penetrate the disbonded coating and corrosion shall take place even if the anode is within three (3) feet of the location. It is important to follow the manufacturer's surface preparation recommendation. Surface preparation is one of the most important factors in obtaining a great coating job.

4. The cad weld connections shall be coated in accordance with (Gas Standard *7.8.3 - Installation of Handy Cap for Coating Cad Weld Connections).*

## E. Coating Inspection

1. The Contractor shall furnish an approved electronic holiday detector (Jeep) for the purpose of locating defects in the pipe coating. All coating defects will be marked, repairs will be made and the pipe retested by the Contractor prior to lowering the pipe into the ditch.

2. The electronic holiday inspection should be performed in accordance with NACE RPO169-96, Section 5.22.3. Refer to the chart below for Holiday Inspection Instruments and Voltages based on pipe type.

3. Prior to lowering the pipeline, a detailed visual and electronic holiday inspection shall be performed on all construction projects where it is practical. On construction projects where it is not practical to perform an electronic holiday inspection, a detail visual inspection is satisfactory.

4. High voltage holiday detectors used for Coal Tar and Polyethylene Extruded Coat (X-Tru Coat) shall not be used for inspection of thin film coatings.

Mill Coated Pipe - Holiday Inspection Chart

| Coating | Inspection | Voltage Setting | Suitable Instrument |
|---|---|---|---|
| Thin Film F.B. Epoxy | Jeep and/or Visual | 1,500 – 2,000 Volts Maximum (100 Volts/Mil – 125 Volts/Mil) | Pipeline Inspection Model 700 or equal |
| Polyethylene Extruded Coat (X-Tru Coat) | Jeep and/or Visual | 8,000 Volts | Pipeline Inspection Model 700 or equal |
| Wax | Jeep and/or Visual | 10,000 – 12,000 Volts | Tinker Rasor Model E/P or E/4 pipeline Inspection Model 700 or equal |
| Coal Tar | Jeep and/or Visual | 10,000 – 12,000 Volts | Tinker Rasor Model E/P or E/4 pipeline Inspection Model 700 or equal |

## F. Handling and Storage of Coating Materials

1. The Purchaser will supply all coating and wrapping materials, unless specified in the plans.

2. The Contractor shall supply his/her own application equipment.

3. Coating materials consigned to the job shall be properly stored and guarded against theft and damage. Pipe wrapping materials shall be protected from the elements.

4. The Contractor shall be responsible for the handling and utilization of coating materials in his/her possession, and shall reimburse the Purchaser for damaged materials. Coating and wrapping materials shall be handled in such a manner as to prevent damage to the packages. No packages shall be dropped or thrown from the trucks. The packages must not be handled with hooks. Refer to procedure GD02.903-2 *Pipeline Coating Specification* for handling and storing of coated pipe, and usage of coating materials.

5. All primers should be stirred before use, to prevent settlement of their components. Care must be taken to ensure that dirt or moisture does not contaminate the primer before or during application. Primers that continue to show settlement after stirring or are contaminated shall be properly discarded.

## G. Field Coating

1. The Contractor shall clean the pipe and apply the pipe coating for field patching in all places on the pipe not mill coated, all places where connections have been made, and where the coating is damaged or defective. Refer to E – Coating Inspection in this section.

2. Materials used for the repair of coating defects shall include; wax compatible primer, wax tape, petrolatum tape_heat shrink sleeve, hot melt patch compound, or epoxy coating.

3. Since contact of coating materials with the skin or eyes may be irritating, consideration should be given to the wearing of gloves, long sleeved shirts, and eye protection during application.

4. Prolonged breathing of fumes shall be avoided. Coatings should be applied from an upwind position. When applying coatings in poorly ventilated areas, the proper type of respirator shall be used. Refer to Gas Standard *8.1.1 - Safe Breathing Mixtures and Signs of Asphyxiation*.

5. The Contractor shall repair all coating defects found during the visual or electrical inspections.

## H. Hot Melt Patch (3M Scotchkote Hot Melt Patch Compound 226P)

1. The repair of surfaces with less than two (2) square inches may be made by Hot Melt Patch Compounds, patching sticks or methods approved by Purchaser.

2. **To ensure good adhesion**, roughen the surface of the parent FBE coating using eighty (80) grit to one hundred twenty (120) grit sandpaper. Clean the surface and wipe away the sanding residue with a non-contaminating cloth.

3. Preheat the parent-coating surface using a non-contaminating heat source, such as portable hand-held propane torch. Heat should be applied in a manner that avoids burning or charring of the epoxy coating. Slight browning of the parent coating is acceptable, but charring or blistering is not. Avoid heat application directly to the patchstick while prewarming the coating surface.

4. While continuing to heat the FBE surface, occasionally draw the patchstick across the repair area until it leaves a residue. Then rub the stick in a circular motion and utilize the torch to help melt it and maintain the pipe coating temperature. Continue until the patch is smooth and has a thickness of at least fifteen (15) mils greater than the parent coating.

5. Allow the patch to cool before handling.

## I. Heat Shrink Sleeves

1. The joint coating over the regular butt weld pipe joints, at the option of Purchaser, shall be a heat shrinking expanded polyethylene sleeve or an epoxy coating.

2. The Contractor shall be required to furnish an approved type propane torch for the installation of heat shrinking expanded polyethylene sleeves as directed by Purchaser.

3. **The heat shrink material shall be installed in accordance with manufacturer's recommendations.** The pipe must be heated to temperature specified by manufacturer. Under no circumstances shall the heat shrink be installed on ambient temperature pipe.

## J. Wax Tape Coating Application (Procedure GD60.462 - *Applying Wax Tape Coatings for Below Ground Applications*)

1. Trenton #1 wax tape is now the preferred method for coating small sections of steel mains and steel fittings. Care must be given if this product is to be used in the vicinity of plastic pipe. Remove any primer that comes into contact with any plastic fitting/pipe with rag before backfilling the hole.

**NOTE: <u>This coating is only to be used for below ground applications.</u>**

2. Wire brush and scrape the surface clean of dirt, loose coating and loose rust. Insure proper PPE is used for this process.

3. Apply a thin film of Wax-Tape Primer. **If the surface is wet, cold or rusty, rub and press the primer to displace moisture to ensure adhesion. The temperature range for application is from $0^0$ F to $110^0$ Fahrenheit the use <u>of gloves are recommended to reduce the possibility of cuts during installation</u>.**

4. Wrap the Trenton #1Wax-Tape using a one (1) inch overlap. On straight pipe, apply slight tension to ensure contact with the surface. On irregular surfaces, allow slack so the tape can be molded into conformity. In either case, press and form the tape so there are no air pockets or voids under the tape. Also, press and smooth out the lap seams to ensure they are sealed. To facilitate installation on couplings, it is recommended that small pieces of the wax tape be cut to cover the studs or bolts/nuts.

