Attachment J

MEMORANDUM

TO: Technical Oversight Committee

FROM: Meifang Zhou, Senior Chemist, SFWMD
David Struve, Supervising Chemist, SFWMD

DATE: February 10, 2003

SUBJECT: The Effect of the Molybdenum Concentration in Water from Stainless Steel during Total Phosphorous Analysis

From our previous research investigating our methods for total phosphorous (TP), when the Molybdenum (Mo) concentration in water is greater than 250 ppm, there is a possibility that Mo (VI) will be reduced slowly to Mo (V) to produce a blue colored complex during TP analysis and cause a positive interference. From the reference paper (Hultquest et al, 1987), the dissolution rate of pure Mo in de-ionized water (DI), 0.5M NaCl and 1 M H_2SO4 are 0.04, 0.06 and 0.6 $\mu g/cm^2$ h, respectively, and the dissolution rate of Mo in stainless steel is lower than that in pure Mo. The Mo content in stainless steels normally ranges from 0 to 6%. In the worst case, (assuming a dissolution rate of 0.6 $\mu g/cm^2$ h, 6% Mo content, $100cm^2$ surface area of the stainless steel, 1L of water sample, and 1 month of time), the predicted Mo concentration in water from Mo dissolution is only 2.6 ppm which is near 100 times lower than the critical concentration (250 ppm). Therefore, the affect of Mo leaching from stainless steel in TP analysis should be insignificant.

In order to verify these calculations, we are currently studying the actual effect of long-term storage on dilute phosphorus solutions in contact with stainless steel. We will present these findings at a future TOC meeting.

References:

Zhou, M and Struve, D, Optimal Conditions for the Determination of Total Phosphorus in Water.

Hultquist, G; Seo, M; Leitner, T; Leygraf, C and Sato, N., 1987, The Dissolution Behavior of Iron, Chromium, Molybdenum and Copper from Pure Metals and from Ferritic Stainless Steels, Corrosion Science, Vol. 27, No. 9, pp. 937-946.