

ILLINOIS POLLUTION CONTROL BOARD
May 22, 1986

VILLAGE OF LAKE ZURICH,)
)
 Petitioner,) PCB 86-41
)
 v.)
)
 ILLINOIS ENVIRONMENTAL)
 PROTECTION AGENCY,)
)
 Respondent.)

MR. ALBERT L. WYSOCKI AND MR. JOSEPH SIKES APPEARED FOR THE PETITIONER; and

MR. WAYNE L. WIEMERSLAGE APPEARED FOR RESPONDENT.

OPINION AND ORDER OF THE BOARD (by J. Theodore Meyer):

This matter comes before the Board on the March 18, 1986 petition for variance of the Village of Lake Zurich from restricted status for a period of five years. The Village requests variance from 35 Ill. Adm. Code 602.105(a), Standards of Issuance, and 35 Ill. Adm. Code 602.106(b), Restricted Status, but only to the extent that those rules relate to 35 Ill. Adm. Code 604.301(a), combined radium-226 and radium-228.* On April 22, 1986, the Illinois Environmental Protection Agency (Agency) filed a recommendation that variance be granted subject to certain conditions. Petitioner waived hearing but as objections were timely received by the Board, hearing was held on May 9, 1986 in Lake Zurich.

The Village provides potable water to a population of 3200 residential and 200 industrial and commercial utility customers representing some 10,000 residents and businesses employing approximately 4,000 people estimated as of the year of 1986. The Village owns, operates and maintains the public water supply and storage distribution system which includes 3 deep wells, 4 storage pumps and distribution facilities. The wells, their depths and ages are as follows:

*Although the variance petition additionally requested relief from the effects of restricted status as to gross alpha particle activity, this request was stricken at hearing. R. at 134.

<u>Well No.</u>	<u>Depth (ft.)</u>	<u>Date placed in operation</u>
5	1,340	1963
7	1,333	1971
8	1,373	1979

The Village was first notified by letter dated October 4, 1985 that the maximum allowable concentration (MAC) for combined radium-226 and 228 was exceeded. The Agency analysis indicated a radium-226 count of 3.8 pCi and a radium-228 count of 1.9 pCi for a combined radium level of 5.7 pCi/ This level exceeds the 5 pCi/l standard. The analysis was of an annual composite of four consecutive quarterly samples or the average of the analyses of four samples obtained at quarterly intervals. The sampling took place over four quarters between November 1979 and January 12, 1981. Thus, there was a four year interval between the sampling and the reporting of the results to Lake Zurich. The Agency has no more current analyses of the radium level because analyses performed for gross alpha particle activity indicated that sampling for radium was not necessary.

The Village has conducted more recent sampling, however, which showed combined radium levels in its three wells of 5.4, 4.9 and 4.8 pCi/l. (Rec. at 1). The Agency notes that these levels demonstrate at least "temporary compliance." However, demonstration of compliance requires an average or composite of this and of three more quarterly samples. Should such compliance be demonstrated, variance will no longer be needed. However, in the interim, the Village would remain on restricted status without a variance.

The Village has twice before found itself in a similar situation regarding the gross alpha and barium standards. A petition from variance from the gross alpha standard was granted by the Board on November 19, 1981. This variance required submittal of a compliance plan by January 1, 1983. However, the Agency informed the Village by letter dated September 27, 1982 that its supply was no longer exceeding the gross alpha level. Similarly, the Village petitioned on June 1, 1981 for a variance from the barium standard but after a June 1981 test showed compliance, the Village asked for dismissal of this petition which the Board granted.

Thus, as regards the radium standard, the Village appears to argue that analyses over the remaining three quarters will more than likely demonstrate compliance and that to require extensive expenditures in the interim would impose an arbitrary or unreasonable hardship. The Board notes that the Village's argument is buttressed by the fact that since the 1980 tests the Village has been consistently in compliance with the gross alpha standard. Compliance with the gross alpha standard is generally indicative of compliance with the combined radium standard.

Should further analyses demonstrate that the Village is not in compliance with the radium standard, however, the Village envisions three alternatives to resolve the problem: 1) constructing shallow wells for blending; 2) constructing treatment facilities; and 3) utilizing Lake Michigan water.

The Village estimates construction costs for implementing a blending program at \$700,000 per site for a total of \$2.8 million. However, the yield capabilities of the shallow aquifers are still under investigation. Also uncertain is the quality of the water available from these deposits. The Village states that it did have had wells in the shallow Silurian Dolomite aquifer which were taken out of service primarily due to poor water quality. The water had very high hardness, sulfate and total dissolved solids concentrations and was produced in low quantities.