5. For below ground pipes that are located in rocky soils, the use of a rock shield or select backfill should be considered.

6. The tape does not require curing or drying time, so it can be backfilled immediately after installation.

## K. Petrolatum Tape Coating Application (Densyl Tape)

1. Prepare surfaces by removing all loose scale, rust or other foreign matter in accordance to SSPC SP2 "Hand Tool Cleaning" or SP3 "Power Tool Cleaning" See Appendix "5-A". A high pressure water wash of 3,000 - 7,000 psi is also suitable.

2. Apply a thin film of Denso Paste, which serves as a primer.

3. Wrap the tape in a spiral fashion with a minimum 1" overlap. For severely corrosive environments, a fifty-five (55) percent overlap is recommended.

4. While wrapping, press air pockets out and smooth all lap seams.

5. For additional mechanical protection, an overwrap may be used to increase impact strength and electrical resistance.

6. For irregular surfaces such as valves, flanges, use of Densyl Mastic or Denso Profiling Mastic or an approved liquid epoxy with the proper surface preparation.

## L. Denso Protal (Epoxy)

1. The proper materials recommended by the manufacture must be used for blasting.

2. All surfaces to be coated shall be grit blasted to a near-white finish (SSPC SP-10 or NACE No. 2). Appendix "5-A"

**NOTE**: Near-white finish is interpreted to mean that all metal surfaces shall be blast cleaned to remove all dirt, mill scale, rust, corrosion products, oxides, paint and other foreign matter. Very light shadow, very light streaks or slight discolorations shall be acceptable; however, at least 95% of the surface shall have the uniform gray appearance of a white metal blast-cleaned surface.

3. Edges of the existing coating shall be roughened by power brushing or by sweep blasting the coating for a distance of one (1) inch minimum.

4. All contaminants shall be removed from the steel surface to be coated. Oil and grease should be removed in accordance with SSPC SP-1 using non-oily solvent cleaner (i.e. xylene, MEK, ethanol, etc.).

5. The Contractor shall check the surface profile depth by using a suitable surface profile gauge (e.g. Press-O-Film Gauge or equal).

6. Metal areas that develop flash rust due to exposure to rain or moisture shall be given a sweep blast to return them to their originally blasted condition before application.

a) Application

1) The surface shall have no condensation, precipitation or any other forms of contamination on the blasted surface prior to coating.

2) The substrate temperature range for application of Protal is 50° to 185° Fahrenheit. The substrate temperature must be a minimum of 5°F above the dew point temperature before proceeding with the coating operation. Ambient temperature may be lower than 50°F if the substrate is heated. Preheating may be accomplished with a propane torch or induction coil prior to application.

3) Protal shall be applied to the specified Dry Film Thickness (DFT) up to 40 mils using a brush, Denso applicator pad or roller. Wet film measurements shall be continuously performed to ensure close adherence to the thickness specification.

4) Mixing: Make sure the part A (Resin) and Part B (Hardener) components match in both material and size as specified on the containers. Mix the B component first, independent of the resin. Pour the contents into the part A (Resin) component. Mix for approximately two (2) minutes until a uniform color

is achieved making sure to scrape the bottom and sides of the container. Mixing should continue until there are no visible streaks showing in the mixture.

5) APPLICATION SHALL TAKE PLACE IMMEDIATELY AFTER MIXING. Pour the product onto the surface and spread down and around the surface in bands beginning from the leading edge of the existing coating to as far under the pipe as can be reached. Overlap the bands onto the existing coating a minimum of one (1) inch. The person applying the mixture shall use a brush to smooth out any obvious sags or rough edges, valleys, or drips. Special attention shall be given to weld buttons and bottom surfaces.

6) The thickness of Protal shall be checked periodically by a wet film gauge to insure the minimum wet film thickness specified. After the Protal has cured to a tack-free condition, the owner's representative and/or contractor's inspector should measure the film thickness by a magnetic gauge and notify the applicator of their acceptance. Notification to the applicator of any inadequately coated sections must be made immediately.

7) Over-coating, when necessary, shall take place within two (2) hours. The surface shall be roughed prior to application of the topcoat using 80 grit sand papers or by sand blasting.

b) Inspection/Testing For Backfill

1) The finished coating shall be generally smooth and free of protuberances or holidays. All surfaces shall have the required minimum Dry Film thickness. Inspection of hand application is best performed immediately after the application.

2) Backfill time shall be determined by the "thumb nail test." The thumbnail test is defined when one can no longer make a permanent indentation in the coating with his or her thumbnail.

**NOTE**: A full and/or chemical cure may not be achieved by backfill time. Therefore, in wet soils the coating will need a full chemical cure.

3) An acceptable field-test to check to see if the coating has a full chemical cure, a solvent such as Xylen, MEK or Toluene can be rubbed on to the coating. If the gloss/sheen is removed, the coating is not fully cured.

4) Spark testing shall be performed to ensure proper film thickness and for holiday inspection.

a) The high voltage, or spark test method, can be used to test coatings up to 7.5mm (300mils) thick.

b) This method is ideal for inspecting pipelines and other protective coatings.

c) Coatings on concrete can also be tested this way.

d) This technique is suitable for locating various types of coating of flaws. **Care is required on thin coatings**.

e) A power supply generates a high DC voltage, which is connected to a suitable probe, and an earth return is connected to the substrate. As the probe is passed over the coated substrate, a flaw is indicated by a spark at the contact point which sets off the alarm.

f) The voltage used for testing weld joints and field applications shall be equal to that used for testing the mainline coating in the field not to exceed one-hundred (100) volts per mil or a maximum of two-thousand (2000) volts for the typical twenty (20) mil minimum requirements.

## Appendix 5A

## Surface Preparation Standards

A. Steel Structures Painting Council (SSPC)

1. SP-1 Solvent Cleaning
2. SP-2 Hand Tool Cleaning
3. SP-3 Power Tool Cleaning
4. SP-4 Flame Cleaning
5. SP-5 White Metal Blast Cleaning
6. SP-6 Commercial Blast Cleaning
7. SP-7 Brush-Off Blast Cleaning
8. SP-8 Pickling
9. SP-9 Weathering Followed By Blast Cleaning
10. SP-10 Near-White Blast Cleaning

B. National Association of Corrosion Engineers (NACE)

1. NACE 1 White Metal Blast Cleaning
2. NACE 2 Near-White Blast Cleaning
3. NACE 3 Commercial Blast Cleaning

C. Surface Preparation Standards – Definitions

1. SSPC-SP-1 Solvent Cleaning - Removal of all detrimental foreign matter such as oil, grease, dirt, soil, salts, drawing and cutting compounds, and other contaminants from steel surfaces by the use of solvents, emulsions, cleaning compounds, steam or other similar materials and methods which involve a solvent or cleaning action.

