

# PIPE BURSTING TECHNICAL SPECIFICATIONS

## 1.0 GENERAL

This section specifies the system, method, or process to include all labor materials, tools, equipment and incidentals necessary to provide for the complete rehabilitation/replacement of deteriorated pipe by the Pipe Bursting System. Pipe bursting is the construction technique of replacing an existing, underground pipe system in situ by simultaneously “bursting” the existing pipe and installing a new pipe in its place. Essentially, the process involves the use of a static “moling” device, suitably sized to break out the old pipe with flared plug that bursts the existing pipe. Forward progress of the “mole” shall be aided by the use of hydraulic static pull method. The replacement pipe is either pulled or pushed into the bore. The method allows for the replacement pipe size on size from 2-inch through 36-inch and/or upsizing in varying increments up to 36 inches.

## 2.0 QUALITY ASSURANCE

### 2.1 Certification:

The Contractor shall provide qualifications to the representative upon request evidence of competency and authority to perform pipe bursting. The qualifications shall at a minimum include the following:

### 2.2 Pipe Bursting Experience:

The Contractor shall have a minimum of two (2) years of experience in the pipe bursting business and a record of at least four (4) mile of pipe bursting using the hydraulic static pull method and pre-chlorination. The contractor has to be certified by the AWWA in pre-chlorination.

### 2.3 Pipe Bursting Certification:

The Contractor shall be trained by the pipe bursting equipment manufacturer in the use of the equipment for pipe bursting.

### 2.4 Pipe Bursting Patent:

The Contractor shall be licensed for the use of the pipe bursting technology patent.

### 2.5 Thermal Fusion Training:

The Contractor shall be trained by the thermal fusion equipment manufacturer in the use of the equipment for thermal butt-fusion of high-density polyethylene (HDPE) pipe.

### 2.6 Underground Utility License:

The Contractor shall be licensed by the State of Florida as a Certified Underground Utility Contractor.

### **3.0 MATERIAL SPECIFICATIONS**

#### **3.1 Pipe**

Pipe shall be high-density polyethylene (HDPE) of the specified SDR ratings. HDPE resin shall be PE3408 resin characterized by ASTM D3350. The HDPE pipe shall be easily identifiable with a minimum of one stripe integrally extruded longitudinally in the exterior of the pipe wall or be of a solid color according to the County color applicable to the service. Mains for gravity sewer applications shall be gray color for ease of viewing when televising.

#### **3.2 Fittings**

Fittings for pressure systems shall be ductile iron with a minimum working pressure rating of 100 psi using HDPE MJ adapters to transition from the HDPE pipe to the fitting. At locations where bends are required pre-cast thrust blocks shall be installed.

#### **3.3 Stiffeners Inserts**

Stainless steel stiffener inserts, ASTM 240, shall be used for all fittings and connections to HDPE pipe. Stiffeners shall be of SS 304, wedge-type design.

#### **3.4 Service Connections**

Service connection fittings for pressure systems shall be HDPE electrofusion type fittings with a minimum working pressure rating of 100 psi. Service saddles shall be self-tapping and sealing. Double-strapped ductile iron body service saddles may be used in lieu of electrofusion type.

### **4.0 EXECUTION**

#### **4.1 Materials Handling**

No materials shall be dumped, dropped, pushed or rolled into a trench. Pipe may be pulled longitudinally into the trench after fusion of the pipeline. Pulling of the main shall be accomplished by mechanical action during pipe bursting operations.

#### **4.2 Pipe Bursting**

Prior to commencement of the construction, the Contractor shall submit to the Contractee a pipe bursting plan which shall minimally include pit locations and schedule, service line replacement, bursting distances and directions, and service outage and reinstatement schedule.

