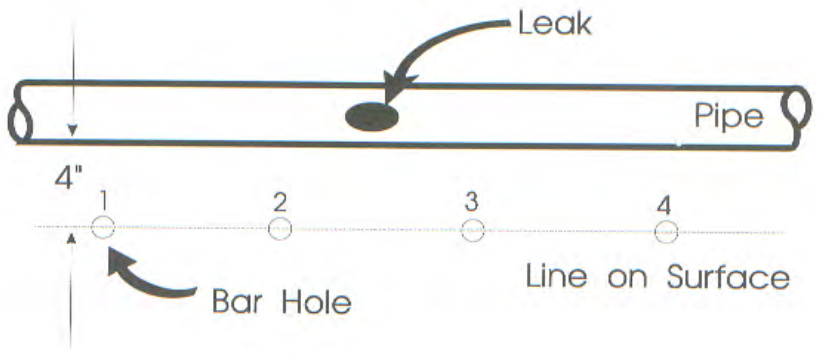
A **Grade II** leak is defined as a leak that is recognized as being non-hazardous at the time of detection, but requires scheduled repair based on probable future hazard will be repaired within one calendar year, but no later than 15 months after they were reported. They must be reevaluated at least once every six months until they are repaired.

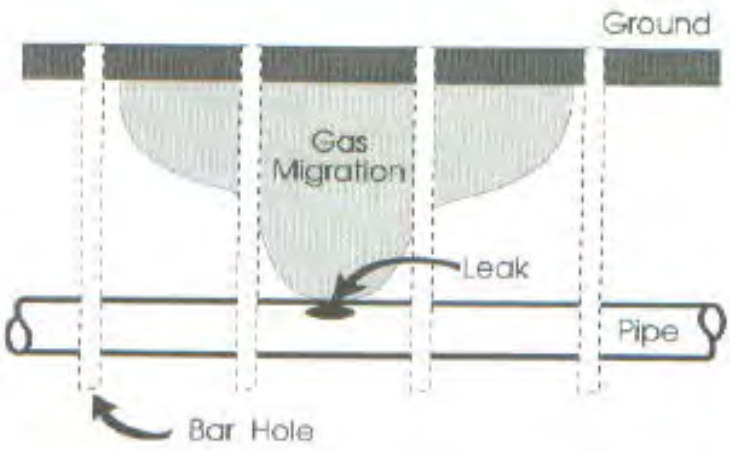
A **Grade III** leak is defined as a leak that are not a hazard and not likely to become a hazard in the future and must be re-evaluated at a minimum of every 15 months until it is re-graded are no longer results in a reading.

| PROCEDURE FOR TESTING WITH A CGI | | |
|---|---|---|
| | **Action** | **Information** |
| **Purge the CGI** | | |
| **1.** | Before you test with a CGI, purge it in a gas-free atmosphere. | If you are going to test indoors, remember that you must turn the CGI on **before** you go into the building. |
| **Take the Sample** | | |
| **2.** | To sample the atmosphere indoors, start with the CGI on the LEL or 5% gas-in-air scale.<br>• Use this 5% scale for initial testing.<br>• Watch the meter during the initial pumping cycle to interpret readings correctly.<br>• For concentrations above 5%, use the 100% (UEL) scale. | **NOTE:** When using the CGI on the LEL scale**, always** keep your eye on the meter needle to watch for possible movement, so that you don't miss the momentary detection of a very low concentration of natural gas. |
| **3.** | Pump the aspirator bulb to sample the atmosphere.<br>• On the 5% scale, a zero reading indicates no gas present.<br>• If the needle rests between zero and 5%, there is less than 5% concentration of natural gas.<br>• If the reading goes above 5%, measure again with the 100% scale. | Be careful not to draw water into the instrument, or you will have to disassemble, clean, and recalibrate it before you can use it again. |
| **4.** | Take the initial reading.<br>• Pump the aspirator bulb until there is an initial movement of the needle<br>• Watch the maximum needle deflection.<br>• This is the initial reading. | Whenever you test for gas in air, you always take two different CGI readings.<br><br>Deflection means movement. |
| **5.** | Take the sustained reading.<br>• After observing initial reading, keep pumping until the needle stops moving.<br>• The percentage reading at which the needle stabilizes is the sustained reading. | All leaks are classified using the sustained reading.<br>• In most cases, this should not require more than 10 to 20 aspirations. |
| **Record the Readings** | | |
| **6.** | Record the sustained reading.<br>• If an initial reading is 2% gas and the sustained reading is 1% gas, record it as 1%.<br>• Enter all readings in percent gas. | **NOTE:** When you record a CGI reading of any kind, you must also note the scale on which the reading was obtained. |

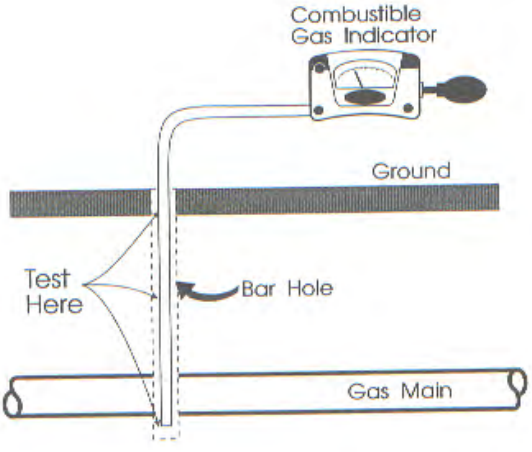
Underground gas leaks are pinpointed, after discovery using a Flame Ionization Unit (FIU) with a Combustible Gas Indicator (CGI) utilizing the Bar Hole Testing Procedure below. This method accurately pin points the location of the underground gas leak and in most cases eliminates extensive excavation.

| PROCEDURE FOR BAR HOLE TESTING | | |
|---|---|---|
| | **Action** | **Information** |
| **Locating Bar Holes** | | |
| **1.** | Drill or dig a series of test holes to one side of the leaking gas line (Figure 4). | When drilling bar holes, take care not to punch holes in the gas line accidentally! |
| **2.** | Drill bar holes **deeper** than the bottom of the gas line where the gas originated (Figure 5). | This is in case the leakage is from the bottom side of the piping. |
| **3.** | Be careful to use proper procedures when using a punch bar. | **Caution!** You can injure your back if you don't use the punch correctly! |
| **4.** | Wear all required protective clothing and equipment. | Approach every leak as though it is hazardous, and take all safety precautions. |






| | Action | Information |
|---|---|---|
| **Spacing Bar Holes** | | |
| **5.** | Starting from one side of the general spread boundary, space the bar holes twelve to fifteen feet apart along the length of the gas line. | Make bar holes the same depth and diameter to make sure your CGI reading will be consistent and accurate. |
| **6.** | Within the perimeter of the spread, drill intermediate holes about two feet apart. | This is based on the percentage of gas-in-air in each bar hole, according to the CGI readings. |
| **7.** | At the area of highest concentration, space the bar holes one foot apart or less | Bar holes should be spaced closer as gas-in-air reading get higher. |
| **Testing Bar Holes** | | |
| **8.** | Using a CGI unit, test each hole for the presence of gas.<br>• Note the concentration at each hole. | Take your test readings as soon as you make each hole, since letting them sit allows them to vent. |



| | Action | Information |
|---|---|---|
| **Spacing Bar Holes** | | |
| **9** | From the area of highest concentration of gas in air, continue bar testing outward in each direction. | You identified the area of highest concentration by the bar holes with the highest gas-in-air readings. |
| **10** | Make a rough sketch of the area showing all bar hole locations and their CGI readings. | Bar holes with zero percent (0%) gas-in-air readings determine the exact boundaries of the spread. |
| **Pinpointing the Leak Source(s)** | | |
| **11** | Once you have defined the exact migration area, try to determine the leak source. | The bar hole with the highest sustained reading usually is closest to the leak. |
| **12** | If necessary, exhaust the entire area to assist in pinpointing the source of gas. | Use this method if the leak source can't be readily determined because of similar CGI readings in other bar holes. |
| **13** | Bar test for any other underground leaks. | Use a methodical search pattern to determine each migration area. |
| **14** | Isolate, pinpoint, and mark the location of all leaks. Be sure you repair them. | Keep in mind that there may be more than one leak source in the area! |
| **Venting Unsafe Gas Concentrations** | | |
| **15** | Do what you can to vent the gas and prevent further subsurface migration. | Do this at each location where you detect an unsafe concentration of natural gas. |
| **16** | Aerate the leak with bar test holes or excavations. | This vents the escaping gas to the surface and reduces the migration pattern. |

In some instances, testing for natural gas leaks require the operator to test in and around gasoline stations, automobile repair shops or in areas where the ground may contain petroleum based product. When encountering these situations, use the following procedure in conjunction with the Procedure for testing with the CGI.

| **PROCEDURE FOR TESTING WITH A CGI NEAR PETROLEUM PRODUCTS** | | |
|---|---|---|
| | **Action** | **Information** |
| **1.** | If you get a positive reading and suspect petroleum vapors, add an activated charcoal filter to the CGI | On some models you add the charcoal filter to the cotton filter, on others you replace the cotton with charcoal. |
| **2.** | Take another reading.<br>• If the test result is the same, the source of the reading is not a petroleum-based product. Natural gas is present.<br>• If the second test result is lower, the charcoal filter is absorbing the petroleum vapors, meaning that the source is gasoline or another petroleum-based product. | The charcoal filter determines if a reading is gasoline or another condensable hydrocarbon. The filter absorbs gasoline, preventing false readings.<br>**WARNING!** If tests result is lower with the charcoal filter than with the cotton filter, this does **not** rule out the presence of natural gas in the test atmosphere. |
| **3.** | Keep aspirating to get a sustained reading. | |
| **4.** | If you detect petroleum vapors with the CGI, you cannot use the same charcoal filter again, so you should always:<br>• Discard the charcoal filter after each use and replace it with another manufacturer-approved activated charcoal filter.<br>• Replace the cotton filter, if necessary.<br>• Store new filters in a sealed container, such as a glass jar with a tight lid. | Charcoal filters quickly absorb petroleum vapors and become contaminated, resulting in false readings.<br>**WARNING!** Using a CGI near large amount of petroleum product without a charcoal filter can damage it internally. If this happens, you cannot trust the CGI's accuracy until it is tested again at the shop. |

