PART 1: GENERAL

1.01 SUMMARY

A. Work Included
   1. Disinfection of potable water distribution system.
   2. Pressure testing of water system.
   3. Testing and reporting results.

1.02 RELATED DOCUMENTS

A. In addition to the Drawings, the general provisions of the Contract, including General and Special Conditions, and the Division 01 specification Section, the following Documents are related to and assist in the definition of the requirements of this Section:

   Section 33 10 00 – Site Water Systems

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with ANSI/AWWA C651.

B. Applicator Qualifications:
   1. Water Treatment Firm: Company experienced in disinfecting potable water systems specified in this Section with minimum three years experience.

C. Testing Laboratory Qualifications:
   1. Testing laboratory qualified in testing potable water, certified by the State of California.

D. Regulatory Requirements
   1. Work under this Section shall be done in accordance with State of California, County of Fresno and City of Fresno codes, ordinances and adopted standards regulatory requirements.

   FC – Department of Health – Fresno County Department of Environmental Health

E. References
   1. Products and procedures shall comply with the following.

      AWWA C652 - Standard for Disinfection of Water Storage Facilities.
      ANSI/AWWA B300 - Standard for Hypochlorites.
      ANSI/AWWA B301 - Standard for Liquid Chlorine.
      ANSI/AWWA B303 - Standard for Sodium Chlorite.
      ANSI/AWWA C601 and C651 - Standards for Disinfecting Water Mains.

1.04 SUBMITTALS

A. Submit in accordance with Specification Section 01 33 00, Submittal Procedures. Test Reports
   a. Indicate results comparative to specified requirements.

   2. Certificate
      a. Certify that cleanliness of water distribution system meets or exceeds the...
following requirement:
1) Coliform M.P.N./100 ML water is 1.1 or less.

1.05 PROJECT RECORD DOCUMENTS

A. In Accordance with Section 01781, Project Record Documents.
   1. Disinfection report; record:
      a. Type and form of disinfectant used.
      b. Date and time of disinfectant injection start and time of completion.
      c. Test locations.
      d. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
      e. Date and time of flushing start and completion.
      f. Disinfectant residual after flushing in ppm for each outlet tested.
   2. Bacteriological report; record:
      a. Date issued, project name, and testing laboratory name, address, and telephone number.
      b. Time and date of water sample collection.
      c. Name of person collecting samples.
      d. Test locations.
      e. Coliform bacteria test results for each outlet tested.
      f. Certification that water conforms, or fails to conform, to bacterial standards of Section 33 13 00/3.03.
      g. Bacteriologist's signature and authority.

PART 2: PRODUCTS

2.01 DISINFECTION CHEMICALS

A. Chemicals:
   1. Hypochlorite, in accordance with ANSI/AWWA B300.
   2. Liquid Chlorine, in accordance with ANSI/AWWA B301.
   3. Sodium Chlorite, in accordance with ANSI/AWWA B303.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that piping system and appurtenances has been cleaned and inspected.

B. Schedule disinfection activity to occur prior to pressure testing and pressurizing of installed system.

3.02 PREPARATION

A. Limit contaminated materials from entering water piping and appurtenances during construction.
   1. Remove, by initial flushing with potable water, contaminated materials which may have entered the system during construction.

B. Provide required equipment and facilities to perform the work of disinfection.
   1. Provide sufficient number of suitable outlets to permit flushing of facilities at a velocity of at least 5.5 feet per second, to permit the obtaining of bacteriologic test samples, and to permit pressure testing.
   2. Outlets provided shall be in addition to these which may be shown on the plans, and
SECTION 33 13 00

DISINFECTION OF WATER DISTRIBUTION SYSTEM
shall conform to Section 33 10 00: Site Water Systems.

C. Provide sufficient number of valves (complete with valve boxes), as necessary, to isolate system for flushing, pressure testing and disinfection purposes.
   1. Valves and valve boxes shall be in addition to those shown on the plans, and shall conform to Section 33 10 00: Site Water Systems.

D. Provide drainage so that water facilities cannot be contaminated by flushing outlets.

3.03 EXECUTION

A. General:
   1. Perform work in accordance with ANSI/AWWA C651.

B. Water System, Pipelines, Pumps, Valves and Fittings.
   1. Disinfection Process:
      a. Disinfect at each water system improvement location where connection and/or alteration is made to the existing potable water system located downstream.
      b. Disinfect after initial flushing and prior to allowing the system at such location to be pressurized.
      c. Introduce chlorine gas or chlorine compound solution made with liquid chlorine, calcium hypochlorite in solution or sodium hypochlorite solution mixed with water into the water piping and appurtenances to form a chlorine concentration of approximately 100 parts per million (ppm), or that which will provide a minimum residual of 50 ppm in all parts of the water piping and appurtenances after 24 hours have elapsed.
      d. The placing of HTH capsules or tablets in pipe sections during the laying process will be considered an acceptable method of introducing chlorine for the test.
   2. Sterilization Period
      a. During the sterilization period, all valves (except those isolating the system being disinfected) and other accessories shall be operated.
      b. After a minimum of 24 hours have elapsed since introduction of the chlorine, flush treated water from the water piping and appurtenances using potable water.
         1) After a minimum of 48 hours after flushing per Section 33 13 00/3.02A, have bacteriologic samples of water from the piping and appurtenances to be tested extracted from the system by testing laboratory.
   3. Bacteriological Tests:
      a. Have bacteriologic tests performed by testing laboratory per Section 033 13 00/1.03.
      b. If the bacteriologic tests show a coliform M.P.N./100 ML water of 1.1 or less on all samples at a particular installation site, the water facilities tested will be considered clear.
      c. In the event the coliform number is above 1.1, the sterilization and testing procedure shall be repeated until the required standard is reached.
   4. Pressure Test
      a. Pressure test system to a hydrostatic pressure of 100 pounds per square inch gauge, only after bacteriologic tests have passed, for each construction location.
      b. Maintain pressure test for 90 minutes.
      c. Pressure tests shall be performed in the presence of the Agency's representative.
      d. Repair any leaks detected by hydrostatic pressure test and repeat disinfection.
SECTION 33 13 00

DISINFECTION OF WATER DISTRIBUTION SYSTEM

and testing process.

5. All costs of disinfection, bacteriologic testing and reporting, and pressure testing shall be borne by the Contractor, and including all additional outlets, valves and valve boxes necessary to accomplish the work.

C. Water Tanks

1. Preparation
   a. Upon completion of tank painting, the tanks shall be cleaned and filled with water.

2. Disinfection
   a. The tanks shall be disinfected in accordance with AWWA C652.
   b. Disinfection shall be by application of chlorine in a chlorine bearing compound form.

3. Sterilization Period
   a. The chlorinated water shall remain in the tank for at least 24 hours.
   b. The tank shall then be drained and filled to capacity with potable water.

4. Bacteriological Tests:
   a. Water samples shall be taken by the Engineer and delivered to a certified water laboratory for bacteriological and volatile organics testing.
   b. Should the test indicate the presence of coliform organisms or volatile organics, the entire disinfection procedure shall be repeated.

3.04 QUALITY CONTROL

A. Provide copies of testing and reports.

END OF SECTION