Alabama Natural Gas Association
Gas Worker
Training & Assessment Program

PLAN C TRAINING TASKS

The topics on this Plan will be covered during training in the next 60 days. You will be evaluated on your possession of the knowledge, skills, and abilities covered in this Plan in approximately 60 days. You need to take personal responsibility to learn these things. Take your Plan with you as you work. Ask questions. Mark the things you have covered in class and in the field. Write in the date when each topic was covered. If you haven't covered a topic five days prior to the end of the 60-day period, ask the supervisor to review this with you.

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Read a Meter Index			
Review the process of reading a meter index with 4-dial and 5-dial meters of various size			
Practice reading the meter at every house and business – even if it is not necessary			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Meter Basics & Types of Meters			
A meter is the equipment used to measure the amount of gas used by the customer. It is the mechanism that allows the company to accurately bill the customer.			
Our company uses a variety of sizes and types of meters to meet customer demand. The size and type of meter used depends on the customer load (btus/gas use/number of appliances on gas) and line pressure. Future expansion (plans for additional gas use in the future) is also a consideration when choosing a size and type of meter. Thus, it is very important to talk with the customer and understand their current situation and future needs when setting a meter. Typically, someone other than the Gas Worker has this conversation. However, sometimes, the Gas Worker becomes aware of information that was not provided to a supervisor or marketing personnel in a prior conversation. For example, the customer might say, "Yes, we think we are going to add a generator next fall because our neighbors just put one in, and they love it."			
Rotary Meters – High demand, varying flow - Find in use at restaurants, big businesses, farmhouses, very large houses - Pressure – High			
Turbine Meters -High velocity, high demand, constant flow - Find in use at custody transfer, hospital, large commercial and industrial - Pressure – High			
Ultrasonic Meters – High velocity, high demand, high flow, has a transducer - Find in use at residential, commercial, industrial - Pressure - Varies			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Diaphragm Meters – residential and small commercial, works digitally - Find in use at residential - Pressure – Low			
Orifice Meters – constant changing velocity - Find in use at industrial customers, gate stations, border stations - Pressure – High			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Regulator Basics & Types of Regulators			
A piece of equipment that controls the amount of gas that goes from the gas line to the customer (residential, commercial, industrial). It is also called a pressure reducing valve. The regulator does this by maintaining a constant/set pressure.			
Some regulators have a built in relief. A relief is a vent or escape for excess pressure downstream. The relief allows the escape of excess pressure, it works in the case of a failed regulator, it provides a way for venting when trash is in the line blocking.			
Our company uses a variety of sizes and types of regulators based on pressure, demand, capacity, and safety concerns. All of these drive the selection of the regulator for a specific job.			
Most regulators have a pressure range so you can adjust the pressure downstream. It is important that you do not exceed the MAOP stated for that regulator. The MAOP is the Maximum Allowable Operating Pressure.			
Spring Operated • Common on residential and small commercial • Have a diaphragm • Typically have vents built in			
Pilot Operated • On industrial and gate stations • Have sensing lines • Have a body and a pilot (two separate parts) • Don't typically have a vent for bleed off overpressure			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
• Two can be installed in series for over pressure protection in the event one fails			
Different color caps on regulator indicate the pressure • Red caps are two pounds			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Repair Gas Leaks on Services			
Verify address matches work order.			
Make contact with customer, identify yourself, and review the purpose of the visit.			
Secure the truck and the work site with cones, signs, strobe lights, and flags as necessary.			
Put on proper PPE and get fire extinguisher out.			
Evaluate any threat to life or property and eliminate accordingly.			
Notify supervisor and applicable company personnel.			
Contact Emergency personnel if needed.			
If a leak is probable, approach the house from the corner. Houses blow out, not out at the corner.			
Communicate with customer if home. Do not call in advance. Do not ring the doorbell. Evacuate if necessary. Eliminate any ignition source (leave phone in vehicle, don't allow customer to crank car or turn on equipment).			
Call 811 for emergency underground utility locate request if excavating will be performed.			
Make sure all underground utilities are represented before any excavation is performed, if possible. Dig with discretion.			
Locate the utilities.			
Spot the other utilities if any are in the way.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Bar hole the service and test with the leak detector/ CGI. *Note: CGI is the only certified device to officially grade leaks.*			
Look for possible indications of a gas leak (e.g., dead vegetation, mold) or sources of recent disturbance to a gas line (e.g., excavation, construction work).			
