STANDARD SPECIFICATION SECTION 15141 DISINFECTION OF PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

This section includes materials and procedures for disinfection of water mains by the continuous feed method or by the slug method. Do not use the tablet method to disinfect pipelines. Disinfect in accordance with AWWA C651, except as modified below. Other methods of disinfection will only be allowed with the written permission of the District's Representative.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Standard Drawings.
- B. Pressure Testing of Piping: STD SPEC 15144.

1.03 JOB CONDITIONS

- A. Discharge of chlorinated water into watercourses or surface waters is regulated by the National Pollutant Discharge Elimination System (NPDES). Apply to cognizant environmental regulation authority and obtain permit for permission to discharge. Disposal of the chlorinated disinfection water and the flushing water is the Contractor's responsibility.
- B. Schedule the rate of flow and locations of discharges in advance to permit review and coordination with District and cognizant regulatory authorities: San Diego County Health Department. If there is any question that the chlorinated discharge will cause damage to the environment, then a reducing agent shall be applied to the water to be wasted to neutralize thoroughly the chlorine residual remaining in the water. See AWWA C651, Appendix C for neutralizing chemicals.
- C. Use potable water for chlorination. Provide a reduced pressure backflow prevention assembly if source of potable water is from District waterlines.
- D. Submit request for use of water from waterlines of District 48 hours in advance.

PART 2 - MATERIALS

2.01 LIQUID CHLORINE

Inject with a solution feed chlorinator and a water booster pump into the pipeline at a metered rate for the continuous feed or slug method. Use an experienced operator and follow the instructions of the chlorinator manufacturer.

2.02 CALCIUM HYPOCHLORITE (DRY)

Use tablets in wet trenches when connecting to existing waterlines to minimize contamination.

2.03 SODIUM HYPOCHLORITE (SOLUTION)

Further dilute in water to desired concentration and swab or spray the inside surfaces of all new piping at connection points to existing waterlines.

2.04 CHLORINE RESIDUAL TEST KIT

For measuring chlorine concentration, supply and use a medium range, drop count, titration kit or an orthotolidine indicator comparator with wide range color discs. Products: Hach Chemical or Hellige. Maintain kits in good working order available for immediate test of residuals at points of sampling.

PART 3 - EXECUTION

3.01 CONTINUOUS FEED METHOD

Introduce potable water into the pipeline at a constant measured rate. Feed the chlorine solution into the same water at a measured rate. Proportion the two rates so that the chlorine concentration in the pipeline is maintained at a minimum concentration of 50 mg/l. Check the concentration at points downstream during the filling to ascertain that sufficient chlorine is being added.

3.02 SLUG METHOD

Introduce potable water into the pipeline at a constant measured rate. At the start of the test section, feed the chlorine solution into the same water pipeline at a measured rate so that the chlorine concentration created in the pipeline is 300 mg/l. Feed the chlorine for a sufficient period to develop a solid column or "slug" of chlorinated water that will, as it passes along the line, expose all interior surfaces to a concentration of at least 300 mg/l for at least three hours.

3.03 DISINFECTION OF VALVES AND APPURTENANCES

During the period that the chlorine solution or slug is in the section of pipeline, open and close valves to obtain a chlorine residual at hydrants and other pipeline appurtenances.

3.04 CONFIRMATION OF RESIDUAL

- A. After the chlorine solution applied by the continuous feed method has been retained in the pipeline for 24 hours, confirm that a chlorine residual of 25 mg/l minimum exists along the pipeline by sampling at air valves and other points of access.
- B. With slug method, confirm by sampling as the slug passes each access point and as it leaves the pipeline.

3.05 PIPELINE FLUSHING

After confirming the chlorine residual, flush the excess chlorine solution from the pipeline until the chlorine concentration in the water leaving the pipe is non-detectable. Use an Environmental Protection Agency approved reducing agent such as Vita-D-Chlor or District approved equal if discharge of chlorinated water would be damaging to the environment.

3.06 BACTERIOLOGIC QUALITY TESTS

- A. The Contractor shall provide the services of an acceptable state certified laboratory to take all samples, deliver to laboratory, and provide written test results to the District's Representative.
- B. Perform bacteriologic quality testing after disinfection, final flushing, and refilling of the pipeline. Collect two consecutive sets of acceptable samples taken at least 24 hours apart from the pipeline. Take samples from the pipeline at 1500-foot intervals and from each end. Repeat the process 24 hours later at the same sample points. The sample point spacing may be adjusted in the field by the District's Representative.
- C. Deliver samples to a certified laboratory within three hours after collecting and have a bacteriologic quality test performed. Test for coliform organisms and perform a heterotrophic plate count for each sample taken. Coordinate the collection of the samples with the laboratory's hours of operation and allow adequate time for the test results.
- D. All samples must show the absence of coliform organisms and all heterotrophic plate counts must be less than 500 colonie forming unit/ml.

3.07 REPETITION OF PROCEDURE

If the initial disinfection fails to produce required residuals and bacteriologic quality tests, conduct investigations into the cause of the contamination and correct the condition. Repeat the disinfection process and the testing until satisfactory results are obtained.

3.08 TEST FACILITY REMOVAL

After satisfactory disinfection, replace air valves, restore the pipe coating, and complete the pipeline where temporary distribution or test facilities were installed.

3.09 FINAL CONNECTIONS TO EXISTING WATERLINES

New waterlines and appurtenances shall be completely installed, disinfected, flushed, and satisfactory bacteriological sample results received prior to permanent connections being made to the active distribution system. Sanitary construction practices shall be followed during installation of the final connection, such that there is no contamination of the new or existing waterlines with foreign material or groundwater.

3.10 CUTTING INTO EXISTING WATERLINES

A. When connecting to existing waterlines, use extreme caution to minimize contamination of the interior passageways of the existing pipe, valves, and fittings. If the trench is wet, apply liberal quantities of hypochlorite to open trench areas to lessen the danger of pollution. Use tablets in this situation for slow and continuous release of hypochlorite as water is pumped from the excavation. Prior to the installation of new piping, swab or spray the interior surfaces of all pipe, valves, and fittings with a 1-percent hypochlorite solution. B. Within 24 hours of making a connection to an existing waterline, a bacteriologic quality test shall be performed by a state certified laboratory. Collect a sample from the existing waterline at the nearest access point to the connection. The sample shall be collected, delivered, and tested as described in paragraph 3.06. If the sample fails the test, the District's Representative will direct the Contractor to perform corrective action and retest.

END OF SECTION