2. SSPC-SP-2 Hand Tool Cleaning - Removal of all rust scale, mill scale, loose rust and loose paint to the degree specified by hand wire brushing, hand sanding, hand scraping, hand chipping or other hand impact tools or by a combination of these methods. The substrate should have a faint metallic sheen and also be free of oil, grease, dust, soil, salts and other contaminants.

3. SSPC-SP-3 Power Tool Cleaning - Removal of all rust scale, mill scale, loose paint, and loose rust to the degree specified by power wire brushes, power impact tools, power grinders, power sanders or by a combination of these methods. The substrate should have a pronounced metallic sheen and also be free of oil, grease, dirt, soil, salts and other contaminants. Surface should not be buffed or polished smooth.

4. SSPC-SP-4 Flame Cleaning - Removal of all loose scale, rust and other detrimental foreign matter by passing high temperature, high velocity oxy-acetylene flames over

the entire surface, followed by wire brushing. Surface should also be free of oil, grease, dirt, soil, salts and other contaminants.

5. SSPC-SP-5 (NACE 1) White Metal Blast Cleaning - Removal of all mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels. A White Metal Blast Cleaned Surface Finish is defined as a surface with a gray-white, uniform metallic color, slightly roughened to form a suitable anchor pattern for coatings. The surface, when viewed without magnification, shall be free of all oil, grease, dirt, visible mill scale, rust, corrosion products, oxides, paint, or any other foreign matter.

6. SSPC-SP6 (NACE 3) Commercial Blast Cleaning - Removal of mill scale, rust, rust scale, paint or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree specified. A Commercial Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, rust scale and foreign matter have been completely removed from the surface and all rust, mill scale and old paint have been completely removed except for slight shadows, streaks, or discolorations caused by rust stain, mill scale oxides or slight, tight residues of paint or coating that may remain; if the surface is pitted, slight residues of rust or paint may be found in the bottom of pits; at least two-thirds of each square inch of surface area shall be free of all visible residues and the remainder shall be limited to the light discoloration, slight staining or tight residues mentioned above.

7. SSPC-SP-7 Brush-Off Blast Cleaning - Removal of loose mill scale, loose rust, and loose paint, to the degree hereafter specified, by the impact of abrasives propelled through nozzles or by centrifugal wheels. It is not intended that the surface shall be free of all mill scale, rust, and paint. The remaining mill scale, rust, and paint should be tight and the surface should be sufficiently abraded to provide good adhesion and bonding of paint. A Brush-Off Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, rust scale, loose mill scale, loose rust and loose paint or coatings are removed completely but tight mill scale and tightly adhered rust, paint and coatings are permitted to remain provided that all mill scale and rust have been exposed to the abrasive blast pattern sufficiently to expose numerous flecks of the underlying metal fairly uniformly distributed over the entire surface.

8. SSPC-SP-8 Pickling - Removal of all mill scale, rust and rust scale by chemical reaction, or by electrolysis, or by both. It is intended that the pickled surface shall be completely free of all scale, rust, and foreign matter. Furthermore, the surface shall be free of unreacted or harmful acid or alkali, or smut.

9. SSPC-SP-9 Weathering Followed By Blast Cleaning - Weathering to remove all or part of the mill scale followed by one of the blast cleaning standards.

10. SSPC-SP-10 (NACE 2) Near-White Blast Cleaning - Removal of nearly all mill scale, rust, rust scale, paint, or foreign matter by the use of abrasives propelled through nozzles or by centrifugal wheels, to the degree hereafter specified. A Near-White

Blast Cleaned Surface Finish is defined as one from which all oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter have been completely removed from the surface except for very light shadows, very slight streaks or slight discolorations caused by rust stain, mill scale oxides, or light, tight residues of paint or coating that may remain. At least 95 percent of each square inch of surface area shall be free of all visible residues, and the remainder shall be limited to the light discoloration mentioned above.

DUKE ENERGY.

# GD150
# Section 6 - Installing Plastic Pipe

This specification covers the General Conditions and the Technical Requirements for the storage, handling, joining of plastic pipe and fittings, and the installation of plastic gas mains and associated appurtenances under the contract proposal or by using company construction forces. Mains and services covered by this specification will be used for the distribution of natural gas at a maximum pressure of sixty (60) psig. Piping covered by this specification is limited to a maximum nominal diameter of twelve (12) inches.

## A. Materials

1. The Purchaser will furnish the plastic pipe, fittings, valves, and appurtenances.

2. The pipe and fittings will be made of polyethylene, conforming to the Duke Energy Procedure GD215 - *Polyethylene Pipe and Fitting Specification*.

3. The pipe will be made available in coils or straight lengths. Valves for use in plastic systems will be either metallic or plastic bodied. Refer to Gas Standard *2.16.1 - Polyethylene Pipe & Tubing*.

## B. Handling Plastic Pipe

1. Pipe trailers shall be required by the Contractor for handling coiled pipe. Brecon does not have the equipment necessary to deliver 6 inch coiled pipe to the job site.

2. The Purchaser will make every effort to have the large diameter coils delivered to the Contractor's material holding area at the start of each project. If the Purchaser is unable to make these arrangements, it shall be necessary for the large diameter coils to be picked up at Brecon by the Contractor. The Purchaser will pay the Contractor for pickup and delivery in these cases. Refer to Gas Procedure GD60.250 - *Receiving, Handling and Storage of Polyethylene Pipe, Tubing and Fittings.*

   **COILED PIPE TRAILER SPECIFICATIONS**
   Single and/or Twin Axle Electric Brake Trailer for three (3) inch, four (4) inch and six (6) inch.

   **Coil Capacity Specifications**
   The coil dimensions of the current Performance Pipe (Driscopipe/Plexco) product that the trailer will need to be able to accommodate are:

| Size | Coil Footage | Weight Per Coil | Minimum Coil ID | Maximum Coil OD | Width |
|---|---|---|---|---|---|
| 2" | 500' | 315 lbs. | 51" | 78" | 13" |
| 3" | 315' | 422 lbs. | 68" | 96" | 15" |
| 4" | 500' | 1110 lbs. | 68" | 94" | 41" |
| 6" | 500' | 2040 lbs. | 84" | 120" | 50" |

The capacity of the trailer must be able to accept all current known coil sizes from all major manufacturers of two (2) inch, three (3) inch, four (4) inch and six (6) inch plastic pipe.

3. Loading System – The trailer will need to have some form of loading mechanism in which the trailer can be field loaded from a Brecon material truck at the job site or loaded at the pipe yard at the Brecon facility. If the trailer does not have a loading mechanism, then the Contractor should make provisions to have the necessary equipment available to safely load the coils without damaging the pipe.

4. Re-rounding/Taming Equipment – The trailer will be equipped with the necessary equipment to re-round the coiled pipe and remove the curvature conditions created in the pipe by the coiling process. Pipe should be able to lie flat in a trench when straightening is complete as well as not to cause additional stresses to the pipe when inserting.