## 8.4.11 DOCUMENTATION

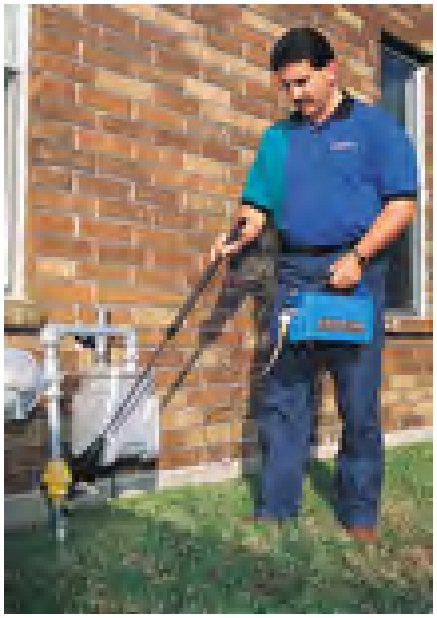
All gas leaks detected are to be documented on a g as leak detection drawing, as depicted in the attached "Leak Inspection - Location Report" which identifies the location of the gas leak, the concentration of gas in percent (CGI) or parts per million (FIU), the date the gas leak was found, personnel who found the gas leak and the grade or severity of the identified leak. Once the gas leak has been repaired, the operator should document on t he attached "Leak Inspection - Location Report" under **"CAUSE"** the cause of each leak and how the leak was repaired i.e. handy ban clamp, tightening of a compression coupling, pipe replacement, etc.

The **cause of each leak** discovered and repaired will fall into the following eight (8) categories:

1. Corrosion
2. Equipment
3. Incorrect Operations
4. Material, Welds or Joints
5. Excavation Damage
6. Natural Forces
7. Other Outside Force Damage
8. Other

See the next page for definitions and guidance regarding documenting the exact cause of each leak. Gas leak detection sheet are to be maintained for the life of the distribution system or until the distribution system has been replaced.

Below is a pictorial of a typical combustible gas indicator (CGI) and a typical Flame Ionization Unit (FIU) used by City of Carencro to locate, pinpoint and grade gas leaks.



## DEFINITIONS

**CORROSION:** Problems resulting from a hole in the pipe or other component that was caused by galvanic, bacterial, chemical, stray current, or other corrosive action

**EQUIPMENT:** Problems resulting from malfunction of control/relief equipment including valves, regulators, or other instrumentation; stripped threads or broken pipe couplings on nipples, valves, or mechanical couplings; or seal failures on gaskets, O-rings, seal/pump packing, or similar leaks.

**INCORRECT OPERATIONS:** Problems resulting from inadequate procedures or safety practices, or failure to follow correct procedures, or other operator error.

**MATERIAL, WELDS OR JOINTS:** Problems resulting from failure of original sound material from force applied during construction that caused a dent, gouge, excessive stress, or other defect that eventually resulted in a leak. This includes problems due to faulty wrinkle bends, faulty field welds, and damage sustained in transportation to the construction or fabrication site. Also include problems resulting from a defect in the pipe material, component, or the longitudinal weld or seam due to faulty manufacturing procedures. Problems from material deterioration, other than corrosion, after exceeding the reasonable service life, should be addressed under Other.

**EXCAVATION DAMAGE:** Problems resulting from damage caused by earth moving or other equipment, tools, or vehicles. Include problems from damage by operator's personnel or contractor or people not associated with the operator.

**NATURAL FORCES:** Problems resulting from earth movements, earthquakes, landslides, subsidence, lightning, heavy rains/floods, washouts, flotation, mudslide, scouring, temperature, frost heave, frozen components, high winds, or similar natural causes.

**OTHER OUTSIDE FORCE DAMAGE:** Include Problems caused by vehicles hitting above ground facilities, grass cutting equipment cutting service riser, fire or explosion and deliberate or willful acts, such as vandalism.

**OTHER:** Problems resulting from any other cause, such as exceeding the service life, not attributable to the above causes.

**METER LEAKS:** Gas leaks found on meters as a result of customer complaints of gas smell or for any reason do not need to be reported in Part C of your Annual report if the leak can be repaired without disassembling the meter. If a fitting or meter nut that is leaking and it can just be tightened to stop the leak you **do not** need to report that leak.

# ASME

## LEAK CLASSIFICATION AND ACTION CRITERIA - GRADE 1

| GRADE | DEFINITION | ACTION CRITERIA | EXAMPLES |
|---|---|---|---|
| 1 | A leak that represents an existing pr probable hazard to property, and requires immediate repair or continuous action until the conditions are no longer hazardous. | Requires ***prompt action*** * to protect life and property, and continuous action until the conditions are no longer hazardous.<br>*The prompt action in some instances may require one or more of the following:<br><br>a. Implementation of Company Emergency Plan.<br><br>b. Evacuating premises.<br><br>c. Blocking off an area.<br><br>d. Rerouting traffic.<br><br>e. Eliminating source of ignition.<br><br>f. Venting the area.<br><br>g. Stopping the flow of gas by closing valves or other means.<br><br>h. Notifying police and fire departments | 1. Any leak which, in the judgment of operating personnel at the scene, is regarded as an immediate hazard<br><br>2. Escaping gas that has ignited.<br><br>3. Any indication of gas which has migrated into or under a building, or into a tunnel<br><br>4. Any reading at the outside wall of a building, or where gas would likely migrate to an outside wall of a building.<br><br>5. Any reading of 80% LEL, or greater, in a confined space.<br><br>6. Any reading of 80% LEL, or greater in small substructure (other than gas associated substructures) from which gas would likely migrate to the outside wall of a building.<br><br>7. Any leak that can be seen, heard, or felt, and which is in a location that may endanger the general public or property. |

# ASME

## LEAK CLASSIFICATION AND ACTION CRITERIA - GRADE 2

| GRADE | DEFINITION | ACTION CRITERIA | EXAMPLES |
|---|---|---|---|
| 2 | A leak that is recognized as being non-hazardous at the time of detection, but justifies scheduled repair based on probable future hazard | Leaks should be repaired or cleared within one calendar year, but no later than 15 months from the date the leak was reported. In determining the repair priority, criteria such as the following should be considered.<br>a. Amount and migration of gas.<br>b. Proximity of gas to buildings and sub surface structure.<br>c. Extent of pavement.<br>d. Soil type, and soil conditions (such as frost cap, moisture and natural venting).<br>Grade 2 leaks should be reevaluated at least once every six months until cleared. The frequency of reevaluation should be determined by the location and magnitude of the leakage condition.<br>Grade 2 leaks may vary greatly in degree of potential hazard. Some Grade 2 leaks, when evaluated by the above criteria may justify scheduled repair within the next 5 working days. Others will justify repair within 30 days. During the working day on which the leak is discovered, these situations should be brought to the attention of the individual responsible for scheduling leak repair.<br>On the other hand, may Grade 2 leaks, because of their location and magnitude, can be scheduled for repair on a normal routine basis with periodic re-inspection as necessary. | A. *Leaks Requiring Action Ahead of Ground Freezing or Other Adverse Changes In Venting Conditions*<br>Any leak which, under frozen or other adverse soil conditions, would likely migrate to the outside wall of a building.<br>B. *Leaks Requiring Action Within Six Months*<br>1. Any reading of 40% LEL, or greater, under a sidewalk in a wall-to-wall paved area that does not qualify as a Grade 1 leak.<br>2. Any reading of 100% LEL, or greater, under a street in a wall-to-wall paved area that has significant gas migration and does not qualify as a Grade 1 leak.<br>3. Any reading less than 80% LEL in small substructures (other than gas associated substructures) from which gas would likely migrate creating a probable future hazard.<br>4. Any reading between 20% LEL and 80% LEL in a confined space.<br>5. Any reading on a pipeline operating at 30 percent SMYS, or greater, in a class 3 or 4 location, which does not quality as a Grade 1 leak.<br>6. Any reading of 80% LEL, or greater, in gas associated substructure.<br>7. Any leak which, in the judgment of operating personnel at the scene, is of sufficient magnitude to justify scheduled repair. |

# ASME

## LEAK CLASSIFICATION AND ACTION CRITERIA - GRADE 3

| GRADE | DEFINITION | ACTION CRITERIA | EXAMPLE |
|---|---|---|---|
| 3 | A leak that is non-hazardous at the time of detection and can be reasonable expected to remain non-hazardous. | These leaks should be reevaluated during the next scheduled survey, or within 15 months of the date reported, whichever occurs first, until the leak is regarded or no longer results in a reading. | *Leaks Requiring Reevaluation at Periodic Intervals.*<br><br>1. Any reading of less than 80% LEL in small gas associated substructures.<br><br>2. Any reading under a street in areas without wall-to-wall paving where it is unlikely the gas could migrate to the outside wall of a building.<br><br>3. Any reading of less than 20% LEL in a confined space. |