Pipe bursting shall be accomplished using the hydraulic method. In general, the bursting operation shall be as follows:

- Post notices of service interruption and outages as indicated in the pipe-bursting plan.
- Isolate the existing system and excavate launch, bursting, and service pipes as indicated in the pipe-bursting plan.
- Construct placement service lines.
- Set up the bursting equipment in the bursting pit and insert the bursting rods or cable through the host pipe.

- Connect the bursting head to the main and the bursting rods or cable in the launch pit.
- Burst the existing main.
- Install new service connection fittings and connect new service lines.
- Flush the new main then connect the new main to the existing system; and
- Continue this series of operation to complete the full scope of burblings.

#### 4.3 Launching and Bursting Pit

Pits shall be strategically located along the alignment of the pipe to be burst to minimize the quantity of pits. The Contractor shall prepare a pit location schematic illustrating the planned pit locations and schedule for pit excavation, backfilling and restoration. The duration that pits are open shall be kept to a minimum. Pit locations shall consider locations of existing and proposed valves, hydrants, fittings, services, and isolating sections of the existing system to minimize service interruption to customers.

#### 4.4 Service Pits

Pits shall be required to install service connection fittings and reconnect services to the newly installed pipe.

#### 4.5 Service Line Replacement

The pipe-bursting plan shall include the schedule for replacing service lines and method for replacing lines (bursting existing service lines and /or moling new service lines).

#### 4.6 Bursting Distance and Directions

The Contractor shall include in the pipe bursting plan distances and directions of the bursts to be performed.

#### 4.7 Service Outage and Reinstatement

The contractor shall minimize service interruption to customer. Service outage shall be strictly limited to the hours of 8:00 AM to 6:00 PM, Monday through Friday. No service interruption shall be allowed fro 6:00 PM to 8:00 AM, Monday through Friday or at all on Saturdays, Sundays, or legal holidays. The pipe-bursting plan shall include the days and hours planned for service outage and reinstatement to each customer.

NOTE: If off hours bursting is anticipated, special permission must be obtained.

The Contractor shall coordinate with the Contractee and post notices to the customers a minimum of 48 hours prior to service interruption.

#### 4.8 Pit Contamination Prevention

Pits shall be kept as dry as possible and shall be excavated to at least one foot below the pipe invert to minimize the potential for contamination during connection of the new main valves, fittings, and services.

#### 4.9 Pipe Jointing

Sections of polyethylene replacement pipe shall be assembled and joined on the job site above the ground. Jointing shall be accomplished by the heating and butt-fusion method in strict conformance with the manufacturer's printed instructions. The Butt-fusion method for pipe jointing shall be carried out in the field by certified operators with prior experience in fusing polyethylene pipe with similar equipment using proper

jigs and tools per standard procedures outlined by the pipe manufacturer. These joints shall have a smooth, uniform; double rolled back bead made while applying the proper melt, pressure, and alignment. It shall be the sole responsibility of the Contractor to provide an acceptable butt-fusion joint. WHO shall make all joints available for inspection before the insertion. The replacement pipe shall be joined on the site in appropriate working lengths near the insertion pit.

4.10 Joining and Connections

Before joining and before any special surface preparation, surfaces must be clean and dry. General dust and light soil may be removed by wiping the surfaces with clean, dry, lint-free cloths. Heavier soil may be washed or scrubbed off with soap and water solutions, followed by thorough rinsing with clean water, and drying with dry, clean, lint-free cloths.

4.11 Cutting Pipe

Joining methods for plain end pipe require square-cut ends. Pipe cutting is accomplished with guillotine shears, run around cutters, and saws.

4.12 Cutting Branch Outlet Holes

Except for self-tapping saddle tees, hole cutting is required for field installed side outlet fittings. Polyethylene pipe hole saws shall be used.

4.13 Heat Fusion Joining

Heat fusion joining is the process where mating surfaces are prepared for joining, heated until molten, joined together, and cooled under pressure. All fusion procedures require appropriate surface preparation tools, alignment tools, and temperature controlled heating irons with properly shaped, non-stick heater faces. An open flame cannot be used for heating because it oxidizes the surface and prevents bonding. During joining, all heat fusion procedures require the mating components to be moved several inches apart to accommodate surface preparation and surface heating tools. All fusions shall be constructed in strict accordance with pipe and fitting manufacturers' recommendations.