Determine if gas service line should be squeezed off in a location away from the actual gas leak before excavating the leak.			
Depending on the size of the leak, dig over the hole with the greatest concentration of gas or best evidence of a gas leak (hole with greatest reading) *or* if a larger leak, dig on either side of that hole to squeeze off gas in a safe and efficient manner.			
Spot the gas service.			
Soap test the service for leak.			
Once leak is identified, determine the best strategy for repair based on location and type of pipe.			
Plastic			
• Apply static suppressant spray, soapy water, and/or grounding wires (any measures to stop static unintentional ignition sources.)			
• Squeeze off section with leak			
• Cut out leaking section			
• Clean and prepare pipe (chamfer, pencil sharpen) for repair			
• Replace with pre pressure tested new section of pipe			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
• Connect new section to existing pipe using stab fittings, amp/met fittings, electrofusion, butt fusion, or other.			
• Shut meter off and lock			
• Apply Gas to perform soap test.			
• Soap test fittings and squeeze point			
• Mark squeezed off section at squeeze point			
Steel			
• Tighten couplings/ Dresser Coupling			
• Check the saddle bolts to determine if they are leaking and replace if allowed			
• If bare steel, insert or run new service			
• If corrosion leak or damage to service, cut out section that is leaking for replacement (if possible – best option), use a wrap-around, or do a partial renewal			
○ Cut Out			
▪ Start at the saddle			
▪ Run the tap down until there is no gas			
▪ If no rundown in the tapping tee, use electrolysis cables for grounding (avoid sparking – potential fire source) (Jumper Wires)			
▪ Clean the section of pipe to be cut using file, isopropyl alcohol, paint scraper, etc.			
▪ Cut out the leaking section of the service line.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
▪ Replace with appropriate size steel pipe and couplings.			
▪ If using a steel Dresser (Style 90), use bonding wires to jump the current from each side to aid in location because the Dresser contains a rubber O-ring.			
▪ Wait for the welder to weld the new section of steel pipe into the existing service and allow it to cool.			
▪ Reapply gas for soap test			
▪ Soap fittings or welds to ensure no leaks.			
▪ Wrap, use mastic, wax tape, hot tape, tape coat 20, primer, and brace.			
o Wrap-Around/Repair Clamp			
▪ Clean & prepare pipe with file, wire brush, scraper, and hammer			
▪ Install wrap around on pipe			
▪ Tighten bolts			
▪ Check for leaks using soap			
▪ Put brace/blocks under the wrap around			
▪ Put on mastic, greyline tape, cheesecloth, wax tape, two-part epoxy, hot tape, tape coat 20, primer, and/or hot wrap.			
o Partial Renewal (See Insert Steel Services)			
Check bar holes again for gas level if necessary (if it is suspected that there could be multiple leaks), understanding that even after a repair is made the residual gas in the ground will register a reading.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Back fill			
Turn on meter or arrange for meter to be turned on			
Conduct relight of appliances			
Tag appliance(s) if necessary			
Landscape as appropriate to repair damage to yard.			
Communicate with the customer			
Recheck leak after repair according to company procedures to ensure no additional leaks.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Install a New Main			
Verify location matches work order.			
Make contact with customer (if parked on customer's property), identify yourself, and review the purpose of the visit.			
Determine the material needed and request from supervisor.			
Secure the truck and the work site with cones, signs, strobe lights, and flags as necessary.			
Direct traffic if necessary.			
Put on proper PPE.			
Verify a locate request of other underground utilities has been made, you have a valid locate number, and the other underground utilities have been located.			
Locate the utilities or ensure utilities have been located (check ticket to ensure locate date has not expired).			
Take picture/video of locates and anything else notable (existing damage).			
Spot other underground utilities in proposed route that may be in conflict.			
Depending on the size of the pipe either fuse pipe together or roll out the pipe.			
If installing Welded Steel main, set up supportive cribbing and prep pipe ends for welder to perform the welding process. Prepare the pipe ends by grinding with angle grinder to remove surface scale and establishing the appropriate bevel angle for the weld joint.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Inspect weld to ensure it meets company procedures and/or API 1104 welding code and have X-rayed if applicable.			
Jeep pipe with Jeeper to check for any holidays (missing sections of pipes coating) in pipes protective coating and repair as needed with wax tape, hot tape, tape coat 20, two-part epoxy, primer, or F1H1 Fusion Bonded Epoxy if boring.			
