

ILLINOIS POLLUTION CONTROL BOARD
May 14, 1987

CITY OF ROCK ISLAND)
)
 Petitioner,)
)
 v.) PCB 87-13
)
 ILLINOIS ENVIRONMENTAL)
 PROTECTION AGENCY,)
)
 Respondent.)

MR. ROY M. HARSCH, MARTIN CRAIG, CHESTER AND SONNENSCHNEIN,
APPEARED ON BEHALF OF PETITIONER.

MR. THOMAS DAVIS APPEARED ON BEHALF OF RESPONDENT.

OPINION AND ORDER OF THE BOARD (by R. C. Flemal):

This matter comes before the Board on the petition for variance filed on January 30, 1987, by the City of Rock Island ("Rock Island"). Rock Island seeks a two-year variance from 35 Ill. Adm. Code 602.105(a) "Standards For Issuance" and 602.106(b) "Restricted Status" to the extent those rules relate to the exceedence in Rock Island's public water supply of the 0.10 milligram per liter total trihalomethane ("THM") maximum allowable concentration of 35 Ill. Adm. Code 604.202.

By Order dated February 5, 1987, the Board asked that Rock Island provide additional information regarding the concentrations of trihalomethanes encountered in its water supply and the locations from which samples have been taken. Rock Island responded to this Order by filing received by the Board on February 27, 1987.

On February 23, 1987, the Board received objections to the requested relief from five users of Rock Island water. These objections triggered a hearing in this matter, and hearing was accordingly ordered by the Board on March 5, 1987; hearing had otherwise been waived by Petitioner.

On April 10, 1987, the Illinois Environmental Protection Agency ("Agency") filed a Recommendation in support of grant of variance subject to conditions.

Hearing was held on May 1, 1987, in Rock Island, and attended by the parties and a member of the press. None of the five objectors was in attendance.

On May 7, 1987, Rock Island filed a Motion for Expedited Decision. On May 13, 1987, the Agency filed a response in support of this motion. The motion is granted.

FACILITIES

Rock Island owns and operates a public water treatment plant and distribution system located in Rock Island, Illinois. The plant provides clarified, filtered, and disinfected water to approximately 47,000 residents and 1,000 businesses in Rock Island.

Rock Island's source of raw water is the Mississippi River. A pumping station pumps the raw water to the treatment plant. The distribution system consists of cast iron, steel, and ductile iron mains. The water treatment facilities have a current capacity of approximately 16 million gallons per day ("mgd"). Average pumping rates have been between 7.0 and 7.5 mgd over the past four years.

Rock Island provides primary clarification through rapid-mix flocculation and sedimentation, aided by the addition of alum and lime. Flocculated raw water solids settle in sedimentation basins, and some of the settled solids are routed to a sludge thickener. Clarified water from the sedimentation basins passes through gravity filters for filtration of the remaining solids. Finished water flows to "clear lakes" (finished water reservoirs) after disinfection and fluoridation. It is then routed either into on-site "dome storage" or pumped into the distribution system.

REGULATORY FRAMEWORK

Trihalomethanes are a family of organic compounds, named as derivatives of methane (CH_4), where three of the four hydrogen atoms are substituted by a halogen atom. Although halogens can include fluorine, chlorine, bromine, and iodine, only THM compounds in which chlorine and bromine act as substituents occur commonly. Thus, the principal THMs of concern are CHCl_3 (chloroform = trichloromethane), CHBr_3 (bromoform = tribromomethane), CHBrCl_2 (dichlorobromomethane), and CHClBr_2 (dibromochloromethane).

THMs in drinking water are most commonly produced by the reaction of chlorine and lesser amounts of bromine with naturally occurring organic precursors (e.g., humic or fulvic acid) found in source waters. Chlorination of drinking waters is a standard means of disinfecting raw waters. Similarly, many raw waters contain the organic precursors of THM. Thus, THMs are commonly found in drinking water supplies throughout the United States.

In recognition of a variety of health effects occasioned by exposure to THM, the U.S. Environmental Protection Agency promulgated in 1979 a maximum concentration limit for drinking water of 0.10 mg/l of total THM. Illinois subsequently adopted the same limit as the maximum allowable concentration under Illinois law.