4.14 Socket Fusion

Socket fusion shall be used with ½ inch through four-inch pipe and fittings.

4.15 Saddle Fusion

Saddle fusion outlets may be used for eight-inch and smaller outlets applied to twelve-inch and larger mains. Larger outlets for larger main sizes shall be factory fabricated.

4.16 Butt Fusion

Butt fusion joints shall be field constructed between pipe and fittings. Fusion may occur in the trench.

4.17 Electrofusion

Electrofusion is a heat fusion process where a coupling or saddle fitting contains an integral heating source. After surface preparations, the fitting is installed on the pipe, and the heating source is energized. During heating, the fitting and pipe materials melt, expand, and fuse together. Heating and cooling cycles are automatically controlled.

## 5.0 RECORD DRAWINGS

Services, fittings, fire hydrants and all other reconnections to the replaced pipes shall be identified and marked in the construction drawings by the Contractor. The Contractor shall be responsible for marking the construction drawings in reference to at least two fixed and easily found points. The Contractor shall submit to the Contractee record drawings within 15 calendar days from the date of completion of the job.

## 6.0 GRAVITY LINES PIPE BURSTING

### 6.1 Pre-Installation Video Inspection

It shall be the responsibility of the Contractor to video inspect the main prior to pipe bursting to assure that existing pipe conditions are acceptable for pipe bursting, and to locate all active service line connections. This inspection as well as the video inspection after the installation shall be paid for as per bid item. Contractor shall provide one copy of each video inspection to the Contractee.

### 6.2 Post-Installation Video of Completed Sections

The Contractor shall provide the Contractee a color video tape taken by a pan and tilt camera that pans 275 degrees and rotates 360 degrees for close up view showing the completed work, including the condition of the restored service connections. This shall be paid for as per bid item.

### 6.3 Bypassing Sewage

In wastewater applications, when required for acceptable completion of the pipe bursting, the Contractor shall provide for continuous sewage flow around the section(s) of pipe designated for pipe replacement. The pump bypass discharge lines shall be rigid of adequate capacity and size to handle flow, solid PVC with socket welds or HDPE butt-fused. Lay flat piping may be used when permitted by the Contractee. Prior to disassembling the discharge piping, the piping shall be flushed with clean water in its entirety. The cost for flushing operations and water shall be incidental to the bypass piping.

When bypassing conditions require overnight or non-working days operation, a standby bypass pump of the same size as the primary pump shall be on-site ready for emergency use in the event that the primary pump fails. Payment for the standby pump shall be in accordance with the pay item for bypass system.

### 6.4 Sags in Line

If pre-installation video inspection reveals a sag in the existing sewer that is greater than one-half the diameter of the existing pipe, it shall be the Contractor's responsibility to install the replacement pipe to the result in an acceptable grade without the sag. The Contractor shall take in necessary measures to eliminate these sags, as directed by the Contractee. Pipe replacement, digging a sag elimination pit, and bringing the bottom of the pipe trench to a uniform grade in line with existing pipe invert or by other measures that shall be acceptable to the Contractee. Payment shall be as per bid item.

#### 6.5 Sealing and Benches in Manhole

The replacement pipe shall be installed with a tight fitting seal with the existing or new manhole. A Fernco CMA Water Stop Gasket or approved equal shall be placed circumferentially on the replacement pipe and encased with cementitious non-shrink grout to prevent inflow at the manhole. The top half of the pipe within the manhole shall be neatly cutoff and not broken or sheared off, at least four inches away from the manhole walls. The channel in the manhole shall be a smooth continuation of the pipe(s) and shall be merged with other lines or channels, if any. Channel cross-section shall be U-shaped with a minimum height of half pipe diameter to three-fourths of the pipe diameter for fifteen inches and larger. The side of the channels shall be built up with mortar/concrete, as specified, to provide benches at a maximum of one in 12 pitch towards the channel.

