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CLARIFICATION OF THE RELATIONSHIP BETWEEN
FLUORIDE COMPOUNDS AND CORROSION IN
POTABLE WATER DISTRIBUTION SYSTEMS

Allegations that fluoridation is the cause of corrosion in water systems continue to be circulated despite refutations by competent authorities such as the American Water Works Association and the National Association of Corrosion Engineers. The following detailed clarification should be helpful to those confronted with such allegations. It is excerpted from a letter of October 10, 1975 to the Division of Dentistry, U.S.P.H.S. from R.A. Dangel, Fluoridation Engineer, U.S. Environmental Agency, Boston, Massachusetts.

"Corrosion by potable water is related primarily to dissolved oxygen concentration, pH, water temperature, alkalinity, hardness, salt concentration, hydrogen sulfide content, and the presence of certain bacteria. The fluoride ion itself is unrelated to corrosion at concentrations found in potable water meeting the EPA Interim Primary Drinking Water Regulations. This finding was amply documented in statements by water supply and corrosion experts whose findings were collected and published in PS, CPB-5 and PS, CPB-11, issued in 1968 and 1969 by the United States Public Health Service, Division of Dental Health.

"Under special conditions of water quality, a small increase in the corrosivity of potable water that is already corrosive may be observed after treatment with alum, chlorine, fluosilicic acid, or sodium silicofluoride. The increase in corrosivity by depression of pH resulting from these treatments occurs in potable waters with little buffering capacity (alkalinity less than about 10 mg/l as calcium carbonate) which also contain dissolved oxygen. These reductions may increase the prevailing corrosion rates of metals (other than cast iron) commonly found in the distribution system and household plumbing. The corrosion rate of cast iron is not greatly affected by changes in pH, but mainly depends on the dissolved oxygen content of potable waters.

"There is considerable data documenting the corrosivity of low alkalinity waters even before any treatment. Concern that fluoridation or chlorination may create a need for corrosion control where untreated water is considered acceptable are

unfounded. For example, Boston, which buys nonfluoridated water that has little buffering capacity, a low pH, a high dissolved oxygen content, and is lightly chlorinated, has severe corrosion problems with copper, cast iron, galvanized iron, and lead pipes.

"Sodium fluoride, another compound used for fluoridating water, has no effect on the corrosivity of the finished water."

Dental Disease Prevention Activity
Bureau of State Services