Regarding treatment facilities, the petitioner estimates construction costs at 2.4 million at each deep well site. Lime or lime-soda softening can remove 80-90 percent of the radium. However, the Agency states that this method produces large quantities of radium causing additional problems and expenses in proper waste disposal. Ion exchange water softening will remove 90 percent of the radium, but regeneration of the softener with salt will increase the sodium content of the water. Increased sodium levels may create a significant risk to persons who are hypertensive or who have heart problems. In addition, waste from routine softening is high in total dissolved solids and may be very difficult to dispose of legally. The ion exchange process also concentrates the radioactivity releasing it in the waste stream in a concentrated form which may be more of a hazard at that point than in the drinking water. In addition, some radioactivity remains in the ion exchange material posing a hazard to anyone working on the softener and disposal of the radioactive ion exchange material may be a problem. Thus, the Agency actively discourages use of the ion exchange process for radionuclide removal.

Concerning the possible use of Lake Michigan water, the Village states that it currently has no allotment for Lake Michigan water. It estimates construction costs for utilizing lake water, were it to become available, at approximately \$8.5 million. Currently residential consumers pay approximately \$1.70/1,000 gal. for water. The total cost after the improvements to utilize lake water would be in the area of \$7.35/1,000 gal. (Pet. at par. 24).

The Village states that the time involved for the planning, financing, engineering and construction of water treatment facilities prevents immediate compliance with the radium standard. In the interim, the Village states that there is a great need for expansion of the water supply. By way of example,

the Village provided the testimony of Peter Bianchini, a vice president of Lexington Development Corporation, a builder-developer in Lake Zurich. Mr. Bianchini testified that Lake Development currently has sold 84 residential units which it is unable to hook up to water service. These units represent approximately \$11 million in construction and sales to Lexington Development.

Since these units have been sold, Mr. Bianchini stated that restricted status has also created problems for the 84 families which are unable to take up occupancy. He further stated that future development by Lexington Development will come to a halt if restricted status is not lifted resulting in a loss of approximately 200 jobs in the construction trades. (R. at 15). Bianchini testified that his company is just one of a number of developments within the Village (Id.). Similar concerns were expressed in a written communication to the Board received from the Dimucci Construction Company supporting the grant of the variance.

As the Agency points out, according to the April 1986 analysis performed by Teledyne Isotopes, the Village is at least temporarily in compliance. Gross alpha particle activity since 1980 also gives a preliminary indication that the Village may be in compliance. To require the Village to remain on restricted status while further testing goes on would impose an arbitrary or unreasonable hardship. (Rec. at 7). The Village also points out that grant of the requested variance would not make less strict the radium content that it must meet but would simply mean that the Agency could not legally deny construction or operating permits for water main extensions. As previously mentioned, the Village has committed to come into compliance should testing demonstrate non-compliance.

The health effects of ingesting radium at these levels was extensively discussed at the hearing by Dr. Richard E. Toohey of the Argonne National Laboratory. Dr. Toohey noted that the limit for radium was set by the United States Environmental Protection Agency (USEPA) based on calculations which, assuming consumption of two liters of water per day containing 5 pCi/l, would result in an excess lifetime cancer risk of 100 per million. Dr. Toohey stated that the normal lifetime cancer risk is 200,000 per million. Dr. Toohey contends, however, that USEPA's risk estimate exaggerates the radium hazard. His conclusions are based on studies of radium dial painters. The lowest dose of radium, according to his studies, which caused cancer was nine microCuries. One microCurie is equal to one million picoCuries. This occurred in a 7 year old boy who was injected with radium for medical treatment. He further observed that no health effects were observed in the children of the dial painters.

Thus, Dr. Toohey takes issue with the USEPA's model for predicting the health effects of radium - the linear no threshold model. The linear no threshold model assumes the health effects of radium at low levels of intake are exactly proportional to what they are at high levels of intake. Dr. Toohey contends that the linear no threshold model is inaccurate because while it predicts five excess cancers below ten microCuries intake, the data actually show zero cancer incidents below nine microCuries intake.

Dr. Toohey also points out that to receive nine microCuries of radium (i.e. nine million picoCuries) would require drinking Lake Zurich water for about twelve thousand or more years. (R. at 94).

Dr. Toohey further testified that even if one assumes that the linear no threshold model is correct, it still grossly overestimates the actual public health impact. He stated that the calculation on which the model is based is wrong by a factor of two. Moreover, the assumed water intake of two liters per day should be corrected to one liter per day according to Dr. Toohey. This conclusion is based on studies which have shown the average intake of tap water, as opposed to total fluid consumption, is much closer to one liter per day than two. (R. at 97). Hence, Dr. Toohey concludes that the standard could be raised from 5 pCi/l to 20 pCi/l, or by a factor of four, and still remain at the same lifetime risk estimate of one hundred excess cancers per million. Thus, Dr. Toohey concluded that there was minimal health risk at the radium levels present in Lake Zurich's water.

