

ILLINOIS POLLUTION CONTROL BOARD  
April 4, 1985

IN THE MATTER OF: )  
 )  
AMENDMENTS TO 35 ILL. ADM. CODE ) R84-12  
604.203 AND 605.104 OF )  
SUBTITLE F: PUBLIC WATER )  
SUPPLIES (Trihalomethanes) )

PROPOSED RULE BY THE BOARD.

PROPOSED OPINION AND ORDER OF THE BOARD (by J. D. Dumelle):

On October 5, 1982, the Board adopted amendments to Chapter 6: Public Water Supply (now 35 Ill. Adm. Code Subtitle F) in R81-11 (49 PCB 101).<sup>\*</sup> That action established a maximum allowable concentration of 0.10 mg/l for Total Trihalomethanes (TTHM) in finished drinking water (35 Ill. Adm. Code 604.203), as well as a sampling program (35 Ill. Adm. Code 605.104). Those rules, however, applied only to water supplies serving over 10,000 individuals. In the Second Notice Opinion issued on July 21, 1982 (47 PCB 453), the Board stated:

Since these smaller supplies generally use ground water sources and have shorter transport times, they are considerably less likely to have TTHM levels exceeding the 0.10 mg/l standard. At the same time, universal applicability would greatly increase the number of water sample analyses which the Illinois Environmental Protection Agency would have to perform. After more data are gathered on existing TTHM levels, the Board may consider an additional rulemaking to protect public water supplies serving less than 10,000 people.

Thus, on May 3, 1984, the Board entered an Order authorizing inquiry hearings "to consider expanding the applicability of 35 Ill. Adm. Code 604.203 and 605.104." Two such hearings were held on August 16 and 28, 1984.

Trihalomethanes are organic chemicals consisting of one carbon atom, one hydrogen atom and three halogen atoms (R81-11,

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<sup>\*</sup>Given the close relationship between this proceeding and R81-11, the Board incorporates by reference the record, opinions and orders of that proceeding into this one. References to the R81-11 transcript and exhibits will be given as (R81-11, \_\_\_ ) and (R81-11, Ex. \_\_\_ ) respectively.

Trihalomethanes are organic chemicals consisting of one carbon atom, one hydrogen atom and three halogen atoms (R81-11, 21). These are formed when free chlorine reacts with naturally occurring compounds which are generally produced by decaying vegetation (R81-11, 21). Thus, TTHM are unlikely to be found in water supplies which are not chlorinated or which has a water source low in organics. Research by the National Cancer Institute and the National Academy of Sciences shows that TTHMs may be carcinogenic and can lead to liver or kidney disorders, birth defects and central nervous system damage (R81-11, 23 and R81-11, Ex. 9).

In recognition of these possible adverse health effects, the United States Environmental Protection Agency (USEPA) promulgated federal regulations (44 Fed. Reg. 68624, R81-11, Ex. 4, R81-11, 23-24) establishing a maximum allowable concentration of total trihalomethanes of 0.10 mg/l and monitoring schedules. The federal regulations are part of the Interim Primary Drinking Water Regulations (40 CFR Part 141) under the Safe Drinking Water Act (42 U.S.C. 300f et seq.) which requires states to adopt rules at least as stringent as the USEPA rules to retain primary enforcement responsibilities (R81-11, 27). If primacy is not retained, federal funding of the program could be lost for the entire public water supply program (R81-11, 28-29).

The present TTHM standard of 0.10 mg/l applicable to public water supplies serving over 10,000 people was set on the basis of the USEPA standard which in turn was at a level which was estimated to allow for "one excess cancer death for every 10,000 to 100,000 people with a lifetime exposure to this in their drinking water" (R81-11, 24). This has allowed the state to retain primacy.

The only testimony presented at the two inquiry hearings was by Agency personnel. The Agency's position was summarized by Ira Markwood, Manager of the Public Water Supply Section:

Okay. I'm not convinced that trihalomethanes are really a problem. I'm also not convinced that they're not a problem. I think that the question is a little too hazy to be resolved really by reasonable regulations based upon the fact that there is not an infinite reservoir of resources.

If we had all the resources that we needed, it would be nice to go ahead with, but we don't. It has to be selective. So, on that basis, I would not think that trihalomethane regulations would be a priority for regulation at this time (R. 42-43).

It is the concensus of the Board of Trustees that research to date does not justify the current requirement that establishes a maximum allowable concentration of 0.10 mg/l for Total Trihalomethanes (TTHM) in drinking water (35 Ill. Adm. Code 604.203). That is, we feel it has not been proven that trihalomethanes at this concentration level are carcinogenic. Accordingly, we see no reason to extend the current rule, which covers supplies over 10,000 individuals, to smaller supplies.

