

ILLINOIS POLLUTION CONTROL BOARD
August 8, 1991

VILLAGE OF BENSENVILLE,)
)
 Petitioner,)
)
 v.) PCB 91-66
) (Variance)
)
 ILLINOIS ENVIRONMENTAL)
 PROTECTION AGENCY,)
)
 Respondent.)

CONCURRING OPINION (by J.D. Dumelle):

The Bensenville petition in Paragraph 33 speaks of the need to do water main looping to eliminate dead ends and to install large diameter mains to obtain increased flows. (See Attachment 2). All of these improvements to a water system can be done now without a variance from restricted status.

Thus the only hardship might be that new development is pending. But that is alleged only in general terms in Paragraph 32. No specific developments are mentioned at all.

Benesenville's radium levels are given as 18.2 pCi/l according to the IEPA Recommendation (p.4). The cancer risk at the 5 pCi/l standard is 1-in-14,300 over a lifetime. The cancer risk at 18.2 pCi/l is about 1-in-3,950. That is an extremely high risk and about 250 times higher than the usual 1-in-1,000,000 risk used to set limits for chemical exposure.

In late 1991 Benesenville will probably begin to receive Lake Michigan water. Full service may occur during 1992. Thus any new development (and none has been alleged) would probably not be constructed and inhabited until the low-radium water is in use.

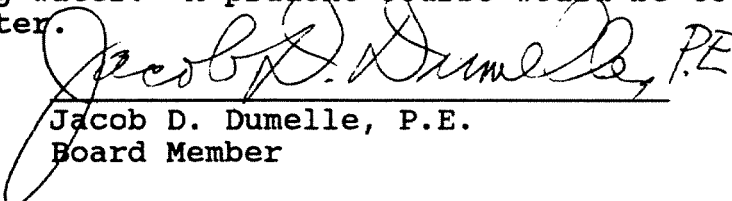
The Illinois Department of Nuclear safety in its "Background Document on Radium in Drinking Water" of August 25, 1986 filed in R85-14 stated on p. 5,

...Radium uptake, i.e., fraction of radium absorbed and transferred to the bone, also appears to vary with age and calcium intake. Muth and Globel found an age dependence of radium-226 concentration in human bone that coincided with periods of rapid skeletal growth. They believed that during these periods of rapid growth (0-1 yr and 10-16 yr) it was probable that radium-226 was incorporated into the hydroxylapatite crystals, a component of the bone matrix, with minimal discrimination against calcium,


resulting in a higher concentration of radium-226. They concluded that the lower intake of calcium per person per day in Germany explains their finding of higher transfer of radium from the diet to the skeleton ("Age Dependent Concentration of Radium-226 in Human Bone and Some Transfer Factors from Diet to Human Tissues"; Health Phys. 44, Suppl. 1, 113-121).

Parks and Keane suggest that younger people have an increased risk per unit intake of radium because of greater bone formation rates and a higher initial retention of radium ("Consideration of Age-Dependent Radium Retention in People on the Basis of the Beagle Model," Health Phys. 44, Suppl. 1, 103-112). In addition, the very young have a longer potential latent period (Advisory Report on the Health Effects of Ra-226 in Drinking Water, 1978). Calabrese points out that the gastrointestinal absorption of pollutants by young children is significantly higher than absorption by adults. A marked sensitivity of children to the toxic effects of ionizing radiation has been reported (Pollutants and High-Risk Groups: The Biological Basis of Increased Human Susceptibility to Environmental and Occupational Pollutants, 1978).

It thus appears that children up through age 16 are most at risk from radium in drinking water. A prudent course would be to have them use low-radium water.


Jacob D. Dumelle, P.E.
Board Member

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Concurring Opinion was submitted on the 16th day of August, 1991.


Dorothy M. Gunn, Clerk
Illinois Pollution Control Board