CR-115155

ADDENDUM TO FINAL REPORT

IODINE COLORIMETER

INTERFERENCES

Since the Skylab water supply may contain traces of foreign substances, it is of interest to evaluate the effect of potential interferences on the performance of the iodine colorimeter. We decided to observe interference effects by performing spectroscopic analyses in a Beckman DK Spectrophotometer (700- to 350-nm spectral range). Lacking definitive information on species and concentrations of foreign substances that might be present in the potable water, we added 10 parts-per-million of several metal salts to the standard aqueous iodine solution (10 ppm of I_2). Ten metal salts were used, each with iodine, and scanned against the iodine, only, solution.

All of the metal salts used, except one, slightly attenuated the iodine absorption peak at 462 nm. The one exception was ferric chloride which, having a yellow color of its own, somewhat intensified the absorption. $CrCl_2$, $CuSO_4$, $Cu(NO_3)_2$, $Ni(NO_3)_2$, and $MgSO_4$ showed very little effect on the I_2 absorption peak. A slightly greater effect was evidenced by $Zn(C_2H_3O_2)_2$, $MgCl_2$, and $MnCl_2$. $NiCl_2$ produced the greatest effect. Potassium iodide in aqueous iodine was given more detailed study after we learned that KI-I_2 would be the solution used to treat the water supply. The effect of 0- to 72-ppm of KI on 6 ppm I_2 is discussed and illustrated on pages 13 to 16 of this report. As can be seen from Figure 7, varying amounts of KI have little effect on the fixed I_2 concentration. Figure 8 is a spectrophotometer scan of six chemical compounds mixed with an equal concentration of iodine (10 ppm). The worst case represents an attenuation of about 1 ppm I_2 ($MgCl_2$ and $Zn(C_2H_3O_2)_2$.

Since the iodine colorimeter is a fixed wavelength photometer, it is important to realize that any significant shift in the 462-nm I_2 peak, caused by an

interfering substance, would result in an ambiguous readout. None of the chemicals tested had this effect. From this point of view, it may be technically incorrect to refer to these substances as "interferences," because what is measured is the amount of free iodine in solution after iodine has reacted with the "interfering" material.

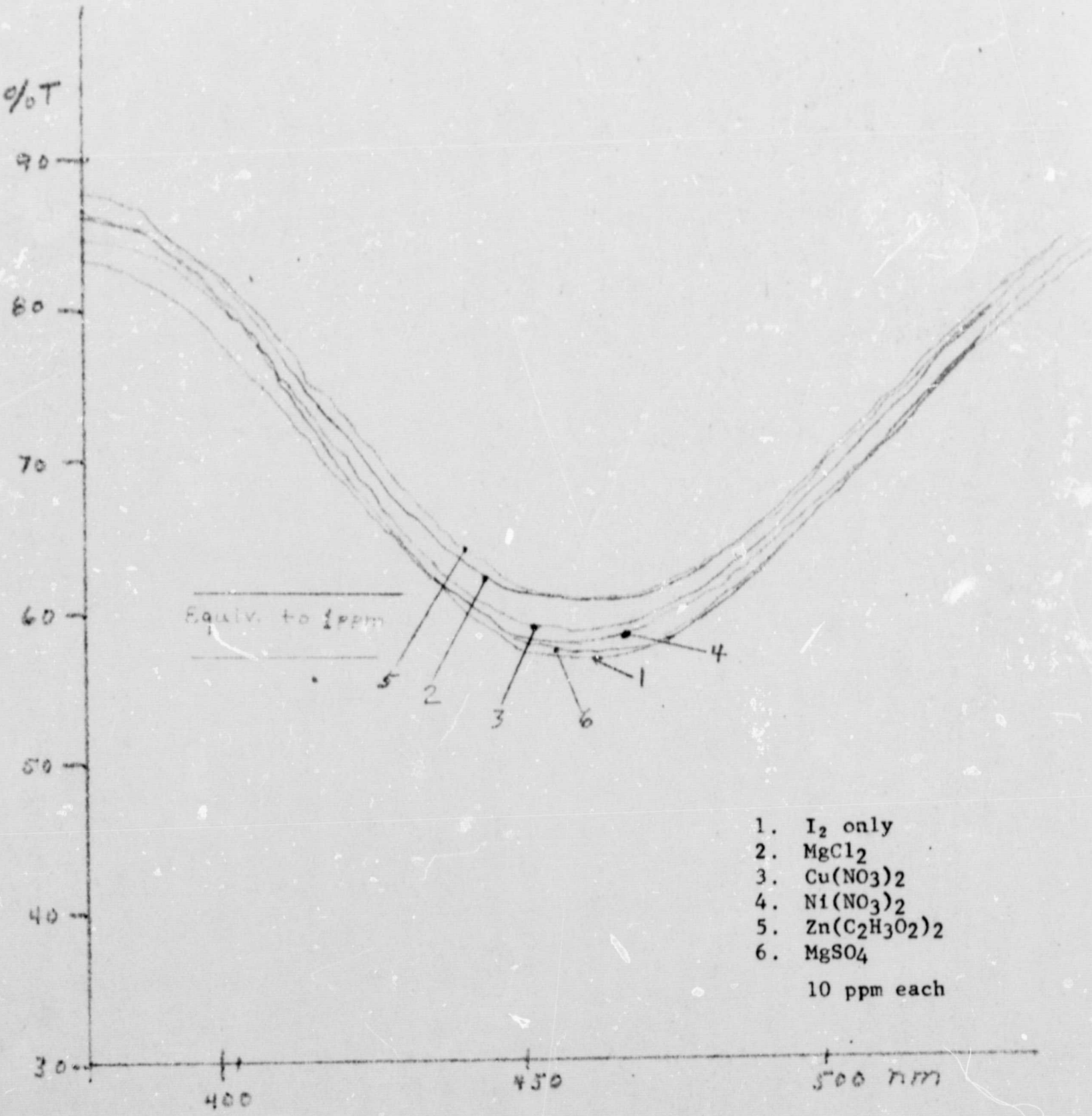

Figure 8. The Effect of some Interfering Substances on Iodine Solutions--5 cm Path Length--DK Spectrophotometer