# CITY OF CARENCRO
# OPERATING AND MAINTENANCE MANUAL

**R&R CONSULTANTS, LLP** **Leak No. _____**

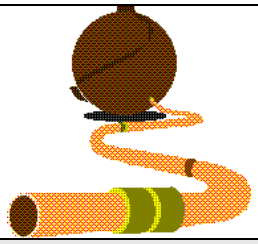
## LEAKAGE INSPECTION - LOCATION REPORT

**ADDRESS** _____

**TOWN/PARISH** _____

**DISTRICT**

**NORTH**



**GRADE OF CASE**

Grade I ……

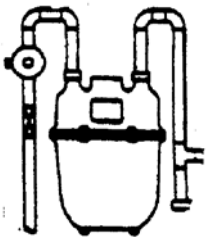
Grade II ……

Grade III ……

Meter Set

Meter No._____

(If inspected)



HOUSE LINE

| DETECTED BY | | COLLECTING | | PROBABLE SOURCE | | SOIL | | VENTED C.G.I TEST | | PRESSURE | | SURFACE | | PIPE & SIZE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mobile flame pack | | In Building | | Main | | Rock | | Gas % | | Low | | Lawn | | Steel | |
| Flame Pack | | Near Building | | Service | | Cinders | | L.E.L.% | | I.P. | | Soil | | Plastic | |
| Visual/Vegetation | | In Man Hole | | Service Tap | | Clay | | P.P.M. | | High | | Paved | | Cast Iron | |
| Combustible Meter | | In Soil | | Valve | | Loam | | Negative | | Transmission | | Other | | Other | |
| Odor | | In Air | | Meter Set | | Sand | | | | | | | | | |
| Other | | Other | | Other | | Other | | | | | | | | | |

**EMARKS – VEGETATION DAMAGE**

_____

_____

**GAS COMPANY DATA**

| LEAK CAUSE | | COMPONENT AND EXPLINATION | | | PART OF SYSTEM | | PIPE & SIZE | | REPAIR DATA | |
|---|---|---|---|---|---|---|---|---|---|---|
| Corrosion | | Pipe | | | Transmission | | Steel | | Number of Leaks | |
| Equipment | | Valve | | | Main | | Cast Iron | | Bare | |
| Incorrect Operation | | Fitting | | | Service | | Ductile Iron | | Coated | |
| Material Failure | | Drip | | | Meter Set | | Copper | | Date Repaired: | |
| Excavation Damage | | Regulator | | | Customer Pipe | | Plastic | | Date Rechecked: | |
| Natural Forces | | Tap Connectio | | | Other | | Other | | Positive ❑ Negative ❑ | |
| Other Outside Force | | Other | | | | | | | | |
| Other | | | | | | | | | | |

**AREA LOCATION** **COMMERCIAL ❑** **INDUSTRIAL ❑** **RESIDENTIAL ❑** **RURAL ❑**

**REMARKS**_____

_____

**REPORTED BY:** **REPAIRED BY:** **RECORDED BY:**

**DATE:** **DATE:** **DATE:**

## ATTACHMENT

## CALIBRATION OF COMBUSTIBLE GAS INDICATOR (CGI)

- CGIs that are used regularly require calibration at least once a month. Under some conditions, the CGI may need calibration more often**:**
- After any repair or part replacement
- If water enters the unit
- If there is any other reason to suspect the CGI is out of calibration.
- Always follow the proper calibration procedures. To Calibrate the CGI for natural gas:

| | Action | Information |
|---|---|---|
| | **Calibrate 5% Scale** | |
| **1** | Set the range switch on the 5% scale. | |
| **2** | Zero the unit. | |
| **3** | Connect a known gas sample (such as a certified 2.5% gas sample) and aspirate. | If the CGI meter doesn't read the same as the known sample, adjust it until it does |
| **4** | Disconnect sample and purge the chamber. | |
| | **Calibrate 100% Scale** | |
| **5** | Set the range switch on the 100% scale. | |
| **6** | Zero the unit | |
| **7** | Aspirate a 100% gas sample | If the reading does not indicate 100%, adjust the CGI unit |
| **8** | Disconnect sample and purge the indicator | |
| **9** | Replace the calibration sticker and/or update other company calibration records | You may use the current date, or the due date of the next calibration, depending on company policy. |

- You must maintain a permanent calibration record that notes all repairs, maintenance and battery changes, and includes the:
- Date of Calibration
- Person performing the test

# ATTACHMENT

## CALIBRATION OF FLAME IONIZATION UNIT (FIU)

### A. GENERAL

It is recommended that DETECTO-PAK II be given the following maintenance at six-month intervals if it is used daily, annually if it is used less often. The unit may be returned to the factory, if desired.

### B. CALIBRATION

DETECTO-PAK II is factory calibrated and should require recalibration only during scheduled maintenance. T he following equipment is required for proper calibration:

1. Span Gas: a methane/air mixture in a known concentration. Approximately 100-ppm methane in air is recommended.

2. D.C. Millivolt meter with a 10-millivolt full-scale range.

# CALIBRATION TEST KIT

**FOR MODEL 400 FLAME PACK**

Now an entire calibration testing kit in an aerosol can for a quick and convenient method of checking the calibration of the Model 400 Flame Pack.

**CONVENIENT**—Nothing to Assemble

**COMPACT**—Small Size Makes It Easy To Carry Or Store

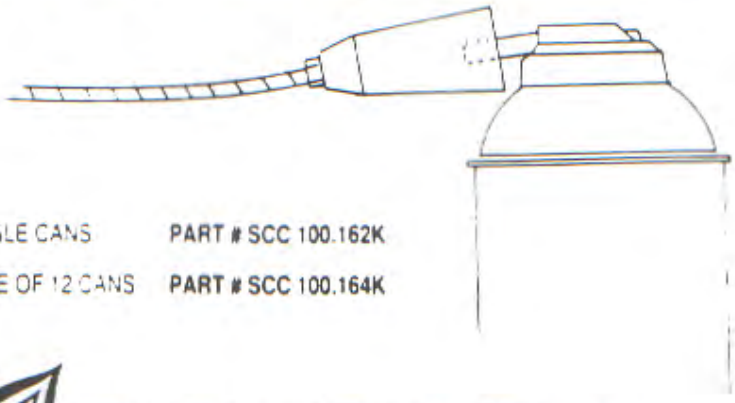
**LIGHTWEIGHT**—Less Than 5 Oz.

**SAFE**—50 PPM; Non-combustible

**HIGH QUALITY**—Certified To Be Within 5% Of Stated Contents

**ECONOMICAL**—40 Or More Tests Each

To use, first adjust the meter to zero in clean air. Then insert can nozzle into intake cone and release a short burst of gas. Meter reading at or near full scale indicates a properly functioning Flame Pack. Readings may vary due to background hydrocarbon level.



SINGLE CANS **PART # SCC 100.162K**

CASE OF 12 CANS **PART # SCC 100.164K**

**Southern Cross Corp.**
P.O. Box 2168 ■ Norcross, GA 30091-2168
Phone 404/441-0403 ■ FAX 404/368-8014

## 8.5 TESTING REQUIREMENTS FOR REINSTATING SERVICE LINES (192.725)(a)(b)

Any gas distribution service line that has been previously abandoned and is being reinstated shall be tested in the same manner a new service line. Any gas service that has been temporarily disconnected from the main must be tested from the point of disconnection to the service line valve in the same manner as a new service line, prior to reconnection. If provisions have been made to maintain continuous service such as installing a bypass, that part of the service line used to maintain continuous service need not be tested.

## 8.6 ABANDONMENT OR INACTIVATION OF FACILITIES (192.727) a)(b)(c)(d)(e)(f)(g)

Abandonment of pipes and facilities to be left in place shall be accomplished by physically disconnecting the piping from all sources of gas and purged unless the lines and the volume of gas is so small that there is no danger of ignition or potential hazard. Ends of the piping should be sealed. Except for service lines, each inactive pipeline that is not being maintained under Part 192 must be disconnected from all gas sources/supplies, purged, and sealed at each end. When gas lines that are 2" and larger are abandoned, the line should be physically disconnected and purged with compressed air and the ends of the piping sealed. When service to a customer is discontinued, the following four steps are required:

1. The valve is closed to prevent the flow of gas to the customer and must be provided with a locking device or other means designed to prevent the opening of the valve by persons other that those authorized by the operator.
2. If the meter and regulator remain, a mechanical device or fitting that will prevent the flow of gas must be installed in the service line or in the meter assembly.
3. Should the meter and regulator be pulled or removed, the customer's piping must be physically disconnected from the gas supply and both ends of the piping capped.
4. If air is used for purging, the operator shall ensure that a combustible mixture is not present after purging.

When it becomes necessary to abandon underground vaults, pits or manholes, these will be filled with compacted dirt in order to avoid accidents and unsafe conditions. Records of abandoned gas distribution system piping and facilities should include location, date abandoned and method of abandonment. These records should become part of the City of Carencro Records Retention Program.

The operator for the City of Carencro will file a written report upon abandonment of any offshore pipeline facility or each abandoned onshore pipeline facility that crosses over, under or through a commercially navigable waterway. The report is to be submitted to Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Room 2103, 400 Seventh Street, SW, Washington DC 20590 or faxed to (202) 366-4566 or e-mailed to InformationResourcesManager@PHMSA.dot.gov.

