

equal to or exceeding the 45 mg/l NO₃ standard have been measured: Wabash, Embarrass, Illinois, Vermillion. (R. 162, Nov. 3, 1971) Mr. Harmeson also named additional rivers where the nitrate levels are trending upward toward the standard. These include the Edwards, Kankakee, Kaskaskia, Mackinac and Sangamon. Six of these nine rivers are used as municipal drinking water sources. As recently as early March 1972 a report was released by the Macon County (Decatur area) Health Department by Dr. Fred Grosz showing nitrate violations on 16 days between December 27, 1971 and February 1, 1972 of 21 days tested in Lake Decatur which is fed by the Sangamon River.

How severe is the problem? We do not know on the record the extent of the "safety factor," if any, built into the 45 mg/l NO₃ standard and so we do not know how urgently to view the necessity to take action. Are high nitrates in drinking water as urgent to reduce as mercury or pesticide residues for example?

Dr. Abraham Gelperin, a physician at the University of Illinois, indicated an abrupt threshold of no methemoglobin in infants at water nitrate levels below 35 mg/l (August 4, 1971, p. 127-8). Presumably some methemoglobin can be tolerated by infants and the 45 mg/l standard would seem to have some safety margin built into it. Of course, this is not conclusive, all we seem to know is that the prestigious U.S. Public Health Service set the 45 mg/l NO₃ standard in 1962 (perhaps earlier) and that the World Health Organization has followed suit. On the other hand, the State of California (alone of the 50 states) has doubled the standard to 90 mg/l.

Dr. Gelperin, in an extended appearance before the Board on August 4, 1971, discussed his preliminary findings based on crude data of a significant increase of 56.8% in the death rate of female babies in high nitrate water Illinois counties compared to low nitrate water Illinois counties over a ten year period. Dr. Gelperin promised to refine his data prior to December 10, 1971 (the last scheduled Board hearing in this proceeding) and at this writing, almost four months later, has not done so (p. 135). I would urge him to complete his study. What could be more urgent than the prevention of infant deaths?

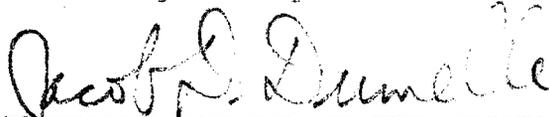
Another disappointment to me in this proceeding was the lack of data from blood testing of persons for methemoglobin levels in the Decatur area compared to St. Louis (where presumably no drinking water nitrate problem exists). The study was promised to be completed by March 31, 1972 but just got underway in March. Preliminary data show Decatur methemoglobin levels twice those of St. Louis residents but the significance of the finding is not validated or known. Furthermore the postulated existence of adults with enzymatic deficiencies such that high nitrates cannot be tolerated is yet to be proven. Again, a public health problem may exist but we do not know its dimensions.

To the second question, one can outline other solutions not explored in this record. Since nitrates are high in Decatur for only short periods in a year, the water supply authority could presumably dilute its pumpage by 10% or more with a low nitrate water source, if one is available. Or the water department might remove nitrates. But we do not know the feasibility and cost of either of these alternatives. And they do have the disadvantage of putting the cost burden on parties which did not cause the high nitrates. Other alternatives such as restricting the use of nitrate fertilizers in selected watersheds such as the Sangamon River should be considered. The record suggests that agriculture is likely the greatest single contributor of nitrates in certain streams such as the Sangamon. There is no basis in the record for assuming either that the present rate of nitrate application is environmentally proper or that it is even that rate at which optimum uptake by the crop occurs. The record does indicate that because a farmer has no adequate method for determining the nitrogen content of his soil (soil profile) the individual farmer may well be applying nitrogen beyond that level necessary for optimum crop growth with the result that needless excess almost certainly flows to the streams of Illinois. Once a widely-used method for determining soil profile is developed, rate restrictions along the lines of the proposed regulations may well be in order. While the kind of regulations needed for a complete answer to the problem have not been fully explored a restraint on rate of application could have some desirable environmental effect without disrupting food supply.

Let us draw the parallel between watersheds and airsheds. The watershed leading to Lake Decatur is overloaded with nitrates. To lessen the concentration by dilution one either adds to the water supply by a ground water source or by inter-basin diversion of additional water. This is like pulling additional fresh air into Chicago and is certainly more feasible to do with water than with air. But if we leave the water supply as being fixed in quantity, then we obviously have too many nitrate sources for the assimilative capacity of the water (legally defined as 45 mg/l NO_3). And the parallel is to have too many air pollution sources, even well-controlled, in a limited airshed. Since on the state of this record we cannot adequately answer the second question as to the solution of the problem we are left adrift with the third question which asks if the solution can be afforded. I can only urge the Institute for Environmental Quality to bring in what relevant testimony it can within a short time and certainly no later than October 1972.

A further point in this record needs to be addressed. Agricultural witnesses in this proceeding made the point repeatedly that if nitrates are a problem then education and the voluntary approach to fertilizer reduction are the best methods to use. I am not sure

based upon Illinois' experience in soil conservation that the voluntary approach will work. In the 1967 publication, Water for Illinois: a plan for action the statement appears that only 29% of Illinois farms containing 23% of the acreage had conservation plans (p. 200). One may well ask, if in 30 plus years of voluntary soil conservation programs only 29% of the farms had seen fit to comply then is voluntary compliance the way to reduce what may be a severe public health nitrate hazard? Former Secretary of the Interior Walter J. Hickel, in his new book Who Owns America?, in discussing the generally unsuccessful attempts of Interior's Bureau of Mines to get mine owners to voluntarily comply with safety standards, capsules his analysis and decision as "...after fifty years of trying to educate it was time to get a good deal firmer." I hope that Illinois will shortly find a way to solve its high nitrate drinking water problem.



Jacob D. Dumelle
Board Member

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Concurring Opinion was submitted and filed on the 6th day of April 1972.



Christan L. Moffett, Clerk
Illinois Pollution Control Board