5. Polyethylene pipe can be easily handled with forklifts or hydro-cranes. When unloading or loading with a hydro-crane, use wide belly slings or a spreader bar with a fabric sling to prevent damage to the pipe. When lifting, axial bending of the pipe can be minimized by using a spreader bar, this technique also helps protect the pipe ends from damage.

6. Pipe coils or straight lengths must never be dropped or rolled from the truck or trailer bed. This is particularly important when unloading pipe in cold weather. At lower temperatures, the pipe is stiffer and more susceptible to damage from impact.

7. Polyethylene pipe, tubing, and fittings should be kept clean. They should be stored in their original packing until ready for use.

8. Care must be exercised at all times to protect polyethylene material from fire, excessive heat, or harmful chemicals. Prevent contact with cleaning solutions, solvents, alcohol, etc.

9. Storage areas will be clean, level, and free of rocks or any other object likely to damage the pipe. The polyethylene pipe and tubing will be supported in a manner as to prevent deformation of the material.

10. All fractured, kinked, buckled, deep gouged, cut pipe or pipe contaminated by exhaust, oil, or dirt will not be used. (An injurious gouge is defined as one who exceeds ten (10) percent of the minimum wall thickness for each pipe size).

## C. Qualification of Joining Personnel

1. All personnel who perform joining of plastic pipe and fittings shall be qualified to federal and state code requirements, including but not limited to CFR Title 49, Subpart F: §192.285 Plastic Pipe.

2. A "Contractor Qualification Card" will be issued to the qualified applicant/contractor upon successful completion of all qualification tests. This card must be carried by the qualified applicant/contractor at all times when performing fusions for the Purchaser.

3. Only personnel trained and qualified in accordance with the Purchaser's written fusion procedures and carrying the Duke Energy's Contractor Qualification Card may perform fusions on plastic pipe and fittings. Re-qualification shall be conducted annually. Also, re-qualification is required if a person has a total of three (3) production joints that are found unacceptable during a 12 month period.

4. All qualification tests shall be performed with the fusion equipment that will be used in the construction of the future projects. All fusion equipment must be inspected and approved by the Purchaser before it can be used. All equipment must have a serial number or a tracking number stamped on it, this number shall be logged upon completion of all inspection tests.

5. The fusions required for qualification are: four (4) inch Butt Fusion, six (6) inch Butt Fusion, one (1) inch CTS Permaset Coupling, four (4) inch Electrofusion Coupling, four inch by one inch (4" X 1") CTS Electrofusion, Service Tee Fusion, one (1) inch Electrofusion Coupling, and any other plastic joining fitting as required.

6. All fusions shall be visually inspected by the qualified operator during and after joining. The new joint must be found to have the same appearance as a joint, or photographs of a joint, that is considered acceptable under that fusion process.

7. Each production joint test sample will be inspected by a destructive bend test.

8. Destructive bend testing shall be performed by a Purchaser approved qualified Inspector. Each test sample will be cut out of the pipe to be no less than one

foot on each side of the fusion joint. It will be dissected longitudinally into one (1) foot wide strips. The strips will be deformed by bending. Any voids, discontinuities or failures in the fusion area will constitute a failed joint.

9. Only personnel trained and qualified in accordance with the Purchaser's written procedures may connect plastic pipe and steel using a posi-hold bolted coupling.

**D. Joining Pipe, Tubing and Fittings** (Gas Standard *2.17 Plastic Joining)*

1. Plastic to plastic joints and the connection of plastic pipe/tubing to plastic fittings will be made by heat fusion, or polyethylene coupling. Only qualified personnel and equipment are permitted to join polyethylene pipe. **Connection of plastic to plastic with a metallic mechanical coupling is also prohibited.**

2. Butt fusion will be considered the primary method of joining longitudinal sections of main. Rotary scrapers will be required when joining four (4) inch and larger pipe in the ditch. Electro-fusion may be used at the discretion of the onsite Inspector. Electro-fusion couplings have been ordered for joining insertion or directional bored mains at intervals of five-hundred (500) feet. Bar clamps should be used to secure two (2) inch coiled pipe when joined by electro-fusion. Vice-grip clamps cannot be used when joining runs of plastic mains together.

3. Two couplings are required per Duke Energy Gas Standards when joining directionally drilled pipe. Personnel found joining pipe without the proper line up clamps and fusion equipment will have their fusion cards taken away. **NO SECOND CHANCES WILL BE GIVEN FOR TAKING SHORT CUTS WHEN JOINING PIPE.**

4. The approved electro-fusion systems are:

   - Innogaz,
   - Central Plastics,
   - Uponor,
   - M.T. Deason, and
   - Friatec. .

5. The Purchaser requires each fitting installed by a Contractor to be recorded on Duke Energy's construction print or Job Control Form. Approved electro-fusion clamps are required when making electro-fusion joints.

   Detailed procedures for joining plastic, pipe, tubing, and fittings are as follows:

   a) Butt Fusion ½" CTS-4" IPS (PE2406) (Refer to Gas Standard *2.17.1- Butt Fusion for Polyethylene Pipe, Tubing & Fittings)*

b) Electro-fusion Couplings and Reducers (Refer to Gas Standard *2.17.4 - Installation of Coupling-Type Electrofusion Fittings*)

c) Electro-fusion Service Punch Tees (Refer to Gas Standard *2.17.5 - Installation & Tapping of Saddle-Type Electrofusion Fittings)*

d) Butt Fusion 2"-8" IPS (Refer to Gas Standard *2.17.9 - Butt Fusion For 2"-8" Polyethylene Pipe and Fittings Using McElroy No. 28 Fusion Unit)*

6. Fusion equipment must be maintained in good condition and must be capable of producing sound joints when used in accordance with the manufacturer's instructions. Each piece of fusion equipment must be inspected and qualified by the Purchaser. Faulty equipment must be repaired or replaced.

7. Heater plates or adapters must be checked daily with a pyrometer for the correct surface temperature. The heater thermometer shall be used for reference only. Heater plates or adapters must be cleaned with a clean cotton cloth before making each joint.

8. All joints shall be inspected visually, and if there is any reason to believe that a joint is unacceptable, it shall be cut out and replaced.

**IMPORTANT: WHEN IN DOUBT, CUT- IT OUT**

Due to potential hazard of a failure, it is critical that all fusion joints are properly made. The Contractor's liability for any unacceptable fusion by visual examination or defect shall include the verification of the quality of all fusions on the specific project.

9. Production joints, selected by the Purchaser, may be cut out for testing by the Purchaser.

## E. Transition Fittings and Mechanical Couplings

1. The connection between plastic pipe and steel pipe may be made with a Purchaser approved transition fitting (Reference Gas Standard *2.17.20: - Transition Fittings - Steel Pipe to Polyethylene Pipe)* or a posi-hold bolted coupling (reference Gas Standard *2.17.30 - Steel(S) Pipe to Polyethylene (PE or PL) Pipe Connection Utilizing An IPS Pull-Out Resistant Bolted Coupling).*

2. The transition fitting is a specialized mechanical fitting designed to provide a connection between plastic and steel systems. The fitting is a device consisting of a short length of coated steel pipe with a prefabricated connection to a short length of plastic pipe. The steel end is attached to the steel system by butt welding, by being welded to a flange, or prefabricated with a flange and

connected to a flange. No other type of welding is allowed on the transition fitting. The plastic end is attached to the plastic system by heat fusion.