Our opposition to further extension of the TTHM regulation is not to be construed to imply that individuals from smaller communities are not entitled to the same protection as those from larger communities. Rather, it is based on our opinion that current regulation is unwarranted and its cost therefore unjustified. On the other hand, the Illinois Section would be the first to encourage the universal application of any regulation that had been proven to be essential to health protection.

There are two initial questions: (1) Are low level TTHMs carcinogenic? and (2) Is the cost of a monitoring program justified? The Agency and the AWWA are unconvinced that TTHMs are carcinogenic, and the Agency also believes that the chance of TTHM exceedances in small supplies is very low. The USEPA, however, continues to require states to have limitations and monitor supplies over 10,000 in order to retain primacy. While the Agency supported the present regulations, it made it clear that the sole reason was to retain primacy (and the concomitant federal funding).

The cost of sampling is \$25-80 per sample (R81-11, Ex. 4 and RII. 6),\* and the Agency argues that it simply could not meet the sampling requirements if they were extended to smaller supplies (R. 11-12 and 15). In fact, the Agency is currently 20,000 analyses (or three months) behind in its sampling program (R. 23, 24, 32 and 33). Covering all supplies would add 27,364 analyses per year (R. 32). This is because there would be 340 additional surface water supplies covered for which four samples per quarter

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\*The transcripts of the August 16 and 28 hearings both begin on page 1. Therefore, references to the August 16 transcript will be referred to as (R.\_\_) and to August 28 as (RII.\_\_).

(continued)

or sixteen samples per year are required. Thus, 6,841 additional samples per year would be required resulting in the 27,364 analyses since four analyses are performed on each sample. According to the Agency, these costs must be borne by it, not by the affected supplies (R. 11).

In regard to the health effects of TTHMs, about all that is clear is that the effects are uncertain. As summarized by the Economic Impact Study prepared for R81-11, "despite the fact that epidemiological studies have shown inconsistent results, the consensus of opinion regards TTHMs as a potential health hazard" (EcIS p. 53). Mr. Markwood attended National Drinking Water Advisory Council meetings concerning TTHM at which "some ... speakers were in favor of very strict trihalomethane regulations," while others "were not convinced that the trihalomethanes were carcinogens" (R. 7-8). He concluded that "the arguments on both sides were equally valid so that the question as to whether trihalomethanes were carcinogens was very indeterminate" (R. 8). Ames tests to determine the carcinogenicity of chloroform have been negative (RII. 13). A study by Dr. Jorgenson of Stanford Research using rats and mice who had been fed for 105 weeks varying doses of up to 1800 milligrams per liter of chloroform, "found that the rats that were fed even at the highest dosage were the sleeker, healthier appearing animals [and] actually seemed to have a longer life span than the control animals" (RII. 24). However, some kidney tumors were found in the rats (RII. 25). Other studies before the Board are also inconclusive (Ex. 2).

Based on the record presently before the Board, it appears that TTHMs are a potential, but not a proven, health hazard. Thus, a fundamental question arises as to how great the potential harm to the public health must be before the Board will regulate to avoid that harm. The answer is in large part dependent upon the cost of the regulatory program which includes sampling, analysis and compliance costs.

There are several treatment techniques for TTHM removal. (See EcIS, pp. 38-45 and Ex. I.) Mr. Joseph Harrison, Chief of the Water Supply Branch, Region V Office of the USEPA, has indicated that compliance can be achieved through only minor alterations of treatment processes resulting in minimal cost increases (EcIS, p. 50). Although this was in reference to supplies serving over 10,000 people, there is no apparent reason why that would not also be true of smaller supplies. Further, Mr. Markwood testified that based on the Agency's "experience," it "would expect that the smaller supplies ... would ... not exceed the maximum allowable concentration" (R. 11). That being the case, there is no reason to expect significant compliance costs.

