PROCEDURE FOR THE DISINFECTION OF WATER LINES/SYSTEMS

Established by UCSB Environmental Health and Safety

UCSB Design, Construction & Physical Facilities Water Treatment, 805-893-2661

I. Scope:

All new and re-introduced water lines must be cleaned, disinfected, flushed and must pass tests for chlorine concentration and coliform absence before being put into use.

A. The Water Treatment Specialist (hereafter referred to as WT Sp) shall review and approve the procedures and schedules prior to initiation of work.
B. Upon completion of satisfactory cleaning, chlorination, and flushing, the WT Sp will take water samples for bacteriological tests. Based on the results of the lab tests, the WT Sp will give a verbal approval followed by a written approval for use or will give a verbal disapproval which requires rechlorination of the water system.

II. Contractor's Responsibility:

A. The contractor shall furnish properly trained personnel, appropriate equipment and materials, and transportation, for the disinfection of domestic hot and/or cold water systems, fire lines, and any lines connected to them. He shall post warning signs at each outlet. He shall be prepared to dispose of waste water in a way that will cause no harmful effects. He shall be prepared to measure chlorine residuals, at both high and low range, using appropriate techniques. The WT Sp will oversee the work and must verify all pertinent chlorine residuals.
B. A minimum of three (3) working days notice must be given to the WT Sp prior to the chlorination procedure. Chlorination should be scheduled to end on a Monday through Thursday in order to coordinate with the lab schedule. A variation from these schedules may require evening and/or weekend overtime at added cost to the contractor.

III. Disinfection (Chlorinating) Agent:

A. Either sodium hypochlorite solution or chlorine gas is acceptable.
B. Tablets or granular disinfectants will not be allowed. Pipes with tablets placed inside are not acceptable.
C. Any other disinfectant must receive prior approval from the WT Sp.

IV. Procedure:

A. Preliminary Preparation:
    1. During the entire construction period, care shall be taken to keep the inside of pipes, etc., as clean as possible.
    2. A suitable service cock or valve within three (3) feet of the supply line shall be installed to introduce the disinfecting agent into the lines. The line(s) to be treated shall be isolated from the rest of the distribution system with cross-connection control devices or other appropriate isolation devices.

3. After final pressure tests and before chlorination, each fixture or outlet shall be flushed until the flow shows only clear water.

B. Disinfection:
   1. The system must be full of water and under “Main” pressure.
   2. Using injection equipment approved by the WT Sp the disinfectant shall be injected through the service cock at a slow, even, continuous rate until a test at the farthest outlet shows chlorine residual concentration of at least 50ppm. All other outlets shall be tested for compliance with the 50ppm residual. The waste chlorinated water must be disposed of properly.
   3. All outlets and valves, including service valve at main and injection cock, must then be closed to retain the chlorinated water. Warning signs must be posted at each outlet. This condition must be maintained for at least 24 hours.
   4. A test after the 24 hour (or longer) treatment should indicate a chlorine residual of 20ppm or greater. If it does not, steps 2 through 4 must be repeated.
   5. After successful completion of the above test, the system should be flushed until the chlorine residual is 0.5 ppm or equivalent to that of the campus water supply.

V. Bacteriological testing:

A. Final flushing should be completed between 9:00 a.m. on Monday and 3:00 p.m. on Thursday in order to expedite laboratory analyses. After final flushing, representative water samples will be taken by the WT Sp for lab tests of coliform presence or absence. A successful test result will indicate the absence of total E. Coli in 100 ml. The test method is the Chromogenic Substrate Test which requires 24 hours to complete. So, occupancy and/or clearance approval will take at least that long. If coliform is found to be present, the disinfection procedure shall be repeated until the standards are met.
B. Sampling and analyzing for other substances to evaluate potability may be required if considered necessary by the WT Sp.

VI. Approval:

Upon satisfactory results of water tests, the WT Sp will give verbal notification of approval to the contractor; this will be followed by a written report. Notification of unsatisfactory results will be made verbally, with written follow-up as necessary. In that case, the disinfection shall be repeated until the standards are met.

VII. References:

Environmental Engineering and Sanitation, 4th ed. (1992), Joseph A. Salvato, Chap. 3 Standard Methods for the Examination of Water and Wastewater, 19th ed., (1995), Chap 4, p 4-36 to 4-47 for Chlorine Residual Tests and Chap. 9, p 9-65 to 9-66 for Coliform test.

American Water Works Assc. (AWWA) Standard for Disinfecting Water Mains, AWWA C651-92, p. 7.
American Water Works Assc. (AWWA) Manual M20, Water Chlorination Principles and Practices, pp35-36.