3. During the welding process, the transition connection and the plastic pipe must be protected from any excess heat generated. This is accomplished by wrapping the steel portion of the fitting with three turns of wet rags about two (2) feet from the area to be welded. Wrap additional wet cloths around the fitting. If more than three welding passes are needed to complete the joint, the weld should be allowed to cool for five minutes before continuing. **DO NOT REMOVE** the wet cloths and tape until at least ten (10) minutes after completing the weld.

4. The posi-hold bolted coupling is designed to provide for pullout resistance when properly installed. The steel pipe ends must be cleaned of the coating, oil, dirt, loose scale, and rust. On the plastic pipe end, the recommended insert stiffener must be installed. Only personnel qualified by the Purchaser may install mechanical couplings on plastic pipe.

5. Plastic pipe jointed to metallic pipe will be installed free of tension.

## F. Valve Installations

1. Valve installation shall include valve, pressure stems, and valve box. *Refer to Gas Standard 2.6.5: Plastic Ball Valve Installation and 2.6.3: Plastic Main Pressure Stem Installation.*

2. All valves in plastic systems must be installed below grade and be equipped with supports and valve boxes. The valve box must not transmit traffic loads or other loads to the valve.

3. On large diameter valves, three (3) feet of cover on the main may be inadequate. Main elevation should taper down to the valve location providing clearance between the valve and valve box. This is especially critical on street improvement work where adequate clearance from the top of the valve to the bottom of the road sub-base is necessary.

4. All plastic valves that are installed will be butt fused. A minimum three (3) foot pup piece must be butt fused on each side of the valve to permit use of electro-fusion couplings. The application of cathodic protection materials and/or repairing the coating to a steel valve shall be included as part of the installation of the valve.

5. All valve assemblies must be supported on undisturbed or well compacted soil to limit stresses and strains to the plastic pipe.

6. The Purchaser reserves the right to add valves and appurtenances not shown on the drawings. ***Payment will be bid price if available; otherwise, a change order will be required.***

## G. Tracer Wire

Tracer wire shall be installed on all polyethylene (plastic) gas main and services to facilitate future location of the buried distribution piping. Refer to Gas Standard *2.18.20 - Tracer Wire Installation On Plastic Pipe – Main Line and Services)*.

1. Material

   a) For direct bury installations, use number twelve (#12) AWG single conductor copper wire with 40 mil yellow polyethylene insulation.

   b) For directional drilled installations, use two (2) parallel strands of number eight (#8) AWG single conductor copper wire with forty (40) mil yellow polyethylene insulation.

2. Installation

   a) Tracer wire shall be placed along the pipe in a straight line (not wound around pipe) and secured to the pipe every five (5) feet with a minimum of three (3) overlapping circumferential wraps of three-quarter (¾) inch PVC electrical tape.

   b) The tracer wire shall be protected from damage during installation of the gas piping. All breaks or cuts in the wire or its insulation shall be repaired prior to burial.

   c) Tracer wire boxes shall be installed over the plastic pipe at intervals of five-hundred (500) feet or less and at all branch connections, elbows, and ends to provide access points for locating equipment. Installation locations should be chosen where possible damage to the boxes will be minimized.

   d) The tracer wire shall be installed to extend a minimum of two (2) feet above ground at all tracer box locations. At intermediate tracer box locations, loop (do not cut) the wire up through the tracer box to keep continuity.

   e) Attach the tracer wire to the tracer box lid and coil the wire back in the box.

3. Spliced Connections

   a) All spliced or repaired wire connections in the tracer wire system with three (3) or more wires shall be made using a wing nut wire connector and made waterproof using an approved buried service wire closure.

b) All two (2) wire splices shall be connected with silicone filled wire nuts. Only a one-half (½) inch of insulation shall be removed from the tracer wire so there is no exposed copper after the nut is twisted on.

c) Metallic round valve boxes shall be installed over the plastic pipe to provide tracer wire access locations at intervals not to exceed five-hundred (500) feet. The valve boxes shall be installed at branch fittings, tees, changes of direction, and plastic ends. Metallic valves boxes are used to facilitate location in the event they become buried.

4. Testing of Tracer Wire

a) The Gas Contractor will be required to conduct tracer wire conductivity testing to prove that newly installed tracer wire is intact.

b) Testing shall be conducted by authorized personnel using approved testing equipment and shall be supervised by the Contractor Inspector.

c) **Pay sheets will not be signed for main or service pipe segment installation until tracer wire testing is completed between access points and accepted by the Contractor Inspector.**

1) All costs for conductivity tests shall be included in the main or service installation item.

2) If the tracer wire is not electrically continuous between access points, the contractor shall, at their expense, replace or repair the wire as required.

3) Any replaced or repaired wire shall be re-tested for continuity and verified by the Contractor Inspector before the pay sheet is signed.

## H. Installation Methods

Acceptable methods of gas main installation are direct bury, insertion, directional drilling, boring and in limited situations, pipe bursting or splitting. The main must be installed in accordance with the specified installation method as shown on the construction drawing unless an alternative method is submitted to and approved by the Duke Energy Design Engineer.

Plastic piping will **not** be installed above the ground, in a joint trench with sewer, in vaults, river crossings, near steam lines, hot water lines or any other source of heat, and under any structures such as buildings, patios, carports, or breezeways.

Plastic pipe may be installed on a bridge with Gas Engineering approval and provided that it is:

- Installed with protection from mechanical damage, such as installation in a metallic casing;
- Protected from ultraviolet radiation; and
- Not allowed to exceed the pipe temperature limits specified in §192.123.