The report shall contain the following information:

1. Location of abandoned piping
2. Size of piping abandoned
3. Date piping was abandoned
4. Method of Abandonment
5. Certification that the facility has been abandoned in accordance with all applicable laws.

| PROCEDURE FOR ABANDONING MAINS LINES | | |
|---|---|---|
| | **Action** | **Information** |
| **Deactivate the Line** | | |
| **1** | Close the valve at the main or boulevar | If there is one available. |
| **2** | If there is no valve, stop/bag the main. | See Module 441 for details |
| **3** | Squeeze off plastic piping. | Gas is stopped at this point. |
| **Prepare to Abandon the Line** | | |
| **4** | Before cutting the pipe, reduce pressure atmosphere (o psig) in section to be aba | Remember to vent gas away from building and poss ignition sources. |
| **5** | On steel pipe, install bond wires before the line.<br>• Clean pipe to shiny metal.<br>• Securely fasten cables to the secti removed and to each adjacent pip | This provides electrical continuity to prevent static e sparks as the pipe end separate.<br>• There must be metal-to-metal contact between and connections. |
| **6** | Cut or disconnect the facility from all sources a<br>natural gas.<br>• Remove all ignition sources from release area. | Use one of the following, depending on type and siz<br>● Chain cutter ● Pipe cutter<br>● Cutting torch ● Guillotine saw |
| **7** | Purge the facility line according to Con procedures. | Se Module 422 for details |
| **8** | Seal all openings/ends of the pipe to be abandoned, using methods:<br>• Concrete plug<br>• Rubber or expander plug<br>• An approved injected sealant such designed for this purpose<br>• Conventional end closures.<br>On a long segment with few line valves plugging the pipe at intervals and/or clo valves left in the line. | Conventional end closures include:<br>• Appropriate caps or plugs<br>• Blind flanges<br>• Compression couplings with end caps<br>• End plates.<br>**WARNING!** Test for gas before welding caps, plat flanges. |
| **9** | Remove all above ground facilities. | |
| **10** | Remove vault lids or valve box covers | |
| **11** | Document according to Company polic | |

| PROCEDURE FOR ABANDONING STEEL SERVICE LINES | | |
|---|---|---|
| | **Action** | **Information** |
| **Expose the Fitting** | | |
| **1** | Excavate and expose the main fitting and compression coupling. | Excavate approximately two feet (2') of service line. |
| **2** | Remove wrap and coating from service tap and compression coupling area. | Be sure you clean debris from the tap and coupling. |
| **Stop Gas Flow** | | |
| **3** | Close the valve or stopcock.<br>-or-<br>• Remove the cap.<br>• Insert Allen wrench; turn clockwise<br>• Seat the tapping bit firmly inside the tap hole to stop gas flow.<br>-or-<br>• Carefully remove the cap from the service tap fitting.<br>• Insert a gas expansion stopper, deeper than the fitting tee.<br>• Tighten the expansion stopper, sealing off all escaping gas. | If there is a gas control fitting.<br><br>If the gas control fitting is incorporated in the tap (such as a self-tapping tee).<br><br>If there is no gas control present.<br>• See the General Procedure for Deactivating Service Lines, on Pages 18-19 of this workbook. |
| **Cut and Purge the Line** | | |
| **4** | Cut out an 18" section of the service line to leave room to cap the open ends of the remaining sections. | Install bond wires before cutting the line.<br>• See general procedure, Pages 18-19. |
| **5** | Separate and raise the pipe at the cut. | |
| **6** | Remove the swing joint and install a cap or plug | If there is a swing joint service tap. |
| **7** | Purge the facility line according to Company procedures | **Never** ignite the purge discharge to test for the presence of gas. |
| **Close the Line** | | |
| **8** | Close pipe ends | See the general procedure, Pages 18-19 |
| **9** | Wrap the main fitting. | Follow Company procedures. |
| **10** | Fill excavations with compacted material and restore the surface. | |

| PROCEDURE FOR ABANDONING PLASTIC SERVICE LINES | | |
|---|---|---|
| | **Action** | **Information** |
| **Expose the Line** | | |
| **1** | Excavate and expose the plastic service or service tee. | Excavate approximately 2' of service line. Leave room for a squeeze tool. |
| **Stop Gas Flow** | | |
| **2** | Install the squeeze tool on the feed side of the service pipe.<br>• Use a squeeze tool specifically designed to prevent excessive force and pipe damage. | Choose a point for squeeze tool placement where the pipe is relatively straight. |
| **3** | Square the tool to the pipe before squeezing. | Center the squeeze tool bars on the pipe. |
| **4** | Squeeze plastic pipe walls together to achieve gas control | A bubble-tight shutoff is usually possible on small diameter pipe.<br>• Complete shutoff is less likely in 3" and larger pipe. |
| **5** | Operate the squeeze tool at a slow rate (generally 1" per minute) that allows for stress relaxation in the pipe as the squeeze point is reached. | The squeeze point is reached when:<br>• Gas flow is completely stopped,<br>• Mechanical squeeze tools can no longer be turned with the handle, or<br>• Squeeze tool mechanical stops are fully contacted. |
| **6** | Ground the pipe:<br>• Wrap the pipe with a cotton cloth dipped in a detergent solution.<br>• Pool the solution in the ground on both sides of the pipe.<br>• Drape the cloth into each pool. | This procedure prevents static electricity buildup.<br>• You may also use a commercial grounding tool for the same purpose. |
| **Cut and Purge the Line** | | |
| **7** | Remove a 12" section of the service pipe. | This leaves room for heat fusion procedures. |
| **8** | Fuse a plastic cap onto the feed end of the pipe. | You may also use a mechanical connection for this. |
| **9** | Purge the abandoned section. | |
| **Close the Line** | | |
| **10** | Cap the abandoned service end. | |
| **11** | Remove the squeeze tool.<br>• Mark the squeeze location for ½" and ¾" pipe by applying two wraps of cold tape around the pipe.<br>• Leave a 2" gap at the point of squeeze. | Always remove squeeze tools in a slow, controlled manner.<br>• Avoid sudden release of mechanical or hydraulic pressure during removal. |
| **12** | Soap test the plastic cap on the feed side. | This to make sure there are no leaks in the cap. |
| **13** | Fill excavation with compacted material and restore the surface. | |

## 8.7 INSPECTION OF PRESSURE LIMITING AND REGULATING STATIONS (192.739)(a)(1, 2, 3, 4,)(b)(c)

City of Carencro pressure limiting stations, relief devices other than rupture discs and pressure regulating stations including equipment must be subjected at intervals not exceeding 15 months, but at least once each calendar year, to inspections and test to determine and verify that each such station is:

1. In Good Mechanical Condition
2. Adequate From the Standpoint of Capacity and Reliability of Operation for the Service in Which it is Employed
3. Set to function at the Correct Pressure consistent with .201(a), except for .739(b)
4. Equipment is Properly Installed and Protected from Dirt, Liquids, or Other Conditions that Might Prevent Proper Operation
5. Relief Valve Set Point Checked

All steel pipelines owned and operated by the City of Carencro are designed and are intended to be able to operate at a Maximum Allowable Operating Pressures from 25 to 60 psig, determined under §192.619(c), by signed affidavit and pressure test records. See Section 7.10 Pressure limitation, controlled by a pressure relief device on this segment of steel piping will provide a pressure that will prevent unsafe operation of the pipeline considering its operating and maintenance history and MAOP.

Any unsatisfactory condition(s) identified shall be corrected as soon as possible. If a relief device is of insufficient capacity, a new or additional device must be installed to provide the required capacity. The City of Carencro Gas Distribution System has two (2) metering stations and one (1) District Regulator Station located in the gas distribution system.

See Regulator Inspection Procedure on the following page.

| | **REGULATOR STATION INSPECTION PROCEDURE** | |
|---|---|---|
| | **Action** | **Information** |
| **1** | While the station is in operation Visually inspect the regulator, OPPDs relief valve, vents, and all above ground piping and vent stacks.<br>• Check for visible damage, deterioration and or atmospheric corrosion. | Inspect while the unit is in operation |
| **2** | Ensure all valves that will be needed during the course of the inspection are operating properly.<br>• Be sure you can find and operate all valves required to isolate the equipment to be tested. | Make sure all valves in the system work, so you don't have a valve fail part way through the inspection.<br>• For example, you might get a valve open and not be able to close it.<br>• Turn valve only until it operates |
| **3** | Test the diaphragm assembly vent and all other piping for gas leaks. | If the diaphragm is leaking, there will be a gas smell at the vent. |

| | | |
|---|---|---|
| **4** | Make sure that all vents and vent pipes are clean and properly protected. | |
| **5** | Inspect all filters and clean them as required. | |
| **6** | Test to determine if the regulator is maintaining the proper pressure setting and will lockup if designed to do so. | Lock-up is the pressure over and above the set point at which the regulator completely stops the flow of gas. |
| **7** | Install test gauge on outlet side of regulator to be tested. | |
| **8** | Slowly close down stream valve of regulator to be tested. Test to determine if the regulator is maintaining the proper pressure setting and will lock-up, stop the flow of gas, at or near the set point. If the regulator does not lock-up, repair as required. Maximum allowed lock-up over set pressure is 2 PSI | |
| **9** | Put regulator back in service by slowly opening down valve. | |
| **10** | Check regulator performance by adjustment at full open capacity and at throttling or even flow capacity. Following lock-up procedures and test for lock-up and set pressure after each check. | |
| **11** | Reset flow pressure for normal setting at time of inspection and recheck lock-up pressure. | |
| **12** | Repeat same procedure for station with multiple legs. | |
| **13** | If there is a monitor regulator, test to ensure that it is set at proper pressure and will assume pressure control. | |
| **14** | If there is a security valve, test to ensure that it is set at proper pressure and will shut off the gas flow. | |

**NOTE**

**CARE MUST BE TAKEN NOT TO TURN ANY VALVE UNLESS AREA IS BACKFED, OR BYPASSED OR OTHER PRECAUTIONS ARE CONSIDERED**

This inspection is to verify that the regulator is in good mechanical condition and is adequate in capacity and reliability. The inspection also verifies that the regulator is set to function at the correct pressure and is installed in such a manner as to protect it from liquid, dirt and other conditions that might prevent proper operation and the relief valve set at a pressure that will prevent unsafe operation of the pipeline considering its operating and maintenance history and MAOP.