While the Citizens of Lake Zurich are understandably concerned about health risks, the Board believes that the risks involved at these levels are minimal. Furthermore, variance will not mean that the Village need not comply with the 5 pCi/l standard but only that the Village will no longer be on restricted status. Thus, the Board finds that to require the Village to remain on restricted status would impose an arbitrary or unreasonable hardship given the minimal health risks, the possibility that the Village may well be able to demonstrate compliance within the year and the substantial economic hardship which will result if variance is not granted. Moreover, should compliance not be demonstrated, the Village has committed to achieve compliance by expiration of the variance and has committed to secure professional assistance and identify a compliance option in the interim so as to be able to act expeditiously in that event. Accordingly, the Village of Lake Zurich's petition for variance from restricted status is granted, subject to conditions.

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

ORDER

The Village of Lake Zurich is hereby granted a variance from 35 Ill. Adm. Code 602.105(a), Standards of Issuance, and 602.106(b), Restricted Status, but only as they relate to combined radium 226 and 228, subject to the following conditions:

1. That this variance expires when analysis pursuant to 35 Ill. Adm. Code 605.105(a) shows compliance with the MAC in question or on May 1, 1991, whichever comes first.
2. In consultation with the Agency, Petitioner shall continue its sampling program to determine as accurately as possible the level of radioactivity in its well and finished water. Testing for radium 226 and 228 shall be continued. Compliance with the following timetable shall continue until, and unless, analysis pursuant to paragraph Number one of this order shows that compliance with the MAC, thus rendering further treatment unnecessary.
3. Within three months of the grant of the variance, the Petitioner shall secure professional assistance (either from present staff or an outside consultant) in investigating compliance options, including the possibility and feasibility of achieving compliance by blending water from its shallow well(s) with that of its deep well(s).
4. Within four months of the grant of the variance, evidence that such professional assistance has been secured shall be submitted to the Agency's Division of Public Water Supplies, FOS, at 2200 Churchill Road, Springfield, Illinois 62706.
5. Within nine months of the grant of the variance, the Petitioner shall complete investigating compliance methods, including those treatment techniques described in the Manual of Treatment Techniques for Meeting the Interim Primary Drinking Water Regulations, USEPA, May 1977, EPA-600/8-77-005, and prepare a detailed Compliance Report showing how compliance shall be achieved with the shortest practicable time, but no later than five years from the date of this variance.
6. This Compliance Report shall be submitted within ten months of the grant of this variance to IEPA, DPWS.
7. Within three months of its submission, or within any written extension of approval time made by IEPA, then within three months after said time 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.

8. Within three months after each construction permit is issued by IEPA, DPWS, Petitioner shall advertise for bids from contractors to do the necessary work described in the construction permit and shall accept appropriate bids within a reasonable time.
9. 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 three years from the grant of this variance and shall be completed no later than four and one half years from the grant of this variance.
10. Compliance shall be achieved with the maximum allowable concentration in question no later than May 1, 1991.
11. Pursuant to 35 Ill. Adm. Code 606.201, in its first set of water bills or within three months after the date of this Variance 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 has been granted by the Pollution Control Board a variance from 35 Ill. Adm. Code 602.105(a) Standards of Issuance and 35 Ill. Adm. Code 602.106(b) Restricted Status, as it relates to the MAC standard in question.
12. 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 standard in question. The notice shall state the average content of the contaminant in question in samples taken since the last notice period during which samples were taken.
13. That Petitioner shall take all reasonable measures with its existing equipment to minimize the level of contaminant in question in its finished water.
14. That within forty-five days of the date of this Order, Petitioner shall execute and forward to Wayne Wiemerslage, Enforcement Programs, Illinois

Environmental Protection Agency, 2200 Churchill Road, Springfield, Illinois 62706, a Certificate of Acceptance and Agreement to be bound to 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 the certification shall be as follows:

CERTIFICATION

I, (We), _____, hereby accept and agree to be bound by all terms and conditions of the Order of the Pollution Control Board in PCB 86-41, May 22, 1986.

Petitioner

Authorized Agent

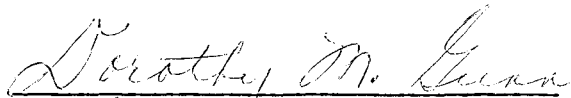
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Date

IT IS SO ORDERED.

J. D. Dumelle and B. Forcade dissented.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 22nd day of May, 1986, by a vote of 5-2.


Dorothy M. Gunn, Clerk
Illinois Pollution Control Board