However, the action that Rock Island here requests is not variance from the 0.10 mg/l total THM standard; irrespective of the action taken by the Board in this matter, that standard will remain applicable to Rock Island. Rather, the action Rock Island requests is the temporary lifting of prohibitions imposed pursuant to 35 Ill. Adm. Code 602.105 and 602.106. In pertinent part these sections read:

Section 602.105 Standards for Issuance

- a) The Agency shall not grant any construction or operating permit required by this Part unless the applicant submits adequate proof that the public water supply will be constructed, modified or operated so as not to cause a violation of the Environmental Protection Act (Ill. Rev. Stat. 1981, ch. 111 $\frac{1}{2}$, pars. 1001 et seq.) (Act), or of this Chapter.

Section 602.106 Restricted Status

- a) Restricted status shall be defined by the Agency determination pursuant to Section 39(a) of the Act and Section 602.105, that a public water supply facility may no longer be issued a construction permit without causing a violation of the Act or this Chapter.
- b) The Agency shall publish and make available to the public, at intervals of not more than six months, a comprehensive and up-to-date list of supplies subject to restrictive status and the reasons why.
- c) The Agency shall notify the owners or official custodians of supplies when the supply is initially placed on restricted status by the Agency.

Illinois regulations thus provide that communities are effectively prohibited from extending water service, by virtue of not being able to obtain the requisite permits, if their water fails to meet any of the several standards for finished water supplies. This provision is a feature of Illinois regulations not found in federal law. It is this effective prohibition which Rock Island herein requests be lifted.

An additional facet of Illinois regulations pertinent to the instant matter is the averaging provision associated with THM, as found at 35 Ill. Adm. Code 604.203(d)(1):

(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.

Thus, to be in violation of the THM maximum allowable concentration of 0.10 mg/l (the limit listed in Section 604.202), it is necessary that the average of samples from four consecutive quarters exceed 0.10 mg/l. Conversely, a determination of compliance requires that the average of samples from four consecutive quarters be below 0.10 mg/l.

TRIHALOMETHANES IN ROCK ISLAND'S WATER SUPPLY

Rock Island was first advised that it was being placed on restricted status by letter from the Agency dated August 19, 1986. This action was occasioned by the presence of THM in the Rock Island water supply, as revealed by sampling, in excess of the 0.10 mg/l maximum allowable concentration. Rock Island has provided results of analyses, all gathered at points within the distribution system, and summarized as follows¹:

<u>Date</u>	<u>No. of Analyses</u>	<u>Average Concentration</u>
September 22, 1981	4	.233
February 18, 1982	4	.084
June 2, 1982	4	.175
April 20, 1983	4	.045
September 7, 1984	4	.139
February 14, 1985	4	.074
May 7, 1985	4	.161
July 17, 1985	4	.457
September 8, 1985	4	.262
April 4, 1986	4	.165
June 18, 1986	4	.287
October 22, 1986	4	.165

¹ Analyses dated from September 1981 through October 1986 were provided in Rock Island's February 27, 1987, filing, p. 3-5. Results of later analyses were provided at hearing (R. at 15; Exhibit 4). The former analyses were made when chlorine was used as the disinfectant, the latter since chloramine has been used.

February 4, 1987	4	.011
February 12, 1987	5	.011
February 17, 1987	4	.004
March 2, 1987	4	.004
March 9, 1987	2	.002
March 19, 1987	2	.054
March 25, 1987	4	.068
April 2, 1987	4	.077
April 8, 1987	2	.046
April 9, 1987	2	.041
April 14, 1987	4	.042
April 23, 1987	4	.072
April 24, 1987	2	.058

COMPLIANCE EFFORTS AND COMPLIANCE STATUS

Although it is agreed that the THMs in the Rock Island water supply may be accounted for by the "normal" process of the reaction of disinfection chlorine with organic substances within the raw water, it is not entirely clear why the Rock Island system should have experienced THM concentrations elevated to the degree encountered in samples. Therefore, it has also not been clear as to what corrective methods may be employed to reduce the THM concentrations to acceptable levels.

Accordingly, Rock Island has undertaken a variety of steps and system modifications in an attempt to find a solution. As early as the spring and summer of 1982, Rock Island installed an aeration system which it believed might reduce the levels of volatile organic precursors. In the summer of 1983, Rock Island also introduced at appropriate positions in the system both potassium permanganate and a synthetic coagulant. The former was intended to reduce disinfection demand and to provide an oxidant for organic precursors; the latter was intended to reduce organic precursors by providing for maximum contact time. Unfortunately, none of these activities proved effective in reducing THM levels, as subsequent sampling showed.