Thus, only sampling and analysis expenses appear to be of concern. The Agency believes that "any expense for analyses of drinking water from these supplies would not serve any useful

purpose" (R. 11). Karl Reed, Manager of the Quality Assurance and Laboratory Certification Section of the Division of Laboratories for the Agency, testified that the Agency has estimated that expanding the trihalomethane testing requirement to all public water supplies would add 340 surface and 1,401 groundwater supplies representing 6,841 new trihalomethane samples per year and, since there are four analyses per sample, this results in 27,364 analyses (R. 32). He also testified that additional resources required to analyze the 6,841 samples include three gas chromatographs at \$32,000 each, a data system attached to the chromatographs at \$28,000; and two refrigerators at \$1,000 each for a total of \$126,000 (R. 33). Further, the Agency would need two additional chemists at approximately \$20,000 per year, one lab technician at \$15,000 per year and one lab helper mainly to prepare bottles at \$12,000 per year for total personnel costs of \$67,000 per year (R. 33). Expenses for chemicals and glassware would be \$30,000 (R. 33 and 34). Finally, the laboratory would need approximately 800 square feet to absorb the additions of equipment, people and to provide room for mailing out the estimated 300 sample bottles per week. No estimate of that cost was given.

There are, however, alternatives to simply eliminating the 10,000 person limitation. If the Board were to make the finished water quality standard applicable to all supplies, but not require sampling or analysis, all these expenses would be avoided. Of course, minimal enforcement of the standard would be expected.

There is also a large middle ground which can be created by varying the size of the class of supplies required to sample and the sampling frequency. There appears to be little reason, for example, to require sampling of groundwater supplies since the risk of such supplies exceeding the TTHM standard is minimal and does not appear to justify the expense. Elimination of those supplies reduces the number of affected supplies to 340, thereby reducing the number of additional samples by 1401 per year. Further, since the smaller surface water supplies are less likely to exceed the TTHM standard it is reasonable to reduce sampling frequency. Surface supplies serving over 10,000 people must, at least initially, submit four samples per quarter (16 samples per year). On the other hand, groundwater supplies serving over 10,000 people need only submit one sample per year unless a problem is found.

Since TTHM exceedances are not anticipated for smaller supplies, annual sampling should provide adequate protection of the public health, especially since the only evidence of harm from TTHM is based upon long-term effects. Under such a rule, only 340 additional samples per year would be required rather than the 6,841 that the Agency objects to, and 1,360 analyses rather than 27,364. This would add less than one week to the Agency's analysis backlog and would avoid most, if not all, of the additional expenses listed by the Agency. The cost to the

Agency, therefore, should be about \$10,880 per year for the additional analyses (assuming \$32 cost per sample analyzed). This does not appear to be an unreasonable administrative expense given the potential adverse health effects of TTHM.

Therefore, the Board proposes to amend 35 Ill. Adm. Code 604.203 such that the TTHM standard of 35 Ill. Adm. Code 604.202 will be made applicable to all public water supplies by January 1, 1988, and to amend 35 Ill. Adm. Code 605.104 such that the sampling requirement will be extended to surface water supplies serving fewer than 10,000 people. Such supplies will be required to sample in the same manner as groundwater supplies which serve 10,000 people or more.

#### ORDER

The Board hereby proposes the following amendments to the Illinois Administrative Code Title 35: Environmental Protection; Subtitle F: Public Water Supplies; Chapter I: Pollution Control Board, as follows:

#### **Section 604.203 Exceptions to Maximum Allowable Concentrations**

- a) **Fluoride:** Those counties of the State north of and including the counties of Henderson, McDonough, Fulton, Tazewell, McLean, Ford and Iroquois shall have a maximum allowable fluoride concentration of 2.0 mg/l.
- b) **Iron and Manganese**
  - 1) Community water supplies which serve a population of 1000 or less or 300 service connections or less shall be exempt from the standards for iron and manganese.
  - 2) All other water supplies shall comply with these standards by July 1, 1981. Iron in excess of 1.0 mg/l and manganese in excess of 0.15 mg/l may be allowed at the discretion of the Agency if sequestration tried on an experimental basis proves to be effective. If sequestering is not effective, positive iron or manganese reduction treatment as applicable must be provided. No experimental use of a sequestering agent may be tried without previous Agency approval.
- c) **Nitrate-Nitrogen:** The provisions of Section 604.204 notwithstanding, compliance with the maximum allowable concentration for nitrate shall be determined on the basis of the mean of two analyses. When a level exceeding the maximum allowable concentration for nitrate is found, a second analysis shall be initiated within 24 hours, and if the mean of the two analyses exceeds the maximum allowable

concentration, the owner or operator of the public water supply shall report his findings to the Agency pursuant to 35 Ill. Adm. Code 606.102 and shall notify the public pursuant to 35 Ill. Adm. Code 606.

d) Total Trihalomethanes:

- 1) The average of Total Trihalomethanes concentration in the finished water of four samples of any four consecutive quarters per treatment plant or per aquifer shall not exceed the limit listed in Section 604.202.
- 2) Supplies serving ~~75,000~~ 10,000 or more individuals shall comply with the Total Trihalomethanes standard listed in Section 604.202 by the effective date of these regulations. ~~Supplies serving 10,000 to 74,999 fewer than 10,000 individuals shall comply with this standard by November 5, 1983 January 1, 1988.~~ This standard does not apply to supplies serving less than 10,000 individuals.
- 3) If the average of samples covering any twelve-month period exceeds the Maximum Allowable Concentration for Total Trihalomethanes, as listed in Section 604.202, the owner or operator of the supply shall notify the Agency pursuant to Section 606.102 and give notice to the public pursuant to Sections 606.201 - 606.205 of these Rules. Monitoring after public notification shall be at the frequency required by Section 605.104.

e) Turbidity:

- 1) Turbidity in drinking water shall not exceed one turbidity unit at a point where water enters the distribution system unless it can be demonstrated that a higher turbidity not exceeding 5 Nephelometric Turbidity Units (NTU) does not:
  - A) interfere with disinfection, or
  - B) cause tastes and odors upon disinfection, or
  - C) prevent the maintenance of an effective disinfection agent throughout the distribution system, or
  - D) result in deposits in the distribution system, or
  - E) cause customers to question the safety of their drinking water.

- 2) The provisions of Section 604.204 notwithstanding, if a turbidity measurement exceeds the maximum allowable concentration, a resample must be taken as soon as practicable, and preferably within one hour. If the check-sample confirms that the standard has been exceeded, the Agency must be notified within 48 hours. The value of the check-sample shall be the value used in calculating the monthly average. If the monthly average of the daily samples taken in accordance with 35 Ill. Adm. Code 605.109 exceeds the maximum allowable concentration, or if the average of two samples taken on consecutive days exceeds 5 NTU, the owner or operator of the public water supply shall report to the Agency and notify the public as directed in 35 Ill. Adm. Code 606.

#### **Section 605.104 Frequency of Trihalomethane Analysis Sampling**

- a) Surface Water Sources for Supplies Serving Over 10,000 Individuals: Supplies serving over 10,000 individuals shall submit at least four samples per treatment plant per quarter for analysis or analytical results from a certified laboratory for Total Trihalomethanes to the Agency. After results of four consecutive quarters demonstrate consistent Total Trihalomethanes concentrations below the Maximum Allowable Concentration, and upon written application by the supply, the Agency may reduce the sample frequency to one sample per quarter until the Maximum Allowable Concentration is exceeded or until a significant change in source or treatment method is made.
- b) Surface Water Sources for Supplies Serving Fewer Than 10,000 Individuals: Surface water sources for supplies serving fewer than 10,000 individuals shall submit at least one initial sample per treatment plant for MTP analysis. After written request by the supply and the determination by the Agency that the results of the sample and local conditions indicate that the supply is not likely to approach or exceed the Maximum Allowable Concentration, the supply shall continue to submit one annual sample per treatment plant, or report of analysis by a certified laboratory to the Agency. If the sample exceeds the Maximum Allowable Concentration or cannot be analyzed for MTP, the supply shall submit samples in accordance with Section 605.104(a).
- c) Ground Water Sources for Supplies Serving Over 10,000 Individuals: Supplies serving 10,000 individuals or more shall submit at least one initial sample per treatment plant for MTP analysis. After written request by the supply and the determination by the Agency that the



results of the sample and local conditions indicate that the supply is not likely to approach or exceed the Maximum Allowable Concentration, the supply shall continue to submit one annual sample per treatment plant, or report of analysis by a certified laboratory to the Agency. If the sample exceeds the Maximum Allowable Concentration or cannot be analyzed for MTP, the supply shall submit samples in accordance with Section 605.104(a).

d) Ground Water Sources for Supplies Serving Fewer Than 10,000 Individuals: Supplies serving fewer than 10,000 individuals are not required to submit any samples for trihalomethane analysis.

ee) Significant changes in water sources or treatment will require testing in accordance with Section 605.104(a).

df) If the result of an analysis made pursuant to the reduced monitoring schedules provided by Section 605.104(a) indicates that the level of Total Trihalomethanes exceeds the Maximum Allowable Concentration listed in Section 604.202 the owner or operator of the supply shall initiate analysis of one check sample promptly after the exceedance is reported to the supply. If the check samples confirms that the level of Total Trihalomethanes exceeds the Maximum Allowable Concentration, the supply shall sample in accordance with the frequency set out in Section 605.104(a), for at least one year.

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Proposed Opinion and Order was adopted on the 4th day of April, 1985, by a vote of 5-0.

Dorothy M. Gunn  
Dorothy M. Gunn, Clerk  
Illinois Pollution Control Board