Upon completion of the valve, regulator, and relief valve inspections, a report shall be prepared identifying the type, make, size, and orifice size of each unit. This report shall indicate all pressure information. The report shall also indicate the full open capacity of regulators and capacity of relief valve. Indicate on report if relief valve capacity is not equal to or greater than capacity of regulator.

Gas superintendent shall confirm that the capacity of the relief valve is equal to or greater than the full open capacity of the regulator. The relief valve must have capacity to limit the pressure to the distribution system to which it is connected so as not to exceed the maximum allowed operating pressure plus allowable buildup.

If the relieving device is of insufficient capacity for the regulator at operating pressure;

1. Determine if reducing the regulator capacity to match the relief valve assembly will supply sufficient gas to the distribution system. If it is found that the reduced capacity of the regulator is sufficient, reduce the regulator capacity. If not,
2. A new or additional pressure-limiting device must be installed to provide additional capacity required.

Reports of these inspections are to be submitted to the Gas Superintendent and will be retained in his office and made available for inspection by Pipeline Safety. O n the following pages are Pressure Regulators used by City of Carencro at its Regulator Stations.

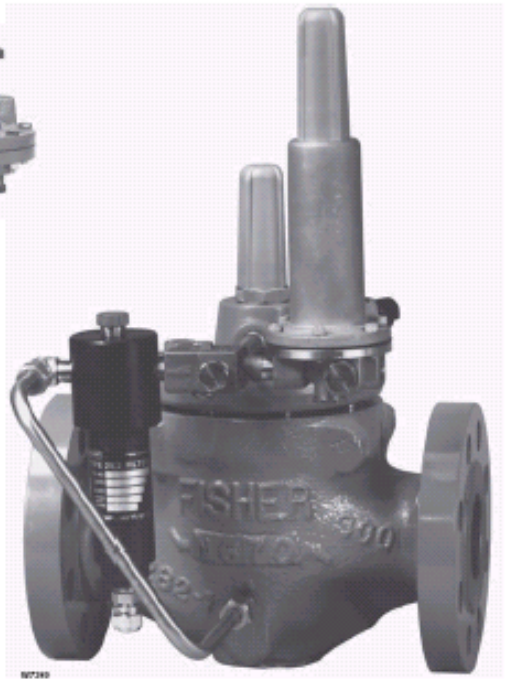
Instruction Manual
Form 5468

Type EZR

January 2003

# Type EZR Pressure Reducing Regulator

161AY SERIES PILOT



TYPE EZR REGULATOR

*Figure 1. Type EZR Regulator Configurations*

## Introduction

### Scope of Manual

This instruction manual provides installation, start-up, adjustment, maintenance, and parts ordering information for the Type EZR pressure reducing regulator, the Type 112 restrictor, the 161AY Series pilot, and the 161EB Series pilot. Any accessories used with this regulator are covered in their respective instruction manuals.

### Product Description

The Type EZR pilot-operated, pressure reducing regulators are used for natural gas, air, or other non-corrosive gas applications and include a Type 112 restrictor and a 161EB Series or 161AY Series pilot. For applications that have high pressure drops, using a Type 161AYM, 161EBM, or 161EBHM monitor pilot will increase the accuracy of the regulator.

### Specifications

Specifications for the Type EZR regulator are found on page 2. The control spring range for the pilot is marked on the spring case of 161EB Series pilots and on the nameplate of 161AY Series pilots. Other information for the main valve appears on the nameplate.

D 103206X012

Patent Numbers 5,964,446 and 6,102,071
Additional Patents Pending

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EMERSON. Process Management

## ROCKWELL 441-S REGULATOR

The City of Carencro has two (2) Rockwell 441-S regulators at the Prejean Road Purchase Point that reduce gas pressure to 37 PSI for delivery to the City Gate Station located on University Drive. There is no pressure relief device located at this station and as such these two regulators are monitor regulators.

The University Purchase Point Station is equipped with Rockwell 461 regulator that also reduces gas pressure to 37 PSI for delivery to the Carencro City Gate Station on University Drive. However, at this station an American Axial Flow Relief Valve provides over pressure protection.

**Rockwell 461 Regulator**

## 8.8 TELEMETERING OR RECORDING GAUGES (192.741)(a)(b)(c)

Distribution systems with more than one district pressure regulating station must be equipped with telemetering or recording pressure gauges to indicate the gas pressure in the district. Distribution systems with a single district pressure regulating station are required to determine the necessity of installing telemetering or recording gages in the district, depending on the number of customers, operating pressures and capacity of the installation and other operating conditions. The City of Carencro has two (2) purchase point stations and one (1) City Gate Station. Pressure gauges have been installed both up stream of each regulator station and down stream of each regulator station to indicate the gas pressure in the district. Distribution systems with a single district pressure regulating station are required to determine the necessity of installing telemetering or recording gages in the district, depending on the number of customers, operating pressures and capacity of the installation. The City of Carencro has two (2) purchase points and has determined through history that pressure decreases due to consumption does not warrant the use of telemetering equipment to facilitate pressure adjustments. However, pressure gauges have been installed at both of the Natural Gas Purchase Point Stations and at the City Gate Station and will be monitored during large flow periods. If there are indications of abnormally high or low-pressure, the regulator and the auxiliary equipment must be inspected and the necessary measures employed to correct any unsatisfactory operating conditions.

## 8.9 TESTING OF RELIEF DEVICES (192.743)(a)(b)(c)

Pressure relief devices located at the purchase points pressure limiting stations and pressure regulating stations must have sufficient capacity to protect the facilities to which they are connected. City of Carencro pressure relief devices except rupture disc shall be tested in place, at intervals not exceeding 15 months, but at least once each calendar year to verify that the relief devices have enough capacity to limit the pressure on the facilities to which it is connected to prevent exceeding the MAOP. On a gas distribution system that has an MAOP of 60 psi gage or more, the pressure may not exceed the maximum allowable operating pressure plus 10 percent or the pressure that produces a hoop stress of 75 percent of SMYS, whichever is lower. On a system that has an MAOP of 12 psi gage or more, but less than 60 psi gage or less, the pressure may not exceed the maximum allowable operating pressure plus 6 psi.

When calculations are used to determine if a device has sufficient capacity, the calculated capacity must be compared with the rated or experimentally determined relieving capacity of the device for the conditions under which it operates. After initial calculations, subsequent calculations need not be made if the annual review documents that parameters have not changed to cause the rated or experimentally determined relieving capacity to be insufficient.

The Gas Operator shall confirm that the capacity of the relief valve is equal to or greater than the full open capacity of the regulator. The relief valve must have capacity to limit the pressure to the distribution system to which it is connected so as not to exceed the maximum allowed operating pressure plus allowable buildup.

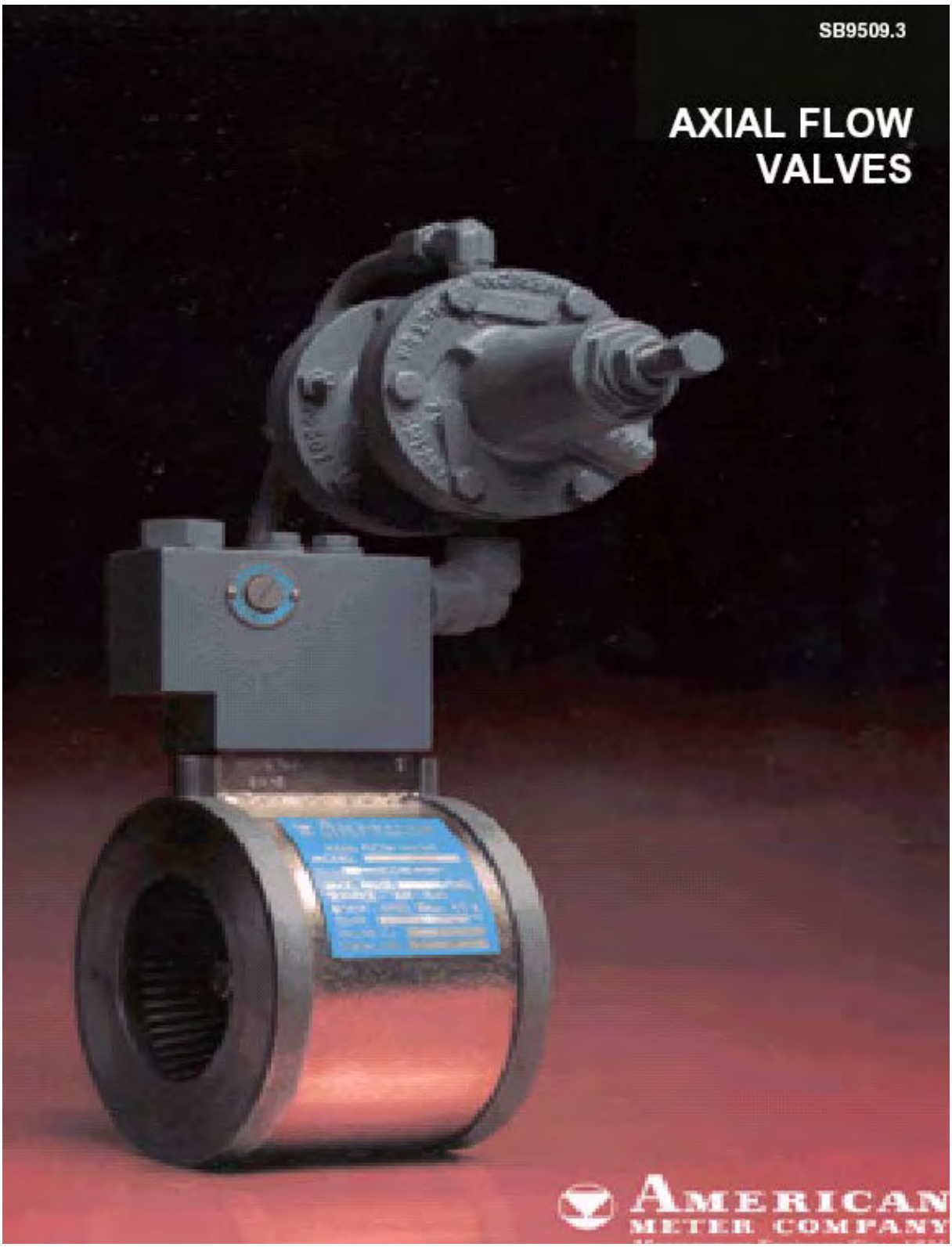
If the relieving device is of insufficient capacity for the regulator at operating pressure;

1. Determine if reducing the regulator capacity to match the relief valve assembly will supply sufficient gas to the distribution system. If it is found that the reduced capacity of the regulator is sufficient, reduce the regulator capacity. If not,
2. A new or additional pressure-limiting device must be installed to provide additional capacity required.