The replacement pipe in the manhole shall be sealed as specified above before proceeding on to the next manhole section and all manholes shall be individually inspected for replacement pipe outfalls, benches and sealing.

Where excavations for the insertion of the replacement pipe are made between two manholes, the ends of the pipe will be cut smooth and square to the axis so that it can be joined in a workman like manner such that both ends meet and touch uniformly and continuously. A full circle repair clamp (Smith-Blair or approved equal) shall be used. Minimum clamp length shall be 24 inches.

#### 6.6 Sewer Service Laterals and Connections

Existing service connections shall be located before initiating sewer main replacement operations. Service laterals shall be reconnected to the new sewer line after replacement and before video inspection is completed. Any services remaining off line for an extended period of time, or any connections as deemed necessary by the Contractee to protect the customer, shall be bypass pumped until such time that they can be reconnected.

Connection of the new service lateral, green color (ASTM D-3034 SDR 35 PVC Pipe) to the new sewer main shall be accomplished by use of the watertight compression-fit service connection. The service connection shall be specifically designed for connection to the HDPE sewer main being installed, and shall be INSERTA TEE, as manufactured by Insert Tee Fittings, Inc., Hillsboro, Oregon, or an approved equal.

Surface materials to be removed for excavation purposes shall be replaced to the condition they were prior to excavation. Affected grassed area shall be sodded.

### **7.0 PIPE BURSTING OF PRESSURE MAINS**

#### Sewer Service Laterals and Connections

Existing service connections shall be located before initiating main replacement operations. Service laterals shall be reconnected to the new line after replacement, flushing and pressure testing is completed. For wastewater applications, any tie-ins remaining offline for an extended

period of time, or any connections as deemed necessary by the Contractee to protect the customer, shall be bypass pumped until such time that they can be reconnected. For bypassing requirements refer to Section 6.0 above.

Connection of the new services to the new main shall be accomplished by use of electrofused HDPE self-tapping saddles. All piping, fittings and accessories shall have a 100-psi minimum working pressure.

Surface materials to be removed for excavation purposes shall be replaced to the condition they were prior to excavation. Affected grassed area shall be sodded.

## **8.0 PIPE BURSTING OF POTABLE MAINS WITH PRE-CHLORINATED PIPE**

### **8.1 Pipe Pre-chlorination**

Pipe shall be pre-chlorinated and cleared for use in accordance with requirements specified herein. Given the essence of time for using a cleared pipe and placing it into service, the bursting plan shall include a schedule for testing, clearing, and installation of the mains. As part of the pipe bursting plan, the Contractor shall include which pipes will be provided on reels and sticks. Lengths and diameters of pipes on reels and sticks shall be included.

Pre-chlorination is the quality assurance technique required when replacing an existing potable water system in-situ by pipe bursting without a temporary bypass main. Pre-chlorination minimally includes pressure testing, chlorination, swabbing, and bacteriologically clearing a pipe for potable use prior to installation of new pipe. AWWA standard C651-99, Section 4.6.2, applies to “pre-disinfected” pipe.

The pre-chlorination method described below is consistent with the requirements of AWWA Standard C651, Section 4.6.

### **8.2 Chlorination**

Chlorination solutions used for disinfecting equipment and pipe shall contain one percent to five percent chlorine, as measured by weight. Acceptable solutions may be prepared from liquid chlorine (100% available chlorine by weight), sodium hypo chlorite conforming to ANSI/AWWA B300 (5% to 15% available chlorine by weight), or calcium hypo chlorite conforming to ANSI/AWWA B300, available in granular or five-gram tables (65% available chlorine by weight). Calcium hypo chlorite intended for swimming pool disinfections is strictly prohibited.