1. Direct Bury

a) The trench bottom shall be continuous, relatively smooth, and free of rock. Plastic piping shall be installed in such a way that shear, tensile, or compressive stresses resulting from construction, backfill, thermal contraction, or external loading are minimized.

b) Sufficient clearance, not less than two (2) feet, shall be maintained between the plastic piping and any sources of heat, such as steam, hot water, and foreign direct buried primary cables, to prevent the temperature of the plastic pipe from exceeding one-hundred forty (140) degrees Fahrenheit Changes in direction will be made with fusion elbows where the minimum bending radius of the plastic pipe must be exceeded. No fittings are permitted within three (3) feet of a bend.

c) The Contractor shall remove liquids from the bottom of the trench before the main is lowered in. Precautions shall be taken to prevent floating of the main, draining of water into the main, and the caving of trenches.

d) All trenches shall be visually inspected for sewer or septic facility damage. Visual inspection shall include examining both the trench and spoil for evidence of damage to sewer and septic facilities.

e) The main shall be laid to the established grade with the pipe resting directly on the bottom of the trench or undisturbed soil.

f) In the event of excessive rainfall and subsequent bad working conditions, the Purchaser may require the Contractor to postpone all operations until such time as the work can progress without excessive property damage.

g) The width of the trench at any point below the top of the pipe shall be sufficient to provide adequate room for filling and compacting the side fills. Minimum trench width may be utilized by joining the pipe outside the trench and lowering into the trench after adequate joint strength has been obtained. Care shall be exercised to prevent gouging and strain which may buckle or over-stress the pipe or joints.

h) The plastic gas main shall be installed with the amount of cover listed on the "issued" drawing.

i) Plastic pipe is flexible and will bend to conform to the trench lines. Excessive bending must be avoided. Do not exceed the minimum bending radius for plastic pipe. Refer to Gas Standard *2.18.10 - Polyethylene Pipe Bending Specifications.*

j) Mitered joints along with cut or altered fittings are prohibited.

k) When long sections of piping that have been assembled alongside the trench are lowered, care will be taken to avoid any strains which may over stress or buckle the piping or impose excessive stress on the joints.

l) Plastic pipe shall be laid and continuously supported on undisturbed or well-compacted soil to minimize shear stresses. It shall not be supported by blocking. The side fills must be compacted to help prevent the plastic pipe from being crushed, buckled, or deflected. Branch connections will be made using butt fusion tees, or other suitable fittings, approved by the Purchaser and specifically designed for that purpose.

m) The ends of the joined pipe or tubing will be closed water tight except while work is being done on that end.

n) In existing areas, the minimum vertical separation of any foreign utility including water and sewer piping and plastic piping shall be eighteen (18) inches in Butler County, Ohio and twelve (12) inches in all other areas, unless approval from Gas Engineering is given.

o) Plastic pipe will not be used to cross streams where buoyancy or crushing is a potential problem. The pipe shall be installed five (5) feet below the firm or established bed of the stream. All stream crossings must be protected from physical damage and flotation. Refer to Gas Standard *2.18.2 - Typical Stream Crossing Detail Polyethylene Pipe).*

2. Directional Drilling

a) Directional drilling is an accepted method for pipe installation and must comply with all the guidelines set forth in this specification. In cases where the contractor would like to directional drill instead of direct bury or the design calls for directional drill, the approval by the Gas Engineering Sponsor will be required if any of the following occurs: rocky conditions, parallel 3rd party utility within three (3) feet, a City of Cincinnati curb is within three (3) feet, or any Metropolitan Sewer or Clermont County Water or Sewer is within five

(5)feet. Refer to Gas Standard *2.18.43 - Weak Links for Pulling Polyethylene Pipe During Insertion and Boring Operations).*

b) The Gas Engineering Sponsor must approve directional drilling of any standard pressure main.

c) Directional drilling will require a profile indicating the location and depth such that appropriate data can be placed on the mapping system. The profile must be in the form of marking depths on the plan sheet approximately every fifty (50) feet.

d) Spot holes or locate holes for 3rd party utilities, under hard pavement for directional drill bores should be done with a vacuum truck to eliminate four (4) feet x two (2) feet restoration holes. The City of Cincinnati does require a one (1) foot cut back for small restoration areas.

e) The location and depth of all sewer mains, laterals and drain lines shall be determined and documented prior to drilling gas main to ensure there is no conflict between the proposed gas main and the existing sewer. A plan for locating sewer mains, laterals and drain lines must be submitted to Duke Energy and approved prior to the Contractor performing any drill work.

f) Acceptable methods for locating the mains, laterals and drain lines are using a camera or physically uncovering the mains, laterals and drain lines. If the Contractor chooses to use the camera method, it is required to:

   a) Determine the location and depth of the sewer mains, laterals and drain lines before drilling begins; and
   b) Confirm after the installation of gas facilities that no breach has occurred.

g) Sewer clean-outs may be installed on a case by case situation and acceptance will be determined by a Duke Energy representative. The Contractor must install a sewer tag on every clean out if the main or any portion of the service is installed by trenchless technology. Duke Energy will provide the tags.

h) When directionally boring on replacements or main extensions, one test hole for every one-hundred fifty (150) feet of bore will be required to verify location and depth of the facility.

3. Joint Trench

a) Plastic pipe and fittings may be installed with up to three (3) other utilities in a common trench, referred to as joint trench construction. In all cases there shall be a 6-inch separation between the plastic main and any other utility

line. Refer to Gas Standard *2.18.3 - Joint Electric, Gas, Telephone and CATV Installation.)*

b) The area between the gas main and other utilities shall be compacted bank run (with some rounded stone) or sand to ensure the continual required separation. Bank run, sand and spoil shall be compacted in accordance with Section 7 "Backfill" of this procedure or permitting agencies requirements. Vibratory compaction equipment is approved for use over plastic pipe. Impact compaction equipment is **not** approved for use over plastic pipe.

c) Rolling and grading shall be used to consolidate final backfill when the joint trench is outside the street rights of way.

4. Boring for Casing (KDOT)

a) The Contractor shall provide all necessary equipment to bore roadways and/or driveways in accordance with the Purchaser's construction drawings and specifications.

b) Jacking may be permitted with the agreement of the Design Engineer. All damaged main must be removed and must not be used. Any damaged coating must be repaired before acceptance. The Purchaser assumes no responsibility for failed attempts.

c) "Boring-With Casing" includes all excavation, hand or otherwise, required for placing the casing inside the bore including the bore pit. The bore is to be installed per design at the designated depth. The new casing must be positioned in such a fashion that no additional fittings will be required on the new main and that there will be no undue stress placed on the new main when installed. All casing joints must be welded per Duke Energy's welding standards to prevent water from entering the casing.

d) Casings:

1) In locations where metallic casings are required, the casing must be reamed and cleaned to the extent necessary to remove any sharp edges, projections, dust, welding slag, or abrasive material which could damage the plastic pipe during and after insertion.

2) Plastic pipe or tubing shall be inserted into the casing pipe in such a manner as to protect the plastic during the installation. Pushing the pipe in is preferred to pulling it in to prevent excessive tensile loading. When pulling, a weak link must be used. The leading end of the plastic must be closed water tight before insertion.

3) A protective inner sleeve will be used to prevent the plastic pipe from bearing on the end of the metallic casing. After insertion, the ends of all casings will be closed off with closed cell foam material or duct seal to prevent water and backfill material from accumulating in the casing.

4) Any portion of plastic pipe which spans disturbed earth must be protected by bridging, by compaction of the soil under the plastic pipe or by other means to prevent the settling of the backfill from shearing the plastic pipe.

