ILLINOIS POLLUTION CONTROL BOARD

April 14, 1971

PHOSPHATE WATER STANDARDS

Supplemental opinion (Samuel R. Aldrich, Board Member)

There are a few sections of the opinion with which I do not concur.

Page 1. Rate of phosphorus inputs

The opinion states that man's activities including agriculture have greatly increased nutrient additions to the lake. This is not supported by studies by the Illinois State Geological Survey of bottom sediments in southern Lake Michigan. The top 1 inch or less of bottom deposits averages no higher in phosphorus than the layer immediately below or of several other more deeply buried layers representing deposits many thousands of years old. If the sewage from Chicago were being discharged into Lake Michigan, which it is not, the phosphorus input would be very large indeed.

It is my opinion that, with the possible exception of increased animal wastes, the introduction of agriculture has had little effect on the phosphorus available for accelerated eutrophication. When grass, leaves, and weeds are left entirely on the surface as in the virgin condition, soluble organic phosphorus compounds resulting from decay are more likely to be carried off into surface waters than when crop residues are incorporated into the soil through farming practices. I feel that this explains the unexpected concentrations of phosphorus in bottom sediments previously described.

Page 9. The proper method for determining phosphorus in water.

The opinion states that total rather than filterable phosphorus is the proper method to assess potential for eutrophication. I agree that this is the correct method for Lake Michigan. Filterable phosphorus by itself fails to measure the phosphorus that is temporarily bound within the tissues of living and dead organisms including higher plants that are in suspension and thus included in the water sample. There is, of course, an additional reserve in the form of dead plant residues and phosphorus loosely held in bottom deposits.

Total phosphorus is not a suitable measurement on the streams of Illinois in which there is an appreciable amount of suspended soil particles. Much of the phosphorus that is associated with soil particles is unavailable or only very slowly released into water. Although this subject urgently needs additional research, it appears likely that a given amount of phosphorus attached to soil particles will support only 1/4 to 1/7 as much algal biomass growth as the same amount of phosphorus in soluble phosphorus compounds (R. M. Gerhold and J. E. Thompson, 1969).

Several soil scientists who are authorities on phosphate chemistry suggest that soil sediment-associated phosphorus is 10 to 30 percent as available for supporting eutrophication as phosphorus in solution.

Samuel R. Aldrich
Member, Illinois Pollution Control Board

I, Regina E. Ryan, Clerk of the Illinois Pollution Control Board certify that Dr. Samuel R. Aldrich submitted the ~~above~~ opinion on 14 of April 1971.

Regina E. Ryan
Clerk, Illinois Pollution Control Board