Inspections and testing of relief devices are to be documented and that documentation maintained for the life of the equipment. Reports of these inspections are to be submitted to the Gas Superintendent and made available for inspection by Pipeline Safety. On the following pages are Relief Valve inspection Procedures and Pressure Regulators used by the City of Carencro at its Regulator Stations.

| | **RELIEF VALVE INSPECTION PROCEDURE** | |
|---|---|---|
| | **Action** | **Information** |
| **1** | Check the stop valve ahead of the relief valve to insure that it is **locked open.** | DOT safety standards require the stop valve to be locked open so that gas con flow to the relief valve. |
| **2** | Close valve below relief valve and bleed off pressure on relief valve. | |
| **3** | Install test hookup and test gauge on test point of relief valve. | |
| **4** | Pressuring of relief valve is accomplished by using inlet pressure upstream of regulator to provide pressure for testing relief valve setting **OR**<br>If piping configuration of station is such that upstream pressure cannot be utilized,<br>pressure testing of the relief valve will be accomplished with nitrogen bottle. | |
| **5** | Loosen adjustment of normal setting so relief valve will open fully when valve below relief is open to check for full opening capability of relief. | |
| **6** | If relief valve does not perform properly, repair as necessary and test again for performance | |
| **7** | After performance test is satisfactory, set relief valve pressure to be sure that it will prevent pressure in the downstream system from exceeding the maximum operation pressure (MAOP) plus allowable buildup pressure of the distribution system, less buildup of relief setting so that capacity of the relief valve is at a wide open capacity and not at bubble set or pilot bleed of relief valve. | |
| **8** | After all test are completed and relief valve is acceptable, remove testing hookup. | |
| **9** | Place relief valve back into service. Open valve below relief valve. Make certain that valve-locking device is in place and valve is locked open. | |
| **10** | Make certain there is a weather cap on top of the relief valve and that it is in good working condition. | |
| **11** | Determine whether additional inspection or maintenance work is required as a result of the general inspection. | These may include internal inspections of:<br>• Restricting elements (valve, boot, seat, O-ring, etc.<br>• Loading element (spring, pilot)<br>• Measuring element (diaphragm, mechanical/electrical instrument) |

The following are typical of the pressure relief devices used by City of Carencro in their metering and district regulator stations throughout the gas distribution system.


SB9509.3
AXIAL FLOW
VALVES
AMERICAN
METER COMPANY

Instruction Manual
Form 5476

Type EZR Relief

March 2001

# Type EZR Relief Valve or Backpressure Regulator

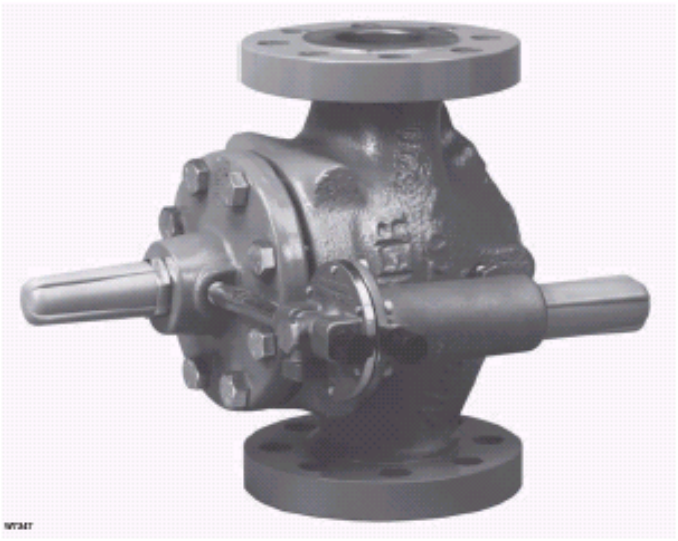


*Figure 1. Type EZR Relief Valve or Backpressure Regulator*

## Introduction

### Scope of Manual

This instruction manual provides installation, startup, shutdown, and maintenance procedures, and parts ordering information for the Type EZR relief valve or backpressure regulator with a 6358 Series pilot. Any accessories used with this relief valve or backpressure regulator are covered in their respective manuals.

### Product Description

The Type EZR pilot-operated, pressure relief valve or backpressure regulator is typically used in city gate and district stations as a relief valve for overpressure protection, or in commercial and industrial applications as a backpressure regulator. The diaphragm and plug assembly moves in response to the pilot loading pressure to control upstream system pressure. Force from the main spring provides downward pressure to keep the main valve tightly shut off.

### Specifications

Specifications for the Type EZR relief valve or back-pressure regulator are listed on page 2. The set pressure range for a pilot as it comes from the factory appears on the spring case. Other information for an individual main valve appears on the nameplate.

Patent Numbers 5,964,446 and 6,102,071
Additional Patents Pending

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## 8.10 VALVE MAINTENANCE (192.747)(a)(b)

Valves in the City of Carencro Gas Distributions System which may be necessary for the safe operation of the distribution system, known as Key Valves are inspected and serviced at intervals not exceeding 15 months, but at least once each calendar year. These key valves have been pre-selected by gas Operations and Maintenance personnel and are considered the most important gas valves in the distribution system. The inspection of these valves will include locating and visually examining the valve and valve box. Servicing of these valves include cleaning, greasing and operating by closing and opening the valve 1/4 turn. At the time of inspection, the valves should also be checked for leaks. Records of this inspection should include the date inspected, valve location, statement of service-ability and any discrepancies identified.

All valves that are found closed shall be checked out with the Operator of the gas distribution system. All closed valves shall be noted on annual valve inspection and maintenance reports. The correct valve symbols denote the operating characteristics of the valve and are essential to proper valve operation. Any valve found not having a stop will be noted on the valve inspection and maintenance report. Any valve found inoperable shall be reported to the Operator of the City of Carencro Gas Distribution System and immediate remedial action correct the deficiency will be taken or an alternate valve designated as a key valve.

Gas Maintenance Management has selected fourteen "**KEY VALVES**" throughout the City of Carencro Gas Distribution System. The following valves have been selected and are in the valve maintenance program.

1. Above ground valve at the University Purchase Point Station.
2. Above ground valve at the Prejean Road Purchase Point Station.
3. Above ground valve at the City Gate Station.
4. Butcher Switch Road
5. Kentwood Street
6. Gloria Switch Road
7. Birdsong Road
8. Arceneaux Road

### VALVE INSPECTION

Gas superintendent or designee shall witness the specific testing and maintenance activities that are required to be performed on each pressure regulating and pressure relief device during their annual inspections. The General Manager or designee for City of Carencro verifies that the individual performing the regulator station inspection is qualified to perform these inspections in accordance with 49CFR 192.805, Operator Qualification Program.

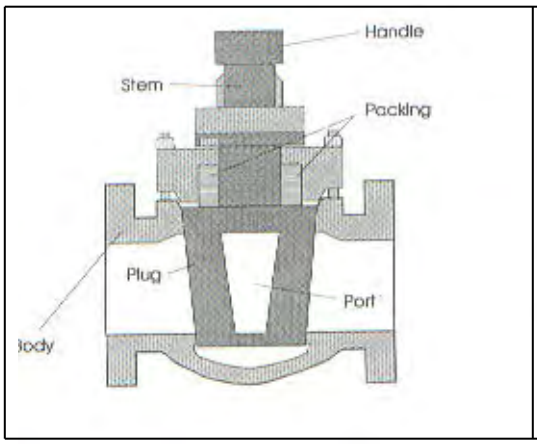
| VALVE INSPECTION AND MAINTENANCE PROCEDURE | |
|---|---|
| **Action** | **Information** |
| **Unlock Gate to Station.** (if applicable) | Regulator Station must be locked at all times to prevent anyone from entering the stations not authorized |
| While the station is in operation, Inspect all above ground piping, valves, regulators, meters, relief valve, vents, vent stack for atmospheric corrosion and possible damage and document that inspection. | Use the City's atmospheric corrosion inspection sheet or similar atmospheric inspection report forms. |
| Locate all valves in the station on all legs of piping and verify that if a locking device is attached that it is for proper operation. | There may be some valves in the station that are locked open and some that are locked closed. |
| Ensure that all valves that will be needed during the course of the inspection are in the correct position - either open or closed. | Generally those valves in the active leg are open and those in the "standby leg" are closed. |
| Check around each valve, pipe joint or other apprentices for gas leakage | If you find leakage, note the valve for repair. |
| If any valves are located below ground that are considered "Key Valves", verify that the manhole lids or valve box covers for proper fit and support. | This helps prevent safety hazards to the public |
| Verify that the valve key aligns through the valve box or guide onto the valve operating nut., | |
| If the valve key cannot be aligned to fit upon the nut, note for follow-up repair. | If this valve is considered a key valve and you cannot get the valve key on the valve nut to operate it, you must designate another valve as the key valve. |
| Lubricate all lubricating type valves in station with Type 55 Rockwell Valve-Tex #80 are other approved lubrication | Take caution not to over lubricate valve to avoid excess lubricant from entering the gas stream and damaging downstream regulators. |
| Turn all valves approximately 1/4 turn to verify that the valve being inspected is operable | This will verify that the valve is operable. |
| If applicable, inspect and maintain the valve actuator (operator). | Follow manufacturer's procedures. |
| Clean gears of dirt, paint, rust, or other foreign materials. | |
| Verify that valves that should be open are left **open** and valves that should be closed are left **closed**. | Generally those valves in the active leg are open and those in the "standby leg" are closed. |
| Document each valve checked whenever you inspect, operate, or maintain valves. | Make a note on the valve inspection if a valve needs inspection or service more than once a year. |
| Clean up any trash or debris on ground and lock gate to station if applicable | |

