

Attachment D Exhibit "K"

CORROSION TEST

1.0 GENERAL

1.1 Contractor shall test and monitor corrosion rates for the chilled water, heating hot water, condensate, and condenser water systems. The acceptable operating ranges are set forth in Section 3.0 below. Contractor shall provide Coupon Racks at the Central Plants; one (1) in each of the water piping systems, to allow scheduled monitoring of both mild steel and copper corrosion rates. In addition, Contractor shall install, approximately eight (8) coupon racks, in any closed loop systems in the terminals that do not have them. They are to be included in the required test procedures. Operating ranges to be within acceptable industry standards for this type of treatment program.

2.0 PROCEDURES

2.1 Each of the coupon racks must contain, or be fitted for, both mild steel and copper coupons to measure corrosion rates for each metal.

2.2 Each coupon insert carrier must be fitted with a ring for attachment of a serially numbered meter band that is secured to the outer portion of the coupon rack. Once each coupon is inserted and securely tightened, a tamper-proof metal band must be attached. The number on the metal band shall be the same as the number stamped on the coupon.

2.3 Contractor shall remove and replace the coupons at 90-day intervals and send the exposed coupons to an independent testing laboratory that specializes in or routinely provides analysis of corrosion rates for the metals utilized for coupons (copper and mild steel). A City representative must be present during removal and replacement of all coupons to verify the coupon has not been tampered with and that the new coupon is properly installed and secured. The testing lab must provide the following certified information concerning the test results for each last coupon.

2.3.1 Coupon Number

2.3.2 Period of exposure

2.3.3 Coupon weight loss

2.3.4 Corrosion rate in mils per year

2.3.5 Type of corrosion observed; general, pitting, etc.

2.3.6 Percentage of deviation of corrosion rates from established industry standards for systems of like type, size, and complexity.

2.3.7 Lab technician's certified professional assessment of the test results as it relates to the affect on equipment, piping, and the system as a whole.

2.4 Contractor shall forward a copy of the independent testing laboratory's report to the Director along with the coupons tested within three (3) days of receiving the report. At the option of the Director, Contractor may be instructed to have a second

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analysis performed on the coupons. This option applies for any testing cycle at any time.

- 2.5 If the 2nd analysis is exercised, the Director will select the testing lab to be utilized. Contractor shall deliver the coupons to the testing lab for analysis. The test information requested will be the same as specified in the initial test. The results, with coupons, will be delivered to the Director. Upon receipt, results of the two test will be compared. Significant deviations in the two independent tests will result in a scheduled meeting of both parties to verify the accuracy of both tests and appropriate action for securing a valid analysis mutually acceptable to both parties. If, based on the results of the tests referenced above, the Director determines that the system is being negatively impacted due to corrosion beyond standards established by the industry, then proposed liquidated damages may be invoked for that test interval; it being understood between the parties that such negative impact will cause damage by the City.

3.0 ACCEPTABLE OPERATING RANGES

A. Cooling Towers:	Operating Range
• PH	7.8 – 8.3
• Molybdate	5 – 6 ppm
• Conductivity	2800 – 3200 μ mhos
B. Steam Boilers:	Operating Range
• Hydrate Alkalinity	200 ppm (minimum)
• Total Alkalinity	1500 ppm (maximum)
• Phosphate	20 – 40 ppm
• Sulfite	20 – 40 ppm
• Conductivity	2200 – 2600 μ mhos
C. Closed Loops:	Operating Range
• Hot Water Nitrate	600 – 800 ppm
D. Condensate:	Operating Range
• PH	7.6 – 8.4