CHEMTROL$_{TM}$ CT2000 CONTROLLER

BID SPECIFICATIONS (7/99)

WATER TREATMENT AUTOMATION SYSTEM

A. **A PROGRAMMABLE WATER TREATMENT AUTOMATION SYSTEM** shall be supplied for continuous monitoring of water conductivity (or TDS), pH, temperature, Langelier Saturation Index and for automatic control of a bleed valve and chemical feeders. The controller shall include a programmable microprocessor with a four (4)-line display screen and a 16-key front panel keyboard with numerical input for operator access.

B. The system shall be a **CHEMTROL$_{TM}$ CT2000 PROGRAMMABLE CONTROLLER** of current design and model manufactured by SANTA BARBARA CONTROL SYSTEMS of Santa Barbara, California or a technically equal system certified by the specifying agent as capable of providing equal performance for all operating functions.

C. Exceptions to the specifications shall be described in detail together with a list of ten (10) similar operating systems of same model and manufacture, with the name, address and telephone number of operating personnel.

D. SPECIFICATIONS

1. The controller shall automatically maintain the water conductivity or TDS level below a user-defined value by actuating the solenoid valve on the bleed line. The operator shall be able to adjust deadband zone to prevent chattering of the solenoid valve. The following operational modes shall also be available: off, manual, cycle timer.

2. The controller shall automatically maintain the pH level within a user-defined range by activating either an acid or a basic chemical feeder. The operator shall be able to choose between on/off control or proportional feed control with adjustable deadband and progressive zones. The controller shall also be capable of actuating the chemical feeder in the following modes: off, manual, cycle time.

3. The controller shall monitor and display the water temperature. The operator shall be able to select automatic temperature compensation for pH and/or conductivity readings with an adjustable temperature compensation slope for conductivity.

4. All setpoints and calibration levels shall be adjustable with a numeric keypad mounted on the front panel of the unit. For all sensor inputs, the operator shall have the choice - depending on the accuracy needed - of using either 1-, 2-, or 3-point calibration to determine respectively the origin, slope and curvature of the calibration curve. Controllers with internal switches or calibration adjustments and/or requiring special signal generating equipment to service shall not be considered equal.

5. The controller shall include programmable high and low alarms for all control functions using sensor inputs with operator selectable feed lockout and alarm buzzer options.

6. The controller shall continuously monitor and alert for failure of the pH probe using dynamic probe testing before the water chemistry gets out of range. Failure alarms based on safety timers or out-of-range alarms will not be considered equal.

7. The controller shall continuously calculate and display the Langelier Saturation Index using either sensor data and/or manual input for pH, temperature, total alkalinity, and calcium hardness. The water saturation condition shall be displayed on the main screen as either AScaling@, ACorrosive@, or AOK@.

8. The controller shall be capable of actuating each chemical additive feeder in the following operator-selectable modes: off, manual, bleed & feed, bleed-then-feed, cycle timer and daily schedule. The operator shall be able to choose to lock the chemical feeder when the bleed valve is activated and to accumulate feeding time during lock-out for delayed feed, to lock the bleed valve when the chemical feeder is activated and to actuate pre-bleed and pre-pH programs before feeding. In addition, the operator shall be able to schedule a delayed single shot booster feeding program for each additive feeder.

9. For each valve and chemical feeder, the controller shall record and display the elapsed run time of each activation event

and a cumulative run time resettable at any time by the operator. The controller shall include operator-adjustable safety time limit alarms that automatically locks out the valve or chemical feeder. The operator shall also be able to adjust the limit on the run time alarm.

10. The controller shall be contained in a NEMA 3R (rain and splatter proof) rating lockable fiberglass cabinet with an LCD graphic display screen of four (4) lines of twenty (20) alphanumeric characters. A front panel 16-key touch pad shall be provided for direct access to all the menus and submenus and for entering numerical data. The main screen shall display current readings, control modes and operational status for conductivity/TDS, pH, and temperature, as well as control modes and operational status of chemical additives feed pumps. All screens shall have the capability of being displayed at any time in unabbreviated English, French or Spanish and in US or metric units.

11. The controller shall be factory set to water treatment industry standard. The operator shall be able at any time to adjust all programmable functions to preferred settings. The controller shall have a reset mode to reset all or selected functions to the original factory standards.

12. The controller shall include a memory storage battery with minimum reserve power for six (6) months.

13. COMM1 OPTION: The controller shall include on-board memory chip for storing of test data on operator-adjustable schedules. Operator shall be able to download data on-site through RS232 serial communications ports to a printer or a computer. A Windows software program shall be supplied for direct true duplex operation through RS485 serial communications port and for automatic downloading and visual graphics representation of test data. Controllers using simulation or virtual representation of the display screen shall not be considered equal.

14. COMM2 OPTION: In addition to COMM1 option, the controller shall include a modem for remote true duplex operation and for automatic downloading and visual graphics representation of test data by a PC-compatible computer with supplied Windows software. Controllers using simulation or virtual representation of the display screen shall not be considered equal.

15. The controller electronics shall be covered by a standard manufacturer warranty of five (5) years. Special extensions of more limited warranties shall not be considered acceptable. All sensors will be covered by a standard one (1) year warranty. Other parts shall be covered by their own manufacturers warranty. The controller shall not require a service technician for annual calibration, seasonal start-up, or whenever chemicals supplier or type are changed.

16. The manufacturer shall supply a complete instruction, operating and maintenance manual. Check-out of installation, start up, and instruction of operating personnel shall be performed by an authorized and properly trained manufacturer representative.