Wrap weld joint with Wax Tape, Hot Tape or apply F1H1 Fusion Bonded Epoxy (FBE) if boring.			
Install casing with vent pipe and appropriate spacers for pipe size if the main is to be placed under a state or county highway (if traffic and/or county requirements dictate).			
Trench, plow, or bore the ground to place the pipe.			
Note: If boring is appropriate, it may be done before the project begins to for increased speed and efficiency.			
If trenching:			
o Inspect trench bottom to make sure it is level to ensure pipe will be properly bedded on the bottom of the trench.			
o Inspect trench for large rocks, rocks with sharp edges or foreign debris that could damage the pipe or pipe coating.			
o Place pipe in the trench.			
o Cover the pipe with dirt.			
o Place the tracer wire and marking tape (plastic only) on top of the dirt.			
o Place a marker ball every 500 feet or line maker or GPS the main.			
If plowing or boring:			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
o Set pipe trailer to designated position.			
o Install appropriate attachment to plow, if directional boring or plowing attach weak link and mud plug to boring head.			
o Connect the pipe and tracer wire to the plow or boring head			
o Ensure all bands holding the pipe together are cut properly			
o Plow/Bore and pull the pipe and wire the designated length, taking care to ensure the wire does not break and that the direction bore rig is properly grounded.			
Note: If the run of the pipe needed exceeds the total length of pipe laid (i.e., pipe is laid in sections), pipe must be connected through fusion. If the pipe breaks before the job is completed, pipe will be tied in and electro-fused (or repaired in another manner) later. Pipe is laid in sections up to 500 feet. Follow company's procedure regarding using weak link.			
o Complete all tie-ins.			
o Shoot a pig to clean out all debris inside the pipe.			
o Place a marker ball or line markers every 500 feet or GPS the main.			
If installing No blo/ Tapping Tee, prepare the existing main (scrape/peel and clean) and connect tapping tee to the existing main.			
If installing Branch side tapping tee, prepare the existing main for installation of side tap and tapping valve and perform pressure test on the components.			
If installing full bore tee, prepare pipe for squeeze off tools, potential bypass and downstream pressure monitoring point.			
Determine where the poly valves will go.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Connect the valves to the tee.			
Connect the valves to the main.			
Put air on the line.			
Note: In order to test the line, use one of multiple strategies to prevent air from exiting the system. This might include putting butt or socket fuse caps on ends, butt fuse or electro-fuse a 2" transition, or another method.			
Use the service chart/test box/clock to perform shut in/pressure test following company guidelines.			
Bleed off air test.			
Put on appropriate fire retardant PPE as required before tapping and place fire extinguisher in appropriate location.			
Tap the main.			
Purge down the gas line and test with CGI/GMI/Rover.			
Squeeze off end of line or install valve.			
Connect cap to end of line:			
o Butt fuse or electro-fuse if at the end at an existing main			
o Polytap or hot tap if valve is necessary			
o If connecting to steel:			
▪ Use Muller tapping machine to stop off steel main in order to tie into plastic.			
▪ Use a Weld Steel (W.S.) Tapping Tee/Noblo and transition fitting to tie steel into plastic.			

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▪ If installing full bore tee, prepare and install stopple fittings for line stops for installation of full-bore tee			
▪ Put on appropriate fire retardant PPE as required before tapping.			
▪ If installing branch side tapping saddle, prepare and install branch side tapping saddle and full bore tapping valve and flange to make tap with tapping machine.			
▪ If making branch side tap perform pressure tests on these components to 1.5 times the operating pressure before the side tap is made.			
Remove Squeeze Off (if used)			
Mark squeezed off section at squeeze point (if squeezed off was used)			
If trenching, safe-in service line and tracer wire to ensure they remain uniform and together before backfill.			
Install valve boxes and back fill			
Bury the end cap at proper depth, backfill and place pipeline markers or GPS the main.			
If installing Welded Steel Main, install anodes and test stations, test station wires for cathodic protection and monitoring as required.			
Landscape yards as appropriate.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Insert Steel Services			
Discuss what personal protective equipment you would wear/use when stopping the flow of gas.			
Demonstrate the proper procedure for stopping the flow of gas.			