## VALVE TYPES

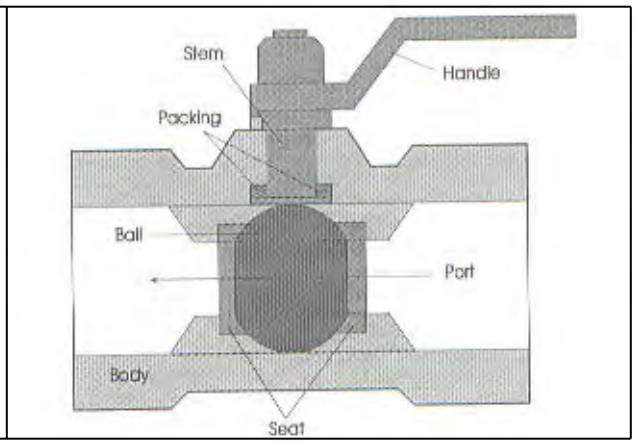
These are commonly used valves throughout the City of Carencro Gas Distribution System.

**Plug Valves** are ¼ turn valves that use a cylindrical or tapered plug to control flow. The plug turns inside the valve to allow more or less flow straight through a hole, called the port.

**Ball Valves** are ¼ turn valves that use a ball to control flow. They are very similar to plug valves, except the ball is round rather than cylindrical. Some ball valves are made of plastic. These do not need maintenance, but must be checked periodically for proper operation.



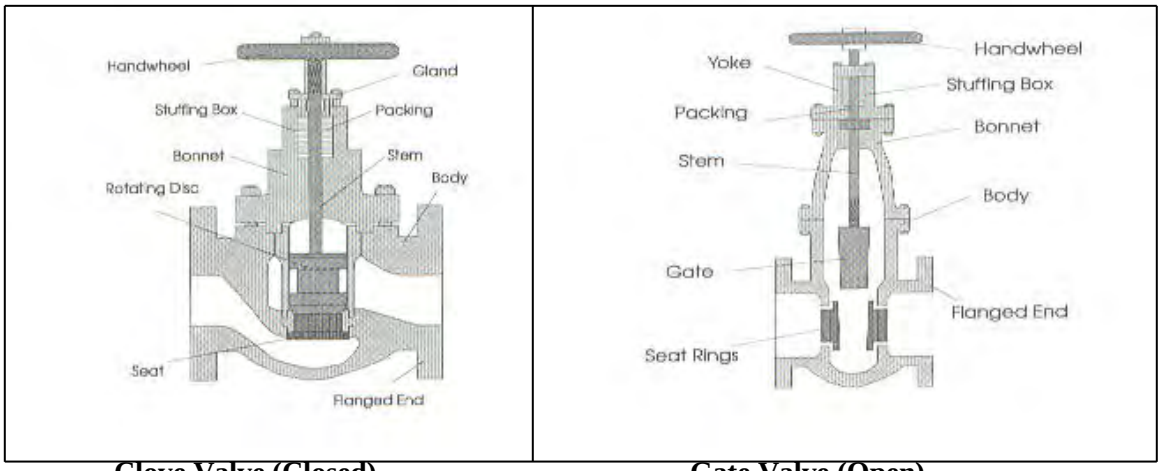

**Plug Valve (Closed)**




**Ball Valve (Open)**

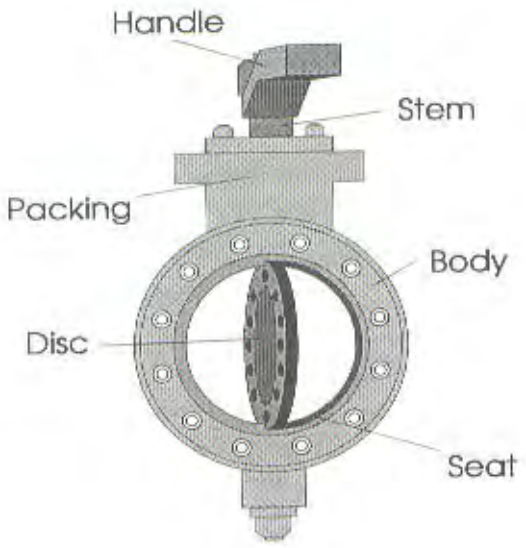
**Globe Valves** are multi-turn valves that operate by raising and lowering a horizontal disc off of or onto a seat below. The gas flow changes direction as it passes through the valve.

**Gate Valves** are multi-turn valves that operate by placing a vertical metal disc, called a gate, across the opening of a pipe with valve seats on both sides. The gate is raised to allow flow or lowered to stop flow. The gas flow goes straight through the valve.




**Clove Valve (Closed)** **Gate Valve (Open)**

**Butterfly Valves** are ¼ turn valves that have a disk that turns inside the body of the valve to control flow. They are similar to gate valves (see Figure 6), except that in a butterfly valve, the disk turns rather than raising or lowering. Flow goes straight through the valve.




**Butterfly Valve (Open)**

**CITY OF CARENCRO**
**OPERATING AND MAINTENANCE MANUAL**

## VALVE MAINTENANCE RECORD

| VALVE LOCATION | INSPECTOR | VALVE CONDITION | DATE | COMMENTS |
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## 8.11 PREVENTION OF ACCIDENTAL IGNITION (192.751)

The City of Carencro has established policies that are intended to prevent the accidental ignition of natural gas. All gas maintenance personnel have completed the MEA Training and Qualification Modules, which include Module 102, "Potential Ignition Sources: Indoor and Outdoor". Gas alone without oxygen is not explosive, however when escaping gas is introduced to oxygen with concentrations between 4.5% and 14.5% it becomes explosive when in a confined space. The City of Carencro will reduce the hazard of fire or explosion by removing the source(s) of ignition in the presence of gas and providing a fire extinguisher.

Extreme caution should be taken when working around gas leaks to eliminate sources of ignition such as open flames, cigarettes, sparks from vehicle ignition, electrical switches, welding equipment and ***STATIC ELECTRICITY***.

Welding or cutting is generally not allowed on pipelines containing a combustible mixture. However, there may be occasions when welding is permitted on a gas line containing a combustible mixture. When this is required the utmost extreme caution will be taken to vent the combustible mixture above the work area so that if ignited the mixture will burn well above workmen's heads. Fire extinguisher(s) will be manned and positioned up wind from the work area. Warning signs will be posted in the area where work is in progress.

Static electricity is extremely dangerous, particularly when working with polyethylene piping systems. Static charges build up on PE piping and when a gas line is cut or broken, the static charge can and in some cases have caused ignition of gas. It is extremely important when working on polyethylene piping to wrap soaking wet rags around the piping on each side of a cut or where a cut is to be made on the pipe allowing the rags to drag or make contact with the ground. Any time repairs are made to gas distribution piping that is leaking; fire extinguisher shall be present and manned by either fire department personnel or City of Carencro maintenance personnel. Warning signs will be posted in the area where work is in progress. Static electricity is discussed further and includes notices from polyethylene pipe manufacturers in Section 4.2 of this Operation and Maintenance Manual.

The City of Carencro gas maintenance personnel take steps to minimize the danger of accidental ignition of gas in any structure or area where the presence of gas constitutes a hazard of fire or explosion, including the following:

- When a hazardous amount of gas is being vented into the atmosphere or open air, each potential source of ignition must be removed from the area and a fire extinguisher on location.
- Gas or electric welding or cutting shall not be performed on pipe or on pipe components that contain a combustible mixture of gas and air in the area of work.
- Operator shall post warning signs, when applicable. Operator shall cut off section of distribution system as needed. If needed operator shall contact Fire Department for safety. If needed operator shall contact Police Department to reroute traffic.

## 8.12 CAST IRON MAINS CAULKED BELL AND SPIGOT JOINTS (192.753)

The City of Carencro has three (3) miles of cast iron mains with steel services. When cast iron piping is subject to greater than 25 psi, each cast iron caulked bell and spigot joint must be sealed with:

1. A mechanical leak clamp; or
2. A material or device which:
   i. Does not reduce the flexibility of the joint;
   ii. Permanently bonds, either chemically or mechanically, or both with the bell and spigot metal surfaces or adjacent pipe metal surfaces; and,
   iii. Seals and bonds in a manner that meets the strength, environmental, and chemical compatibility requirements of §192.53(a) and (b) and §192.143.

For gas distribution systems with cast iron piping where the caulked bell and spigot joint is subject to pressures of 25 psi gage or less and is exposed for any reason must be sealed by a means other than caulking.

## 8.13 PROTECTING CAST IRON PIPELINES (192.755)

Should any segment of cast iron piping in the City of Carencro Gas Distributions System become disturbed, that segment of piping will be protected, as necessary, against damage during the disturbance. The disturbance may be caused:

1.) Vibrations from heavy construction equipment, trains, trucks, busses or blasting; impact forces by vehicles; or earth movement.
2.) Impact forces by vehicles
3.) Earth movement
4.) Apparent future excavations near pipeline
5.) Other foreseeable outside forces which may subject the segment of the pipeline to bending stress.

