

ILLINOIS POLLUTION CONTROL BOARD
October 29, 1992

VILLAGE OF WINNETKA,)	
)	
Petitioner,)	
)	
v.)	PCB 92-162
)	(Provisional Variance)
ILLINOIS ENVIRONMENTAL)	
PROTECTION AGENCY,)	
)	
Respondent.)	

ORDER OF THE BOARD (by J.C. Marlin):

This matter comes before the Board on receipt of an Agency Recommendation dated October 28, 1992. The recommendation refers to a request from Petitioner, Village of Winnetka, for a provisional variance for its Cook County facility from the prohibition on discharge without an NPDES permit as set forth in 35 Ill. Adm. Code 304.141(b), to allow them to use hot water to destroy the present infestation of zebra mussels on their inlets and within their intake pipelines for both their water treatment plant and power plant. The recommended term of this provisional variance is for the period from when the Petitioner begins the thermal treatment process for zebra mussel control, and continuing until the Petitioner ceases thermal treatment, but not for longer than 45 days.

The Agency recommends that the Board grant the requested provisional variance with specified conditions. The Agency agrees that the repairs are necessary. The Agency anticipates that the requested provisional variance would have minimal environmental impact on the receiving stream. The Agency is unaware of any public water supplies that the requested provisional variance would adversely impact. The Agency maintains that a grant of a provisional variance would violate no federal laws. The Agency finds that a denial of the requested provisional variance would create an arbitrary or unreasonable hardship on the Petitioner.

The responsibilities of the Agency and the Board in these short-term provisional variances are different from the responsibilities in standard variances. See Ill. Rev. Stat. 1991, ch. 111½, pars. 1035(b) & (c). In provisional variances it is the responsibility of the Agency to make the technical determinations and finding of arbitrary or unreasonable hardship. The Board's responsibility is to adopt a formal Order, to assure the formal maintenance of the record, to assure the enforceability of the variance, and to provide notification of the action by a press release.

0137-0095

Having received the Agency recommendation finding that a denial of the requested relief would impose an arbitrary or unreasonable hardship, the Board hereby grants Petitioner a provisional variance from 35 Ill. Adm. Code 304.141(b), on the following conditions:

1. The term of this provisional variance shall commence when the Petitioner, Village of Winnetka, initiates the thermal treatment process for zebra mussel control, and it shall expire on the date the Petitioner completes the required maintenance work, or after 45 days have elapsed, whichever comes first;

2. During the term of this provisional variance, Petitioner shall maintain compliance with 35 Ill. Adm. Code 302.507, thermal limitations at the edge of a mixing zone and shall conduct the thermal treatment process in accordance with the procedures described in Petitioner's variance request. If a temperature rise of more than 3°F at the edge of the mixing zone is detected, the Petitioner shall close the valve connecting the thermal plant to the intake pipe and shall start a low lift pump to draw the heated water out of the intake pipelines into the water treatment plant.

3. The Petitioner shall notify Robert Sulski of the Agency's Maywood Regional office by telephone, at 708/531-5900, when the thermal treatment process begins and when that process ends, and the Petitioner shall confirm this notice in writing within five days, addressed as follows:

Illinois Environmental Protection Agency
Division of Water Pollution Control
Compliance Assurance Section
2200 Churchill Road
P.O. Box 19276
Springfield, Illinois 62794-9276

Attention: Mark T. Books

4. Petitioner shall monitor the lake's water temperature as described in their October 19, 1992 provisional variance request letter and their October 9, 1992 letter to Liam McDonnell of the Agency, copies of which are attached.

5. The Petitioner shall execute a copy of a Certificate of Acceptance of this provisional variance and forward that copy to the Agency addressed as is the written notice required in the above condition; the Petitioner shall forward that copy within 10 days of the date of this Order of the Board, and the Certificate of Acceptance shall take the following form:

0137-0096

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 92-162, October 29, 1992.