On a Plastic Service			
• Unscrew the cap			
• Run down the tap			
• *If tap is not accessible,* o Find the right size squeeze off tool o Ground the squeeze off tool o Use static suppression methods on service			
On a Plastic Main			
• Find the right size squeeze off tool			
• Ground the squeeze off tool			
• Use static suppression methods main			
On a Steel Service			
• Remove cap			
• Run down the tap/Remove completion plug			
• Insert proper size plunger and screw down plunger			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Procedure			
• Verify address matches work order.			
• Make contact with customer, identify yourself, and review the purpose of the visit.			
• Secure the truck and the work site with cones, signs, strobe lights, and flags as necessary.			
• Put on proper PPE and get fire extinguisher out.			
• Verify a locate request of other underground utilities has been made, you have a valid locate number, and the other underground utilities have been located.			
• Locate the utilities.			
• Spot the other utilities if any are in the way.			
• Spot the gas service.			
• Cut the meter off and lock (if it is still on).			
• Cut the gas off at the main.			
• Blow down and purge gas line.			
• Cut the service line at the tap.			
• Ream the old service line.			
• Install a pip/captain's hat (plastic insert) in the existing service to protect the plastic.			
• Insert the plastic line into the existing service.			
• Add service head adapter to the existing riser.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
• Set new anode less riser.			
• If the existing riser has an elbow at the bottom, cut out the old riser and add a new one (replace).			
• Add service/house/gas cock to the service head adapter/new riser			
• Pressure test the plastic service with test box.			
• Replace the tapping tee if needed.			
• Add an EFV at the tap.			
• Tie the service into the tapping tee.			
• Add gas to the line.			
• Purge air from the new service.			
• Use leak detection equipment (GMI, CGI) to ensure it is 100% gas.			
• Soap test for leaks.			
• Attach tracer wire to the old steel service (and attach to 1lb anode if used that is placed directly under the steel gas main line to jump the plastic pipe where the new line was placed).			
• Wrap exposed main with greyline tape, mastic/Roskote, wax tape, hair & jelly, hot tape, tape coat 20, primer, cheesecloth, and/or hot wrap.			
• Place blocks, wedges, or soil under the tap.			
• Turn on meter.			
• Conduct relight of appliances			
• Tag appliance(s) if necessary			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
• Install supportive devices in area were transition from steel to plastic are made and insertion of plastic pipe into steel pipe began to prevent undo stress on plastic pipe from the weight of dirt settling causing kinking or breaks.			
• GPS any exposed lines.			
• Backfill the hole.			
• Place an EFV tag on the riser.			
• Landscape the yard and road damage.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Tie In			
A tie in is connecting two pieces of pipe together to make one solid pipe.			
Discuss when you would perform a tie in.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Relocate Mains & Services			
Verify address matches work order.			
Make contact with customer, identify yourself, and review the purpose of the visit.			
Secure the truck and the work site with cones, signs, strobe lights, and flags as necessary.			
Direct traffic as necessary.			
Put on proper PPE and get fire extinguisher out.			
Verify a locate request of other underground utilities has been made, you have a valid locate number, and the other underground utilities have been located.			
Locate the utilities.			
Spot the other utilities if any are in the way.			
Depending on the size of the pipe either fuse pipe together or roll out the pipe.			
If installing welded steel main, set up supportive cribbing and prep pipe ends for welder to perform the welding process. Prepare the pipe ends by grinding with angle grinder to remove surface scale and establishing the appropriate bevel angle for the weld joint.			
If welded steel main is being installed, jeep pipe with pipe jeeper to check for any holidays (missing sections of pipes coating) in pipes protective coating and repair as needed with wax tape, hot tape, tape coat 20, primer, two-part epoxy, or F1H1 Fusion Bonded Epoxy if boring.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
If welded steel main is being installed, wrap weld joint with wax tape, hot tape, tape coat 20, primer, or apply F1H1 Fusion Bonded Epoxy (FBE) if boring.			
For a service, install casing and appropriate spacers for pipe size if the service is to be placed under a state or county highway (if traffic and/or county requirements dictate).			
For a main, install casing with vent pipe and appropriate spacers for pipe size if the main is to be placed under a state or county highway (if traffic and/or county requirements dictate).			
Trench, plow, or bore the ground to place the pipe.			
Note: If boring is appropriate, it may be done before the project begins to for increased speed and efficiency.			
Inspect trench to ensure the bottom of the trench is level and the pipe will be properly bedded on the bottom of the trench to avoid stress points.			