### **8.3 Disinfection of Equipment and Tools**

All tools and equipment used for pre-chlorination and pipe bursting that may contact pipe, service lines, or fittings shall be disinfected with a hypochlorous solution containing one percent to five percent chlorine, as measured by weight.

### **8.4 Preparing the Pipe (Coil or Sticks)**

An area to prepare the new pipe for pre-chlorination shall be of relatively impervious surface (asphalt, concrete, or stone) and free from visible contamination. When using coiled pipe, the coil shall be laid on its side to ensure expelling of all air within the coil.

8.5 Swabbing, Pressure Testing and Chlorinating

The pipe shall be assembled and tested in lengths not to exceed 1,200 lineal feet. A poly swab shall be inserted into the low end of the pipe. Instant-dissolve tablets, or equivalent, shall be inserted behind the poly swab. The quality of tablets shall be sufficient to develop a minimum available chlorine concentration of 25 mg/l. The pipe shall then be filled slowly with potable water to dissolve the chlorine tablets, propel the swab through the pipe and ensure all air is expelled from the pipe. The introduction of water into the pipe shall generate less than one foot per second velocity. Once the pipe swab is discharged from the high end of the pipe, a tapped watertight cap shall be placed on the high end of the pipe. Additional water shall be introduced into the pipe to ensure the pipe is completely full of water and all air is expelled. The pipe shall then be pressure tested as per the recommendations for testing HDPE pipe. The highly chlorinated solution shall be maintained in the pipe for at least 24 hours. After 24 hours, the pipe shall be drained, flushed and filled with potable water to expel the highly chlorinated solution.

At least one sample shall then be taken each day for two consecutive days from each end of the pipe. All samples shall be bacteriologically tested by a State certified laboratory. Consecutive samples shall be taken at least 24 hours apart. The maximum holding time of a sample prior to analysis shall be 30 hours.

8.6 Poly Swab

Poly swabs used for swabbing pipe shall be suitable for use in potable water systems and shall be as manufactured by Knapp Industries or equal.

8.7 Manifest

Once the required samples have been tested and found to be satisfactory, the pipe shall be stored hygienically with both ends sealed watertight. A manifest shall be affixed to the pipe stating the dates of swabbing, chlorinating, sampling and test results of the samples.

8.8 Timely Use of Pipe

The pipe shall be installed within 14 days of the first day of sampling. If it is not, then the pipe shall be re-sampled and tested for bacteriological purposes in accordance with the preceding procedures. On the day of intended use of the pipe, water shall be drained from the pipe. The pipe shall be connected to the bursting head and installed by pipe bursting.

8.9 The Second Method: Pre-chlorination Procedure for Rehabilitation of Existing Water Lines

All work involving the renewal of water lines using pipe insertion techniques shall be carried out as hygienically as practicable in accordance with applicable specifications, procedures, codes, regulations and laws of governing regulatory authorities, as applicable and the American Water Works Association with all reasonable steps being taken to avoid contamination of water supplies.

Inform the water provider immediately of any renal dialysis patients or other critical supplies which may be affected.

Where possible, the inside section of the replacement pipe shall be inspected for debris before any work commences and any visible matter removed.

The new length of main should be positioned and jointed on the surface, each end capped and charged with chlorinated water. A free chlorine residual of 25 mg/L should be maintained for a minimum contact time of 24 hours. Where coils are used, they should be laid on their side rather than in a vertical, making sure that air can escape, and charge slowly to ensure tablets (which must be the instant dissolve type) are evenly distributed. The ends of the pipe should be closed and sealed at all times and the disinfection/swabbing procedure repeated if a coil is cut and not used until the next day. Normally, the maximum period between emptying chlorinated water from a coil and subsequent laying/commissioning shall not exceed 2 hours.

Access holes should be kept dry as possible, the excavation being taken 12" below the pipe invert to prevent ingress of contamination.