5) Any portion of plastic pipe unsupported due to the removal of a section of the casing pipe must be supported with bridging or other means, so as to withstand the anticipated external soil loading.

e) Driving of pipe will not be permitted.

f) Tunneling shall be done only upon agreement with the Purchaser or where required by and in a manner as specified by the Purchaser or public authorities. The Contractor shall provide all adequate shoring for trenches and boxing for tunnels where necessary upon agreement with the Purchaser. The Contractor must have a competent person on site to ensure OSHA Shoring Regulations are being followed. Refer to Gas Standard *Section 12: Excavations*.

5. Boring for Plastic Pipe

a) The borehole size must be at least the next pipe diameter larger than the pipe size being installed.

b) When using a mechanical assist to pull plastic pipe through a bore hole, a "weak link" must be used between the pulling head and the pipe being pulled to protect the pipe from being over-stressed. Refer to Gas Standard *2.18.43: Weak Links For Pulling Polyethylene Pipe During Insertion and Boring Operations*. The Contractor must provide specifications to the Inspector when using a mechanical weak link.

c) A section of pipe will be brought beyond the exit hole and investigated for possible damage.

d) The borehole will not be used any time that the bore causes the pavement to hump.

e) Before a main is installed by boring or directional drilling, the location and depth of all existing utilities and sewer laterals must be determined. A plan showing the location of existing sewer laterals must be submitted to the Purchaser and approved prior to the Contractor performing any directional

drill work. Acceptable methods for locating the existing sewer laterals are by camera/sonde or by physically uncovering the lateral.

f) All bores shall be installed per depth listed on the "issued" drawing. If the depth is not listed, it must be assumed that a cover of 3 feet will be required.

g) All bores must be installed within +/-one (1) foot horizontally of the designed location unless waivers are authorized in writing by the Design Engineer.

6. Installation by "Insertion"

a) Insertion projects will require all customers to be back in service the same day.

b) When using a mechanical assist to pull new plastic pipe through an existing main, a "weak link" must be used between the pulling head and the pipe being pulled to protect the pipe from being over-stressed. Refer to Gas Standard *2.18.43 - Pulling Plastic pipe During Insertion and Boring)*. The Contractor must provide specifications to the Inspector when using a mechanical weak link.

c. Pipelines will be leak surveyed by the on-site Inspector in accordance with the Purchaser's standards.

d. The removal of segments of pipe associated with insertion and service reconnection activities must be removed from the job site and disposed of in an approved landfill.

DUKE ENERGY.

# GD150
# Section 7 - Main & Service Tie-Ins

## A. Contractor Responsibility

1. Duke Energy intends to perform all tie-ins with Duke Energy crews, however the Contractor may be required to perform tie-ins in certain situations. This shall require the installation and tapping of TD Williamson fittings, squeezing polyethylene mains and installing the appropriate saddles and making appropriate taps for connecting to cast iron mains. The Contractor shall be required to have the proper TD Williamson equipment, guillotine saws, pressure gages and pertinent equipment necessary to tie into 2 through 6 inch steel mains. All Contractors are required to have squeeze off equipment, pressure gages and pertinent equipment necessary to tie in 2 through 8 inch polyethylene and stopper bags for tying into two (2) through twelve (12) inch cast iron.

2. The tie-in shall include the preparation of any and all by-pass requirements, the installation of fittings, such as TD Williamson, excavation, preparing cast iron mains by installing appropriate saddles and making appropriate taps in accordance with the Purchaser's standards. The Contractor shall be responsible for the abandonment of the existing facilities, including purging and sealing the ends in accordance with the Purchaser's standards.

3. It shall be the responsibility of the Contractor to meet with the Inspector, prior to scheduling any tie-in work, to discuss the equipment and personnel necessary to perform the work. The Purchaser will provide pressure crews to assist on the tie-in and purging activities.

4. The time associated with separating the existing gas facilities and reconnecting to the new main will be paid on an hourly basis. Flag-persons, arrow-boards, and plates required for tie in work will be paid on a time and material basis. Duke Energy reserves the right to allocate work to company personnel at any time to provide assistance with the tie-ins, to insure completion in a timely manner.

5. Wipe tests will be performed by Duke Energy. If the contractor sees any liquid concentrate, the onsite inspector must be notified. Removal of any gas main, service line or houseline piping must be disposed of in a designated Duke Energy container. If not disposed of immediately, it must be protected from the weather until it is disposed of in the designated Duke Energy container.

## B. Service Installations

**NOTE**: The Gas Contractor shall be required to renew customer services from the gas main to the customer's service meter, as needed. Customer service lines are broken into two segments:

- The main-to-curb cock (M-C) portion, and
- The curb cock-to-gas meter (C-M) portion.

1. The Purchaser will provide training to the Contractor on the renewal of services by insertion and direct bury installation of meter sets, turn off, turn on and appliance light up. The Contractor shall be required to review company policies associated with spotting unacceptable meter locations and the identification of tin meters and mercury regulators. Safety procedures, grounding procedures and a review for sizing services will also be provided at the training session. There will be no charge to the Contractor for this training.

2. The Contractor may be required to renew services main-to-curb and curb-to-meter.

3. On all work when the main is replaced, the metallic (steel and copper) residential curb-to-meter services will be renewed.

4. Services that are polyethylene and pass the required pressure test will not be renewed and will be reconnected to the new main.

5. The minimum depth of services on customer owned property is 18 inches. The minimum depth on street right of way is the depth of the main or the local governmental requirements, whichever is greater.

6. The Gas Contractor is required to complete all associated Job Completion Forms (JCF's) with the service work. The completion of the JCF's is required within one day of the completion of the service work. JCF's which are not filled out correctly will be returned to the contractor for correction.

7. Gas meters may be relocated to the outside if the services or meters are found in an unacceptable location.

8. The Contractor may be required to rebuild the customer's meter sets associated with the renewal of curb-to-meter services along with associated meter and riser brackets.

9. The Contractor shall also be required to turn off and to re-light customer appliances in accordance with the planned replacement work and the Purchaser's approved procedures.

   a) The Contractor must contact the Inspector whenever any appliances are found to be unacceptable. Bad appliances will be referred to the Purchaser's Service Delivery Department and red tagged. The Purchaser will deal with the customer.

## C. Main-to-Curb (M-C) Service

1. The main-to-curb service replacements shall include excavating at the curb valve for reconnecting to the curb-to-meter portion of the service, and installing weld-o-let, service tee, excess flow valve when required (Reference Gas Standard 3.8.1 –

*Excess Flow Valves*), service piping, curb cock, cap, setting of the curb box to grade, air test, soft restoration and C-M tie-in.

2. Main-to-Curb services will be classified as either short-side M-C or long-side M-C. M-C short side services are less than fifteen (15) feet in length, regardless of the installation conditions. M-C long side services are fifteen (15) feet or longer in length and usually cross under roadways. It is possible to have all long side (crossover) services on a project. The M-C portion of the service lines must be installed at the depth of the main or as specified in street right of way or at the depth required by the local governmental agency, whichever is greater. Street improvement plans typically contain cross section sheets which should be used to determine the depth of services. If cross section sheets are not included on the available prints, it shall be the Contractor's responsibility to request the sheets from the Design Engineer before the installation of any services.