Inspect trench for large rocks, rocks with sharp edges or foreign debris that could damage the pipe or pipe coating.			
Place pipe in the trench.			
GPS any exposed pipe.			
Cover the pipe with dirt.			
Place the tracer wire and tape, if using (plastic main or service only) on top of the dirt.			
Continue the backfill.			
Test the line to ensure no leaks are present using company guidelines and specific situation to determine which test to use (e.g., air, nitrogen, hydrotest).			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Put air on the line (must be done *before* the test if conducting an air test, but after if conducting a nitrogen test or hydrotest).			
Use the service chart/test box/clock to perform shut in/pressure test following company guidelines.			
If welded steel main is being installed, inspect welds to ensure welds meet company procedures and/or API 1104 welding code and have X-rayed if applicable.			
Once the test passes, connect to the existing gas source.			
• Put on appropriate fire retardant PPE as required before tapping.			
• Butt fuse or electrofuse if at the end at an existing main			
• Polytap or hot tap if valve is necessary			
• If connecting to steel:			
o Use appropriate tapping machine to stop off steel main in order to tie into plastic			
o Use a weld tee tap and transition fitting to tie steel into plastic			
Test the new main with appropriate test to ensure no leaks are present.			
Use leak detection equipment (GMI, CGI) to ensure it is 100% gas.			
Apply static spray, soapy water, and/or grounding wires (any measures to stop static and avoid sparks)			
Squeeze off the test point and place end cap on end of main.			
Unless it is to be retired, mark squeezed off section at squeeze point.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Mains and services can be extended or retired.			
To retire the existing main, refer to Retire a Main or Service.			
To extend the existing main, refer to Install New Mains.			
To retire the existing service, refer to Retire a Main or Service.			
To extend the existing service, refer to Install New Service.			
Bury the end cap at proper depth and place pipeline markers.			
Take measurements for Service record and/or GPS relocated facility.			
Landscape yards as appropriate.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Repair Gas Leaks on Mains			
Verify address matches work order.			
Make contact with customer (if parked on customer's property), identify yourself, and review the purpose of the visit.			
Secure the truck and the work site with cones, signs, strobe lights, and flags as necessary.			
Evaluate any threat to life or property and eliminate all ignition sources.			
Notify supervisor and applicable company personnel.			
Contact Emergency personnel if needed.			
Call 811 for emergency underground utility locate request if excavation will be performed.			
Direct traffic as necessary.			
Depending on location and situation, communicate with customers if home. Do not ring the doorbell. Evacuate if necessary.			
Put on proper PPE and get fire extinguisher out.			
Make sure all underground utilities are represented before any excavation is performed if appropriate under the emergency conditions.			
Locate the utilities.			
Spot the other utilities if any are in the way.			
Bar hole and test the main with the leak detector. Check for migrating gas into surrounding utilities and/or property.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Determine if gas main should be valved off or squeezed off in a location away from the actual gas leak before excavating the leak.			
Depending on the size of the leak, dig over the hole with the greatest concentration of gas or best evidence of a gas leak (hole with greatest reading) *or* if a larger leak, dig on either side of that hole.			
Spot the gas main.			
Soap test the main for leak.			
Once leak is identified, take pictures of damage that caused the leak whether natural forces, third party damage or component failure for documentation			
Once leak is identified, determine the best strategy for repair based on type of leak, location of the main, type of pipe, pressure, and if it is a one-way or two-way feed. More experienced personnel on the scene will determine best strategy for repair.			
Plastic:			
• Apply static suppressant spray, soapy water, and/or grounding wires (any measures to stop static and avoid sparks)			
• Squeeze off section with leak or valve off.			
• If it is a one-way feed and a section of the main must be cut out, add a bypass and downstream pressure monitoring point to determine if minimum operating pressure was exceeded.			
o Add bypass saddle (bolt on, tapping tee/Noblo or electrofuse) to each side of the section of main to be removed.			
o Install gauge downstream of repair to ensure system holds pressure			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
○ Squeeze off on both sides behind the cutoff point			
• If the section of main is lost, physically cut off and lock all meters on the impacted main line.			
• Cut out the section of pipe to be removed			
• Clean the replacement pipe (clean with alcohol, file)			
• If butt fusion process is used to install the new segment of pipe, the length of new segment of pipe shall be determined, account for shave out distance and cut to this measurement.			
• If fittings are being installed, the takeoff measurement of those fittings must be accounted for before cutting the new segment to length.			