Somewhat more effective was movement of the injection point for prechlorination down-system within the overall treatment process. This action was designed to reduce chlorine contact period and to provide disinfection after maximum settling of flocculated colloids, while still insuring total bacteriostatic measures.

Subsequent to receiving notice of restricted status from the Agency, Rock Island examined and instituted a number of additional projects. These have included relocation of the point of pH adjustment of the water entering the settling basins and redesign of the potassium permanganate application system. An additional major change in the system was the replacement of

chlorine by chloramine as the primary disinfectant. This change was undertaken during the early part of January 1987 (R. at 15).

Rock Island believes that the more recent projects may in fact have corrected the problem. As evidence thereto, Rock Island submitted at hearing the results of 43 THM analyses conducted on waters from the distribution system collected subsequent to the change from chlorine to chloramine disinfectant (see above table). All 43 analyses are below 0.10 mg/l. Thus, concentrations have been below the 0.10 mg/l level during the most recent quarter for which complete data are available as well as for that fraction of the current quarter for which data are also available. This notwithstanding, Rock Island asserts that it intends to continue to explore methods and to take additional steps to reduce the concentrations of THM in its public water supply.

HARDSHIP

Notwithstanding the fact that Rock Island has been able to achieve THM concentrations below 0.10 mg/l THM, it would remain on restricted status, absent variance, for some additional time. This follows because compliance for purposes of restricted status is based on the average of four consecutive quarterly samples pursuant to 35 Ill. Adm. Code 604.230(d). Only the most recent quarterly average is below 0.10 mg/l and the averages of the previous three quarters are such that the most recent four-quarter average remains above 0.10 mg/l. Thus, without variance, restricted status cannot be lifted immediately.

Rock Island believes that remaining on restricted status while it is employing further methods to control THM places an arbitrary and unreasonable hardship on the community and prevents it from expanding, extending, or modifying its water distribution system. Rock Island notes that it has suffered a loss of its industrial base and has recently been experiencing a worsening economic climate. It has therefore been Rock Island's position that it needs to attract new industry to improve the depressed economic conditions of the city. To further this end Rock Island has embarked on a national advertising campaign to attract new industry, focused in part upon the abundant availability and high quality of public water, as noted in a brochure it has prepared and distributed (Exhibit 6). Rock Island believes that this enterprise has been blunted by the Agency's placement of Petitioner on restricted status because Rock Island cannot modify its water distribution system to accommodate new industry, and thus is effectively prohibited from establishing that industry. Rock Island concludes that this constitutes imposition of an arbitrary and unreasonable hardship.

ENVIRONMENTAL AND HEALTH EFFECTS

Rock Island believes that the current levels of THM in its public water supply do not pose a threat to human health or the environment.

The Agency believes that "an incremental increase in the allowable concentration for the contaminant in question should cause no significant health risk for the limited population served by new water main extensions for the time period of this recommended variance" (Agency Recommendation., p. 5). In conclusion the Agency states:

The Agency believes that the hardship resulting from denial of the recommended variance from the effect of being on Restricted Status would outweigh the injury of the public from grant of that variance. In light of the cost to the Petitioner of treatment of its current water supply, the likelihood of no significant injury to the public from continuation of the present level of the contaminant in question in the Petitioner's water for the limited time period of the variance, the Agency concludes that denial of a variance from the effects of Restricted Status would impose an arbitrary or unreasonable hardship upon Petitioner.

The Agency observes that this grant of variance from restricted status should affect only those users who consume water drawn from any newly extended water lines. This variance should not affect the status of the rest of Petitioner's population drawing water from existing water lines, except insofar as the variance by its conditions may hasten compliance. In so saying, the Agency emphasizes that it continues to place a high priority on compliance with the THM standards.

Id., p. 7-8

CONCLUSION

The Board finds that, in light of all the facts and circumstances of this case, denial of variance would impose an arbitrary or unreasonable hardship upon Petitioner. The Board also agrees with the Agency that no significant health risk will be incurred by the persons who may be served by any new water main extensions, particularly assuming that Rock Island can continue to maintain the THM concentrations witnessed in the more recent samples.

For these reasons the Board will grant Petitioner variance as requested, subject to conditions similar to those stipulated to by the parties at hearing (R. at 8-9; 27-29) and submitted to the Board as Exhibit 3, p. 8-10.