The existing main shall be cut and capped at the access holes and the services disconnected. All fittings including the internal surfaces of the existing main, should be sprayed or rinsed with dilute solution of freshly prepared chlorox of 1-5%. This should be freshly prepared on site as dilute chlorox solutions will deteriorate after 1 week.

Approximately 1 hour before being laid, the length of main to be installed shall be drained of super-chlorinated water and capped. **NOTE:** The environment to which the chlorinated water is to be discharged shall be inspected. If there is any possibility that the chlorinated discharge will cause damage to the environment, than a neutralizing chemical shall be applied to the water to be wasted to neutralize thoroughly the residual chlorine. Where necessary, federal, state, provincial and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.

During the reconnection operation, all pipe work and fittings shall be rinsed or sprayed with chlorox solution (1-5% strength).

Once the main has been laid, it shall be chlorinated to 50 – 100 mg/L and stood for 3 hours or 300 mg/l and stood for 15 minutes before being flushed, swabbed, and commissioned.

**NOTE:** The discharge of large quantities of water from a main must be planned to avoid flooding or causing dangerous road conditions.

After thorough flushing, two consecutive acceptable bacteriological samples, taken at least 24 hours apart, shall be taken downstream by fully qualified rehabilitation staff that are involved in the valving operations. Where no pollution hazard has been present, the main can be returned to service prior to completion of bacteriological testing in order to minimize the time customers are without water. Where there is doubt, the affected section of main shall not be recommissioned until satisfactory bacteriological sample results have been obtained. If positive bacteriological samples are recorded, the water system and the appropriated Department of Environmental Protection District Office or appropriated approved County Health Department shall be notified immediately.

Only fully trained and certified personnel shall be allowed to undertake disinfection and piece-up operations involving main laying, fittings installation and all reconnections.

All samples, when taken, must have a maximum holding time of 30 hours.

Wherever practical, work should progress in such a way that location of the commissioned water slug is known and not distributed widespread throughout the system until the bacteriological sample is confirmed satisfactory.

#### 8.10 Service Connections

Existing service connections shall be located before initiating sewer main replacement operations. Replacement service lines shall be ¾", 1", 1-1/2", or 2" Endopure ENDOT polyethylene tubing conforming to specifications in AWWA C800 and AWWA C901. Existing services shall be reconnected to the new line after testing and replacement are completed.

Surface materials to be removed for excavation purposes shall be replaced to the condition they were prior to excavation. Affected grassed area shall be sodded.

Payment for replacement/reconnection of service laterals shall be at the unit price for each as outlined in the Bid Proposal and shall include all labor and materials, excavation, location of service, backfill, compaction, pavement removal and replacement, and sodding.

#### 8.11 Post-Installation Flushing

After installation of the pipe-by-pipe bursting, the pipe shall be flushed using potable water. Following, the pipe shall be connected to the existing system and service may be reinstated.

#### 8.12 Post-Installation Sampling

After activation of the pipe, at least one sample at each end of the new pipe shall be taken and bacteriologically tested for post-installation assurance of sanitary conditions of the pipe. Should a problem be realized, the new pipe shall be deactivated, re-swabbed and chlorinated. The maximum holding time of a sample prior to analysis shall be 30 hours.

#### 8.13 Prior to the commencement of construction, the water provider and Contractor shall notify the local regulatory authority (Florida Department of Environmental Protection, Approved County Health Department, etc.) having jurisdiction over potable water systems of the planned construction and submit copies of all satisfactory bacteriological test results to the local regulatory authority.

### **9.0 HYDROSTATIC TESTING OF POLYETHYLENE PIPELINES**

The maximum allowable test pressure shall 1.5 times the pipe rated operating pressure at the lowest point in the section under test or that of the lowest rated pressure component such as flanges, valves, fittings, etc. (i.e.: for a SDR 12 pipe rated at 100 psi the maximum test

pressure shall be 150 psi). The test section shall be completely filled with clean water. The venting of trapped air at high points may be necessary to purge air pockets. Concurrent with the pressure test, a visual inspection of the entire system being tested shall be conducted to insure complete integrity of the system.