3. The use of split duck for shear protection on the electrofusion tee outlet has been discontinued. The service pipe shall be installed with a smooth, gradual transition from the service tee to the required service installation depth. Sudden elevation changes in the service pipe overstress the service tee and can cause it to fracture over time.

4. On some projects, it may be possible to reconnect the existing M-C service to the new gas main if the service is non-metallic and if the service passes the required pressure test.

5. All personnel must be trained and qualified in accordance with the Purchaser's procedures to connect service curb cocks.

6. Curb cocks should not be installed in the sidewalk without the inspectors' approval prior to installation.

7. All service holes located outside the pavement area are to be covered with three-quarter (¾) inch plywood with flasher barricades or snow fencing while left open and unattended.

8. When encountering a gas street lamp, the service to this will be considered M-C only and the actual connection to the lamp will be done by the Cincinnati Gas Light Company or other Duke Energy selected contractor.

## D. Curb-to-Meter (C-M) Service

1. Curb-to-Meter service replacements shall include turning on and off appliances, separating existing facilities for testing, excavating, air testing, rebuilding of the meter

set (including setting a new meter bracket and replacement of the meter as required), and re-lighting the customer appliances.

2. Renewed C-M service lines shall be installed at a minimum depth of eighteen (18) inches on customer owned property. Gas Contractors are to gas track their own service work, which includes all inside and outside meter sets in addition to soap testing. The inspection must be done by someone other than the installer. Every C-M service renewal or meter replacement must be gas tracked the same day it is installed. No leaks will be tolerated on inside meter sets, cards will be pulled as a consequence of not adhering to this requirement.

3. When renewing a C-M service by insertion, tracer wire must be attached from the curb cock to the street end of the casing and from the house end of the casing to the riser. This will facilitate locating of C-M services in the field.

   a) "Conversion" projects – where the C-M portion of the service is inserted and <u>has a metallic curb cock:</u>

      i. A tracer wire must be attached to the parent metal of the original service pipe and run up in the curb box.

      ii. At the riser, tracer wire is to be attached to the parent metal of the original service and the other end attached to the riser bracket.

   b) "Conversion" projects – where the C-M portion of the service is inserted and <u>is not in a straight line with the meter and has a plastic curb cock:</u>

      i. A tracer wire must be attached to the parent metal of the original service pipe and run up in the curb box.

      ii. At the riser, tracer wire is to be attached to the parent metal of the original service and the other end attached to the riser bracket.

4. "Conversion" projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators, vent piping and the possible removal of orifices.

5. "Replacement" projects where gas services must be converted from standard pressure to intermediate or high pressure will require the installation of regulators and vent piping.

6. If old style regulators with three-quarter (¾) inch vents are encountered, they shall be replaced with a new regulator (one (1) inch vent). The new one (1) inch vent pipe shall not be reduced to with three-quarter (¾) inch.

7. **Curb-to-Meter services that are polyethylene and pass the required pressure test will not be renewed.**

8. The Gas Contractor shall be required to replace tin meters and regulators associated with the renewal of curb-to-meter services. Duke Energy will train Contractor's employees at Duke Energy's cost on the policies associated with spotting unacceptable meter and house service line locations and the identification of tin meters and mercury regulators. Only Duke Energy personnel shall handle mercury regulators. Actual removal will require a forty-eight (48) hour notice before the removal can begin.

9. If the household service lines or meters are found in an unacceptable location, the meters may be relocated to the outside.

10. When moving remote meters to the outside of a building, the Contractor must reuse the existing meter and reattach the remote reader and verify that reads of the meter and the remote are the same. In Ohio, when moving meters outside, make sure to replace any non-temperature compensated meters with a temperature compensated meter.

**NOTE**: In Kentucky, a temperature compensated meter will be installed during the meter age change process.

11. The only approved methods of installation for C-M's without the acquisition of a waiver are direct bury and insertion. In the event that circumstances prevent installation by one of these two pre-approved methods, a waiver requesting a variance to install all or part of the C-M service via a trenchless technology must be requested from the Duke Energy Construction Supervisor. The contractor must obtain a signed copy of the waiver prior to renewing the service utilizing trenchless technology.

12. Large Service Renewal – The renewal of services two (2) inch and larger shall include turning on and off appliances, separating existing facilities for testing, excavating, air testing, rebuilding of the meter set (including setting a new meter bracket and replacement of the meter as directed by the Gas Inspector), and re-lighting the customer appliances.

13. Service Risers through retaining walls – Several communities have expressed concerns with service risers through walls (generally concrete retaining walls next to sidewalks). Any drilling of the C-M portion of the gas service through walls will require a waiver. All efforts should be made to install a C-M service under retaining walls. When this is not possible, contact needs to be made with the homeowner to grant permission to drill through the wall. No hole will be drilled in a retaining wall without the knowledge of the homeowner. For unusual situations, a waiver may be granted to bore under the wall. Listed below are the preferred options for walls six (6) feet and less in height:

a) Insert a one (1) inch PL service through the existing gas service, as long as the existing service is below ground.

b) For use on IP pressure systems and greater, insert a one-half (½) inch PL service C-M through the existing gas service, as long as the existing service is below ground. This option must be approved by the Duke Energy Gas Inspector. Refer to Appendix "7 - A" for guidelines and load requirements.

c) Drill a 1 inch PL service C-M under the wall. This may require digging a hole two (2) feet below the ground level on the customer side of the wall and shooting a missile under the wall.

d) As a last resort, hang the riser on the retaining wall and move the gas meter outside of the building, except in the City of Cincinnati where notification to the Job Sponsor must be made before any work is begun.

## E. Curb-to-meter (C-M) Service Trenchless Technology Waiver

1. The Contractor must notify the Duke Engineering representative at least 1 day prior to requiring the waiver. All underground drains and utilities must be either exposed or traced and marked prior to the arrival of the Duke Energy Representative.

2. Those drains that were not exposed will require a pre-bore locate as well as a post-bore video camera inspection as directed by the Gas Engineering representative. The house address should be included on the video and marked on the DVD itself with light scribe. See Section 10 - Sewer Location and Breach Prevention for greater detail.

3. The contractor's representative, who is responsible for locating and videotaping the underground drains, shall be required to sign his/her name on Duke Engineering's inspection document indicating they did what was required to protect the property owner's sewers and underground drains.

## F. Test & Relight

1. The Test & Re-Light work includes turning on and off the gas service, separating existing facilities for testing, air testing, re-connecting the meter set, and re-lighting the customer appliances according to Duke Energy approved procedures.

2. Old Normac or Robroy flexible risers shall be replaced with a new flexible riser before the pressure test and then relit after a successful pressure test.