When any of these activities occur adjacent to any cast iron piping the City of Carencro will as soon as feasible take appropriate steps to provide permanent protection for that segment of piping from unstable soil, landslides or other hazards caused by the disturbance.

# SECTION 9 - GAS DISTRIBUTION PIPELINE INTEGRITY MANAGEMENT (SUBPART P)

## 9.1 INTEGRITY MANAGEMENT PLAN (192.1001)

The City of Carencro has established an Integrity Management Plan in accordance with Subpart P, 49CFR192.1001. The Integrity Management Plan is in a separate binder, was established using the SHRIMP Users Guide and was written prior to August 2, 2011.

## 9.2 REQUIRED ELEMENTS OF THE IM PLAN (192.1007)

The Integrity Management Plan contains procedures for developing and implementing the operators understanding of the gas distribution system and identifies the pipeline design, operations and environmental factors necessary to assess threats and risks of the gas distribution system. The program will be reviewed periodically and revised as needed to incorporate additional risks and/or to remove existing risks associated with the operation of the gas distribution system. The program identifies outside threats such as corrosion, natural forces, excavation damage, other outside force damage, material, weld or joint failure (including compression couplings) equipment failure, incorrect operation and other concerns that could threaten the integrity of its pipeline. The plan evaluates the risks associated with the distribution pipeline and determines the relative importance of each threat and estimates and ranks the risks posed to the pipeline. The plan also identifies and implements measures to address the identified risks as well as providing performance measures, a method for monitoring results and evaluates effectiveness of the plan.

This plan also requires tracking of the number of hazardous leaks eliminated or repaired and categorized by cause as required by §192.703(c), the number of excavation damages and the number of excavation tickets received. The operator will report these items on the annual report.

## 9.3 MATERIAL FITTING FAILURE REPORTING (192.1009)

City of Carencro will report on an annual basis, information related to failure of compression couplings, excluding those that result only in non-hazardous leaks as part of the annual report required by §191.11. Repairs to the City of Carencro gas distribution system are required as leaks are discovered and based on leak severity. Any segment of piping that becomes unsafe must be replaced, repaired or removed from service. All hazardous gas leaks will be repaired immediately. In addition, other repairs are made such as wrapping or coating steel piping when wrapping on exposed sections of piping has been damaged or when painting of exposed piping is required. The information will include the location of the failure in the system, nominal pipe size, material type, nature of failure including any contribution of local pipeline environment, coupling manufacturer, lot number and date of manufacture. and other information that can be found on markings on the failed coupling. On-line submission is required unless an alternative reporting method is granted by PHMSA. This information is also to be reported to the Commissioner of Conservation, Box 94275, Baton Rouge, Louisiana 70804.

The following is the procedure for submitting your reports online:

1. Navigate to PHMSA's, Office of Pipeline Safety web site, Pipeline Safety Community, located at http://www.phmsa.dot.gov/pipeline.
2. Click the "**Online Data Entry**" hyperlink listed in the first column. This takes you to the OPS Online Data Entry and Operator Registration System.
3. Click the "**Mechanical Fitting Failure Report Form**" hyperlink under the Gas Distribution Systems subtitle. This takes you to the PHMSA portal login screen.
4. Enter your "Username" and "Password and click on "**Login".**
5. Create or modify record:
   a. To create a new fitting failure record, click "**Submit a Failure".** Enter the "Calendar Year" for which the report is being filed.
   OR

   b. To modify an existing fitting failure record; locate the record using the "**Search**" function. This will allow changes to data in Part C to be made. Once the record is located, click "**Create Supplemental**" and make the necessary changes.
6. Follow the detailed instructions below to complete Parts A, B, and C.
7. Click "**Save**" when finished.
8. A copy of the report can be printed or downloaded in either MS Excel or PDF format.
9. For distribution pipelines subject to the jurisdiction of a State agency pursuant to certification under 49 U.S.C. § 60105, send a copy of the report to Commissioner of Conservation, Box 94275, Baton Rouge, Louisiana 70804 no later than March 15th.

On the following pages is a copy of the **MECHANICAL FITTING FAILURE REPORT FORM**

**NOTICE: This report is required by 49 CFR Part 192.1009. Failure to report may result in a civil penalty not to exceed $100,000 for each violation for each day the violation continues up to a maximum of $1,000,000 as provided in 49 USC 60122.** **OMB No. 2137-0522** **Expiration Date 01/31/2014**

U.S. Department of Transportation
Pipeline and Hazardous Materials
*Safety Administration*

# MECHANICAL FITTING FAILURE REPORT FORM FOR CALENDAR YEAR 20___ FOR DISTRIBUTION OPERATORS

INITIAL REPORT ☐
SUPPLEMENTAL REPORT ☐

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0522. Public reporting for this collection of information is estimated to be approximately 1 hours per submission, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

## PART A - OPERATOR INFORMATION

1. NAME OF OPERATOR

2. OPERATOR'S 5 DIGIT IDENTIFICATION NUMBER
/ / / / / /

## DOT USE ONLY

3. HEADQUARTERS NAME & ADDRESS

Number and Street

City and County

State and Zip Code

## PART B - PREPARER AND AUTHORIZED SIGNATURE

(Type or print) Preparer's Name and Title

Area Code and Telephone Number

Preparer's email address

Area Code and Facsimile Number

Preparer's address:

Number and Street

City and County

State and Zip Code

Date Submitted

Authorized Alternative Reporting Submissions Only:

Name and Title of Person Signing

Area Code and Telephone Number

Authorized Signature

**PART C – MECHANICAL FITTING FAILURE DATA – (If the data about the "Manufacturer", "Part or Model Number", or" Lot Number" cannot be located with reasonable effort or if the data is unknown, enter "Unavailable"; do not leave data fields blank.)**

1) State in Which Fitting Failed: _____

2) Date of Failure:_____

3) Specify the Mechanical Fitting Involved: OStab ONut Follower OBolted OOther Compression Type Fitting_____

4) Specify the Type of Mechanical Fitting: OService or Main Tee OTapping Tee OTransition Fitting OCoupling ORiser
OAdapter OValve OSleeve OEnd Cap OOther _____

5) Leak Location: OAboveground or O Belowground;
O Inside or O Outside;
OMain-to-Main or O Main-to-Service or O Service-to-Service or OMeter Set

6) Year Installed: _____
7) Year Manufactured: _____
8) If Neither Year Installed or Year Manufactured is Known, Provide Decade Installed: _____

9) Manufacturer: _____
10) Part or Model Number:_____
11) Lot Number:_____
12) Other Attributes:_____

13) Fitting Material: O Steel O Plastic O Combination Plastic and Steel O Brass O Unknown O Other_____

14) Specify the Two Materials Being Joined:

a) First Pipe
Nominal Size: O1/4" O1/2" O3/4" O 1" O1-1/4" O1-1/2" O1-3/4" O2" O3" O4" O6" O8" or larger
Unit: O IPS or O CTS or O NPS

Material: OSteel OCast/Wrought Iron ODuctile Iron OCopper OPlastic OUnknown OOther_____
❖ If Plastic ⇨ Specify: OPolyethylene (PE) OPolyvinyl Chloride (PVC) OCross-linked Polyethylene (PEX)
OPolybutylene (PB) OPolypropylene (PP) OAcrylonitrile Butadiene Styrene (ABS) OPolyamide (PA)
OCellulose Acetate Butyrate (CAB) OOther ⇨ Specify: _____

b) Second Pipe
Nominal Size: O1/4" O1/2" O3/4" O 1" O1-1/4" O1-1/2" O1-3/4" O2" O3" O4" O6" O8" or larger
Unit: O IPS or O CTS or O NPS

Material: OSteel OCast/Wrought Iron ODuctile Iron OCopper OPlastic OUnknown OOther_____
❖ If Plastic ⇨ Specify: OPolyethylene (PE) OPolyvinyl Chloride (PVC) OCross-linked Polyethylene (PEX)
OPolybutylene (PB) OPolypropylene (PP) OAcrylonitrile Butadiene Styrene (ABS) OPolyamide (PA)
OCellulose Acetate Butyrate (CAB) OOther ⇨ Specify: _____

15) Apparent Cause of Leak:

OCorrosion
ONatural Forces — Was there thermal expansion/contraction? O Yes or O No
OExcavation Damage — Time excavation damage occurred? OAt time of leak discovery or O Previous to leak discovery
OOther Outside Force Damage
OMaterial or Welds/Fusions — Was the leak due to OConstruction/Installation Defect or OMaterial Defect or ODesign Defect
OEquipment
OIncorrect Operation
OOther — Explain:_____

16) How did the leak occur? O Leaked Through Seal or O Leaked Through Body or O Pulled Out

Record Identification Number <<This number will be auto-generated by PHMSA for each submitted mechanical fitting failure report.>>

| PART F - TOTAL NUMBER OF LEAKS ON FEDERAL LAND REPAIRED OR SCHEDULED FOR REPAIR | PART G - PERCENT OF UNACCOUNTED FOR GAS |
|---|---|
| _____ | Unaccounted for gas as a percent of total input for the12 months ending June 30 of the reporting year.<br><br>[(Purchased gas + produced gas) minus (customer use + company use + appropriate adjustments)] divided by (purchased gas + produced gas) equals percent unaccounted for.<br><br>Input for year ending 6/30_____ %. |

**PART H - ADDITIONAL INFORMATION**

**PART I - PREPARER AND AUTHORIZED SIGNATURE**

_____ (Type or print) Preparer's Name and Title

_____ Area Code and Telephone Number

_____ Preparer's email address

_____ Area Code and Facsimile Number

_____ Name and Title of Person Signing

_____ Area Code and Telephone Number

_____ Authorized Signature