However, the Board is concerned that the conditions of the variance be supported by an adequate record of sampling and analysis. It is admitted that the reactions which form THM occur more readily during warm weather months due to higher temperatures of the raw water (R. at 20-22). Rock Island thus recognizes that the system changes which have been undertaken to date could be insufficient to control THM levels during all of the year (R. at 21-22), and that therefore additional system modifications may yet be required. The Board accordingly believes it necessary that Rock Island continue to sample for THM with a frequency sufficient to allow rapid response to any significant increase in THM concentration. The Board will therefore order that Rock Island sample its public water supply distribution system for THM at least once each week for the period of the variance, and report the results of these analyses to the Agency as part of the otherwise required six-month progress reports.

As a final modification of the proposed conditions, the Board will order that the variance expire upon achievement of compliance with the THM maximum allowable concentration, should that event occur before completion of the two-year term of the variance. This provision will eliminate the need for Rock Island to continue to abide by the full set of conditions of the variance should compliance be achieved before two years have passed.

This Opinion constitutes the Board's findings of fact and conclusions of law in this matter.

ORDER

1. Petitioner, the City of Rock Island, is hereby granted variance from 35 Ill. Adm. Code 602.105(a), Standards of Issuance, and 602.106(b), Restricted Status, but only as they relate to the 0.10 mg/l total trihalomethanes maximum allowable concentration of 35 Ill. Adm. Code 604.202 and 604.203(d), subject to the following conditions:
 - (A) This variance expires on May 14, 1989, or when compliance with the total trihalomethanes maximum allowable concentration of 35 Ill. Adm. Code 604.202 and 604.203(d) is achieved, whichever is sooner.

- (B) Compliance shall be achieved with the total trihalomethanes maximum allowable concentration of 35 Ill. Adm. Code 604.202 and 604.203(d) no later than two years from grant of this variance.
- (C) Within fourteen months of grant of the variance Petitioner shall apply to IEPA, DPWS, Permit Section, for all permits necessary for construction of installations, changes or additions to the Petitioner's public water supply needed for achieving compliance with the maximum allowable concentration for the standard in question.
- (D) If necessary, within three months after each construction permit is issued by IEPA, DPWS, the Petitioner shall advertise for bids, to be submitted within 60 days, from contractors to do the necessary work described in the construction permit. The Petitioner shall accept appropriate bids within a reasonable time. Petitioner shall notify IEPA, DPWS, within 30 days of each action, of: 1) advertisements for bids, 2) names of successful bidders, and 3) whether Petitioner accepted the bids.
- (E) If necessary, construction allowed on said construction permits shall begin within a reasonable time of bids being accepted, but in any case, construction of all installations, changes or additions necessary to achieve compliance with the maximum allowable concentration in question shall begin no later than one and one-half years from the grant of this variance and shall be completed no later than two years from the grant of this variance.
- (F) Pursuant to 35 Ill. Adm. Code 606.201, in its first set of water bills or within three months after the date of this Order, whichever occurs first, and every three months thereafter, Petitioner will send to each user of its public water supply a written notice to the effect that Petitioner is not in compliance with the standards in question. The notice shall state the average content of total trihalomethanes in samples taken since the last notice period during which samples were taken.
- (G) Petitioner shall take all reasonable measures with its existing equipment to minimize the level of total trihalomethanes in its finished water.
- (H) Petitioner shall sample and analyze its public water supply distribution for total trihalomethanes at least once each week. Results of such sampling and analysis shall be provided to the Agency within the report specified in paragraph (I).

- (I) Petitioner shall provide written progress reports to IEPA, DPWS, FOS every six months concerning steps taken to comply with paragraphs C, D, E, G, and H. Progress reports shall quote each of the above paragraphs and immediately below each paragraph shall state what steps have been taken to comply with each paragraph.
2. Within forty-five days of the date of this Order, Petitioner shall execute and forward to Wayne L. Wiemerslage, Enforcement Programs, Illinois Environmental Protection Agency, 2200 Churchill Road, Springfield, Illinois 62706, a Certificate of Acceptance and Agreement to be bound by all terms and conditions of this variance. This forty-five day period shall be held in abeyance for any period this matter is being appealed. The form of said Certification shall be as follows:

CERTIFICATION

I, (We), _____, having read the Order of the Illinois Pollution Control Board, in PCB 87-13, dated May 14, 1987, understand and accept the said Order, realizing that such acceptance renders all terms and conditions thereto binding and enforceable.

Petitioner

By: Authorized Agent

Title

Date

IT IS SO ORDERED.

Board Members Bill Forcade and John Marlin concurred, and Jacob D. Dumelle dissented.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 14th day of May, 1987, by a vote of 5-1.

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