Monitored Make-up Water Test: The hydrostatic test shall be comprised of two stages:

- 1) Initial expansion and stabilization stage, where the initial test pressure is applied and the system is allowed to stand without makeup water during a 2 to 3 hour period, to allow for the diametric expansion or pipe stretching to stabilize.
- 2) Test stage, after the stabilization period is completed, the system is pumped back to the test pressure and at the end of a two hour period, water is pumped back to return to the test pressure and the amount of pumped water measured. The amount of water added shall not exceed the values listed in the following table.

## **TWO HOUR TEST PRESSURE**

Nominal Pipe Size in inches

2	4	6	8	10	12	14	16	18	20	22	24	30	36
0.1	0.2	0.6	1.0	1.3	2.3	2.8	3.3	4.3	5.5	7.0	8.9	12	18
Make-up Water Allowance (Gallon/100 ft)													

Allowance for Leakage due to Fittings: This leakage is defined as the quantity of water lost through pipe connections, valves and other fittings and that has to be made-up to return the tested system to the test pressure after the two hour test.

Allowable leakage in gallons per hour shall not be greater than that determined by the formula:

$$L = \frac{ND(P)^{1/2}}{7,400}$$

L = Maximum allowable leakage, gallons per hour.

N = Number of joints (connections for pipes or fittings) in the tested section of pipe.

D = Nominal inside diameter of the pipe, inches.

P = Test pressure, pound per square inch (psi)

Alternate Non-monitored Make-up Water Test: This hydrostatic test shall be comprised of two stages:

- 1) Initial expansion and stabilization stage, where the initial test pressure is applied and the system is allowed to stand without makeup water during a 3 hour period, to allow for the diametric expansion or pipe stretching to stabilize. Make-up water may be added each hour to bring the pressure to the test pressure.
- 2) Test stage, after the stabilization period is completed, the system is pumped back to the test pressure, and then the test pressure is reduced by 10 psi. The pressure shall then remain steady, not falling more than 5% during one-hour test. (i.e.: 150 psi test pressure, 140 psi reduced pressure, minimum lowest pressure 133 psi).

Test Duration: The total test time including expansion and actual test must not exceed a total of 8 hours. If the test can not be completed within this allotted time, the system must be depressurized and then allowed to “relax” for at least 8 hour before initiating the system retest.

## **10.0 EMERGENCY REPAIRS TO DAMAGED UTILITIES**

### **10.1 Known or Field Located Utilities**

In the event that the Contractor or his Subcontractor during the execution of the work breaks any know or field located pressure or gravity main causing the disruption of service and/or an eminent hazard, it shall be the responsibility of the Contractor/Subcontractor to immediately notify PCU Operations at the designated emergency telephone number and immediately undertake measure to repair the damaged utility. To that effect the Contractor/Subcontractor shall ascertain prior to initiating the work that the necessary repair parts, tools, equipment, and labor are on ready and available onsite to complete the repair work without delays. PCU personnel shall witness the repair work.

If the Contractor/Subcontractor estimates or determines that he is not going to be able to restore service within a less than two-hour period, the Contractor shall immediately contact the PCU Operation’s Regional Manager to initiate repair. PCU Operations will undertake the repair work and will back charge the Contractor. PCU will submit an itemized bill within 30 calendar days from the occurrence of the event.

### **10.2 Unknown or Inaccurately Located Utilities**

If the utility was not field located or it was inaccurately located in accordance with the prescribed procedures under the Sunshine State One-Call guidelines and the Contractor/Subcontractor cause a line break during the execution of the work, the same notification procedure as above must be followed. PCU Operations will undertake the repair work at no cost to the Contractor.