

SECTION 15025  
CLEANING PIPELINES

**PART 1 – GENERAL**

1.01. SUMMARY

This section includes furnishing necessary labor, material, tools, transportation, and other equipment for cleaning the required pipeline when it is determined that normal flushing will not sufficiently remove dirt and debris introduced during construction. The cleaning shall use foam pigs, swabs or "go-devils" as described herein.

1.02. GENERAL

After the installation of water mains normal flushing often proves inadequate to remove all the entrapped air, loose debris and other objects that may have been left in the main during installation. Therefore, after the installation of water mains it may be necessary to use polyurethane foam pigs and/or polyurethane hard foam swabs to remove all foreign matter from the pipeline (i.e. "pig" the pipeline).

Cleaning per the requirements of this section shall be performed prior to testing and disinfection of the main.

1.03. RELATED WORK

- A. Specification Section 15000-3.02-Construction Methods to Avoid Contamination.
- B. Specification Section 15020-3.01-Preparation (prior to disinfecting pipelines).

1.04. SUBMITTALS

- A. Submit a cleaning plan.
- B. Submit in accordance with Section 01300.

1.05. PROTECTION DURING FLUSHING AND CLEANING

- A. Coordinate with Engineer and Owner before flushing to ensure that an adequate amount of flushing water is available, at sufficiently high pressure. Determine if the water can be disposed of safely. Notify the Owner, Engineer, and the following prior to flushing or cleaning:
  - 1. Fire Department
  - 2. Other utilities, such as gas, electric and telephone companies, who may have underground facilities in the area.
  - 3. Customers who may be inconvenienced by reduced pressure or dirty water.

- B. Operation of Water System – The operation of main valves and fire hydrants on the water system in service often results in disturbance of the natural sediments and mineral deposits in mains, causing problems for Illinois-American’s customers. Illinois-American has a responsibility to provide its customers the highest level of service possible. Therefore Illinois-American has adopted a strict policy that no one, other than an employee of Illinois-American, unless expressly authorized, is to operate any valve, fire hydrant, or other appurtenance of water system that is in service or which will affect the system that is in service. This operation is to be performed by an employee of Illinois-American or under Illinois-American direct supervision.
- C. Coordinate with the Owner to isolate the section to be flushed from the operating distribution system. Provide a minimum notice of two (2) working days to schedule Illinois American staff to report to site.
- D. Protect the work staff and the public during flushing and cleaning operation. Keep children away from the flow of flushing water. Where practical employ energy dissipators to help avoid damage to property and the flooding of streets. See General Conditions Article 6.

## **PART 2 - PRODUCTS**

### **2.01. MATERIALS AND EQUIPMENT**

As the cleaning described in this section pertains to new water mains, the use of pipe cleaning plugs which utilize bristles, wire brushes, carbide abrasives, steel studs or any other type of abrasive is not permitted unless specifically approved by the Engineer. Consult a manufacturer of pipe cleaning plugs, such as Knapp Polly Pig (Houston, Texas), to determine the type and size of cleaning plug best suited for the application. Two types of plugs shall be considered and are described as follows:

- A. Swabs used for cleaning mains shall be made of polyurethane foam. This foam has a density of 1 to 2 pounds per cubic foot. Swabs shall be purchased from commercial manufacturers of swabs for pipes. Both soft and hard grade foam swabs are available. New mains are typically cleaned with hard foam swabs.

Use swabs cut into cubes and cylinders slightly larger than the size of the pipe to be cleaned. Cubes one inch larger in dimension than the nominal diameter of the pipe being cleaned have worked well for cleaning pipes up to 12-inches in diameter.

For mains greater than 12-inches in diameter, the swab diameter must be considered individually for each operation. For new mains, swabs three inches larger than the pipe diameter have worked well. Swabs for the larger mains are usually 1-1/2 times the diameter in length.

- B. Pigs, if used, shall be commercially manufactured for the specific purpose of cleaning pipes. They shall be made of polyurethane foam weighing 2 to 15 pounds per cubic foot. Pigs are bullet shaped and come in various grades of flexibility and roughness. Pigs are typically 1/4 -inch to 1/2-inch larger in diameter than the pipe to be cleaned.

