

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
GUIDANCE FROM HOTLINE COMPENDIUM

WSG H25

SUBJECT: Possible Toxicity of Aluminum

SOURCE: Jennifer Orme

Aluminum, which is listed for possible development as a primary drinking water regulation in 1991, was proposed in 54 FR 22062 (May 22, 1989) at a Secondary Maximum Contaminant Level (SMCL) of 0.05 mg/l. This level is to prevent post-treatment precipitation in the distribution system. Considering SMCL's are based upon cosmetic or aesthetic effects, many concerns exist regarding the possible toxic levels of aluminum. Further guidance is needed in order to answer the following questions.

1. At what level, if any, does aluminum become toxic?
2. What adverse health effects results from aluminum exposure?
3. What are the high risk groups?

**Response:**

In assessing the potential risks of ingesting aluminum in drinking water, EPA has determined the following:

Aluminum, which is the most abundant metal and the third most abundant element (behind carbon and silicon), is an ever present substance with a variety of uses. Although aluminum compounds (e.g. aluminum/sulfate) are used as coagulants in drinking water treatment, food is the major source of exposure. Food contributes anywhere from 9-30 mg/d, while drinking water accounts for 0.02-4 mg/d (assuming consumption of 2L/d) and finally, air which is measured in the very low ug/cubic meter range. In general, the adverse health effects from ingested aluminum are not clear. Further research is needed, and EPA has initiated studies which they hope will determine what effects, if any, result from the ingestion of aluminum. Aluminum has been linked to some neurological disorders such as Alzheimer's Disease. There is, however, no conclusive evidence that ingested aluminum causes the disease.

Again, this issue is controversial and under investigation. Persons with chronic or long term kidney disease seem to make-up the high risk group. Persons with kidney disorders should consult their physician regarding aluminum levels.

In conclusion, the toxicity of ingested aluminum is a matter of controversy and conjecture. In addition to the U.S., aluminum has not been regulated in drinking water by Canada or Europe. Until issues concerning aluminum toxicity (and specifically neurotoxicity) are resolved, the proposed SMCL of 0.5 mg/l is recommended. This practice would assure optimum aesthetic quality of the water and obviate any possible health concerns that might exist.