• Measure couplings to be used			
• Insert pipe and couplings			
• Connect pipe and fittings to existing main through electrofusion, butt fusion, or stab fittings			
• Remove squeeze offs and soap squeeze location for leaks			
• Mark squeezed off section at squeeze point			
• Check fittings for leaks using soap			
• Remove the bypass and gauges			
• Bed the couplings or place blocks under the couplings for support			
• Record all materials used and get location measurements of repair by using the nearest intersecting street and measurement from back of the curb or edge of pavement.			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
Steel:			
• Tighten couplings			
• Check the saddle bolts to determine if they are leaking and replace if needed (per company policy)			
• If bare steel, make temporary repairs and document for replacement			
• If a section of steel main must be cut out, the flow of gas may need to be stopped before work can be completed.			
• If corrosion leak or damage to main, use a wrap-around, repair clamp, split bell/M80/Plidco sleeve/overweld, or cut out section that is leaking.			
o Cut out			
▪ Clean the section of pipe to be cut using file, paint scraper, alcohol, etc.			
▪ Appoint a designated fire watch			
▪ Install jumper wires			
▪ Cut the section of pipe to be removed			
▪ Take exact measurement of segment to be replaced (e.g., account for weld joint root gap) for the welder to perform welding in of new segment.			
▪ Prepare the replacement pipe for welding and couplings by buffing and beveling			
▪ Replace with appropriate size steel pipe and couplings by welding or using compression couplings (Maxigrip)			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
▪ If Dresser couplings or Maxigrip fittings are used, install bonding wire to allow cathodic protection to bypass the Dresser couplings, Maxigrip couplings and plastic pipe replacement segment to continue maintaining CP and prevent possible isolated sections of steel main without CP.			
▪ Allow welded area to cool.			
▪ Soap fittings to ensure no leaks.			
▪ Bring up bonding wire and valve box to be able to locate main			
▪ Wrap, use mastic/hot tape/wax tape, and brace.			
o Wrap-Around/Repair Clamp			
▪ Clean & Prepare pipe with file, wire brush, scraper, and brass hammer			
▪ Install wrap around on pipe			
▪ Tighten bolts			
▪ Check for leaks using soap			
▪ Bring up bonding wire and valve box to be able to locate main			
▪ Put brace under the wrap around			
▪ Put on mastic, greyline tape, cheesecloth, two-part epoxy, hot wrap			
Cast Iron:			
• Tighten couplings			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
• Check the saddle bolts to determine if they are leaking and replace if needed			
• Pack the bell with lead and/or use Anacure and a screw plug to create a seal for holes in the cast iron.			
• If a section of cast iron main must be cut out, the flow of gas must be stopped before work can be completed (Maxigrip). If needed to prevent large outages, a plan to perform segment replacement in blowing gas (hot) will be carefully created and executed with appropriate personnel and materials.			
• If corrosion leak or damage to cast iron main has occurred, use a wrap-around, split bell/M80/stainless steel repair sleeve, or cut out section that is leaking (rare)			
o Cut out			
▪ Clean the section of pipe to be cut using file, paint scraper, alcohol, etc.			
▪ Cut the section of pipe to be removed			
▪ Prepare the replacement pipe and couplings			
▪ Replace with appropriate size plastic pipe and couplings using transition couplings or using compression couplings (Maxigrip)			
▪ Soap fittings to ensure no leaks.			
▪ Wrap, use mastic/wax tape/hot tape, tape coat 20, primer, and brace.			
o Wrap-Around			
▪ Clean & Prepare pipe with file, wire brush, scraper, and brass hammer			
▪ Install wrap around or sleeve on pipe			

Category & Topic	Discussed	Demonstration (Observed)	Field Demonstration (Participated)
▪ Tighten bolts			
▪ Check for leaks using soap			
▪ Put brace under the wrap around			
▪ Put on mastic, greyline tape, cheesecloth			
Check bar holes again for gas level			
GPS the section of main that is exposed.			
Back fill			
Once the leak is repaired and back fill is made, go to the furthest service away that was lost. Breakdown and bleed for 100% gas. Relight pilots and work from furthest point back to the leak site.			
If gas service was interrupted for any customers:			
• Communicate with the customer			
• Conduct relight of appliances			
• Tag appliance(s) if necessary			
Landscape to repair road damage			
Recheck leak after repair according to company procedures to ensure no additional leaks.			