## **PART 3 – EXECUTION**

### **3.01. PLUG INSTALLATION AND REMOVAL**

- A. Satisfactorily expose cleaning wyes, or other entry or exit points. Remove cleaning wye covers, etc., as required by the Engineer to insert the plugs into the mains.
- B. If approved by the Engineer, stripped fire hydrants, air valves and blow-offs may serve as entry and exit points for smaller sized mains. The Engineer will examine these appurtenances and the connecting laterals to ensure that adequate openings exist through which a plug may be launched. If these appurtenances are used, a special launcher to ease the insertion and launching of the plug is required. If available a pressurized water source such as a fire hydrant can be used to launch the plug. If water from the system is not available nearby, use a water truck with pump.
- C. If hydrants are used as entry and exit points, remove the internal mechanisms and plug the drains. Insert the plug and replace the cap with a special flange with a 2-1/2-inch fitting. Connect the 2-1/2-inch fitting with a pressure gauge and valve to a pressurized water source. After the last valve isolating the section to be cleaned is closed, open the hydrant supply valve. Propel the swab or pig into the main by opening the exit valve.
- D. In mains greater than 8-inches, wyes shall be used at the entry and exit points. Fabricate the wye section one size larger than the main to ease the insertion and extraction of the plug. The use of wyes, as with the previously mentioned appurtenances, requires an outside source of pressurized water for launching. Cap the wye with a flange with a 2 to 6 inch fitting for connecting with the pressurized water source.
- E. Many pigs, since they are less flexible than swabs, are harder to insert into a pipe. Other methods acceptable to insert pigs include:
  - 1. winching with a double sling,
  - 2. winching with a rope attached to the pig,
  - 3. compression with a banding machine prior to insertion, and
  - 4. the use of a specially designed tapered steel pipe which is removed after use.
- F. During swab or pig installation, leave as much water as possible in the main to be cleaned. The water suspends the material being removed from the pipe and

minimizes the chance of the material forming a solid plug. Water in the pipe also keeps the swab or pig from traveling through the pipe at excessive rates. If swabs or pigs travel too fast they will remove less material. The swab or pig will also wear more rapidly in such a case.

- G. At the exit point or blow-off, install a wye long enough to house the swab or pig. Attach temporary piping to the end cap to allow the drainage of the water.
- H. Take precautions to prevent backflow of purged water into the main when the cleaning plug exits through a dead end main. This can be accomplished by installing mechanical joint bends and pipe joints to provide a riser out of the trench. Additional excavation of the trench may serve the same purpose.

### 3.02. PRE-CLEANING PROCEDURES

- A. Prepare a written cleaning plan for the Engineer's review.
- B. Suggested pre-cleaning procedures include the following:
  - 1. Identify mains to be cleaned on a map. Mark the location of the entry, water supply and exit points, any blow-offs to be used, valves to be closed, and the path of the swab or pig.
  - 2. Under the Engineer's supervision and with Owner staff as required, inspect and operate all valves and hydrants to be used in the cleaning operation. Ensure that all operate correctly and that a tight shutdown is possible.
  - 3. Check location and type of hydrants, launch and exit location, and blow-offs to be used. Make blow-off tap connections if necessary.
  - 4. The Owner will notify customers served by the main to be cleaned that their water will be off for a specified period on the day of the cleaning.
  - 5. The Owner will identify customers who may require temporary services during the main cleaning operation. The Contractor shall provide the temporary connections.
  - 6. Determine the number and size of plugs to be used.

### 3.03. CLEANING PROCEDURE

Clean the pipeline using the following procedures and the Contractor's cleaning plan, as approved by the Engineer.

#### A. Swab Cleaning Procedures

- 1. Open the water supply upstream of the swab. Throttle the flow in the main at the discharge (plug exit) point so that the swab passes through the main at a speed of 2 to 4 fps. At this velocity, swabs will effectively clean pipes for distances of up to 4000 feet before disintegrating to a size smaller than the

main. Use pitot gauges at the exist hydrant or blow-off to estimate the flowrate in the main.

2. Note the time of entry of the swab into the main and estimate its time or arrival at the exit point. If the swab does not reach the exit point in the estimated time plus ten minutes, then a blockage has probably occurred. Reverse the flow in the main and note the time required for the swab to reach the original entry point. From the return travel time, approximate the location of the blockage. The Engineer may require a swab to which a transmitter has been attached to be used to accurately locate a blockage.
3. Swab repeatedly as needed. Stop swabbing when the water behind the swabs emerging at the exit clears up within one minute. Account for all swabs inserted into the main.
4. After the last swab has been recovered, flush the main to remove swab particles. This may require up to an hour or flushing.

#### B. Pig Cleaning Procedures

1. Remove all air valves along the line. This will provide pressure relief should the pig suddenly stop and assure that no air is trapped in the main.
2. If the pig is inserted directly into the main, set it in motion by opening the upstream gate valve and a downstream fire hydrant or blow-off valve (usually the valve on the capped end at the exit point). If the pig is launched from a wye, fire hydrant, or other appurtenance, use an external pressurized water source to inject the pig into the main as described in Section 3.01.
3. Once the pig is in motion in the main, control its speed by throttling the discharge at a downstream fire hydrant or blow-off. Operate pigs typically at 1 fps. This slow speed will help prevent pressure surges when the pig passes through undersized valves, enters smaller pipes, or turns through tees or crosses. Speeds of up to 2 fps can be used on straight runs with no restrictions or sharp turns.
4. Make sufficient passes of the pig to obtain thorough cleaning. Two pigs may be used in tandem to save time and water. Sufficient cleaning is established when the water discharging after the pig becomes clear within one minute.

#### 3.04. POST CLEANING PROCEDURE

After successful completion of cleaning the main shall be tested, flushed and disinfected in accordance with applicable sections of these Specifications.

#### 3.05. BASIS OF PAYMENT

The items described in this Specification Section are considered incidental to the installation of the water main.

END OF SECTION 15025