Petitioner

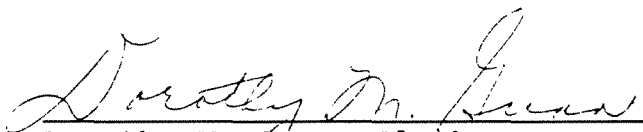
Authorized Agent

Title

Date

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control
Board, do hereby certify that the above order was adopted by the
Board on the 29th day of October, 1992,
by a vote of 7-0.



Dorothy M. Gunn, Clerk
Illinois Pollution Control Board

HARZA

ENVIRONMENTAL SERVICES, INC. Consulting Engineers

October 9, 1992

Mr. Liam McDonnell
Environmental Protection Engineer
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62794-9276

Subject: Village of Winnetka Zebra Mussel
Control Study
Log. No. 93-0463
Permit Application

Dear Mr. McDonnell:

This additional information on the Winnetka Zebra Mussel Permit Application is sent in response to your request of October 9, 1992.

Operating Procedures

The operating procedure and sequencing of valve and pump operations will be as listed in the "Scope of Project - Operating Procedure" summary that is part of the application, as supplemented by your phone conversations with Leonard Holt of Harza. We trust that this is sufficient to cover the valve and pump operating procedures. We can submit more information at your request.

Lake Monitoring Procedure

The thermal treatment procedure will conform with IEPA and NPDES guidelines for warm water discharge to the lake. A remote reading thermometer will be attached to the shore side of the intake strainer or inlets and will provide a continuous temperature reading to a boat at the surface. The boat will be manned with personnel to radio the readings to personnel on shore. A diver will be available as necessary. These precautions will be taken to ensure that the lake water temperature does not increase by more than one degree F° above the ambient temperature of the water. If a temperature rise of

more than one degree is detected, the valve connecting the thermal plant to the intake pipe will be closed and a low lift pump will be started to draw the water out of the intake into the water plant. A careful control of the slug of hot water being pumped into the intake pipe will result in all or most of the intake pipeline achieving the desired 95-100 F° temperature.

Water Treatment and Monitoring

Incoming water drawn into the plant via the low lift pumps will be monitored for turbidity, odor, debris, and organic content. A water plant basin will be reserved to allow for diversion of any unsuitable water. This water will be treated by normally used flocculation and precipitation chemicals and activated carbon as necessary. Any basin sediment or water not suitable for water treatment plant use will be disposed of to the sanitary sewer based on approval from the MWRD or dewatered debris will be disposed to an approved landfill.

Summary of Thermal/Heat Transfer Calculations

This calculation is based on a volumetric relationship used for feasibility purposes only. Actual procedure will be monitored to record the actual results of the thermal treatment procedure.

Physical parameters:

- 20-inch diameter cast-iron intake pipe
- Length of intake 3,000 ft.
- Volume of intake = 6545 CF
- Exterior surface area of pipeline = A = 17,279 SF
- Lake Water Temperature = 55°F
- Desired water temperature in pipe = 100°F
- Temp. of hot water entering intake = 115°F
- Coeff. of heat transfer (cast iron pipe) = U = 1.99
- Thermal conductivity = K = 27 BTU/HR/F°/FT

1. Heat Loss = $H = (A) \times (U) \times (\Delta t)$
 $H = 1.547 \times 10^6 \text{ BTU/HR}$

2. Total BTU's required to heat intake volume

Def. BTU: 1 BTU raises 1 lb of water 1°F

Total BTU's = $(408,408 \text{ lb H}_2\text{O}) \times (100^\circ\text{F} - 55^\circ\text{F}) = 1.838 \times 10^7 \text{ BTU}$

Mr. Liam McDonnell
October 9, 1992
Page 3

3. Rate of BTU Addition

Using Winnetka condenser #8; Q=3,750 gpm = 1.683×10^6 BTU/HR

Rate = $(1.683 \times 10^6 \text{ BTU/HR}) \times (118^\circ\text{F} - 55^\circ\text{F}) = 1.00 \times 10^8$ BTU/HR

4. Time to heat intake water to 100°F
(assumes control valve is unthrottled at power plant)

Actual BTU's added to intake =

$$1.00 \times 10^8 - 1.547 \times 10^8 = 9.84 \times 10^7 \text{ BTU/HR}$$

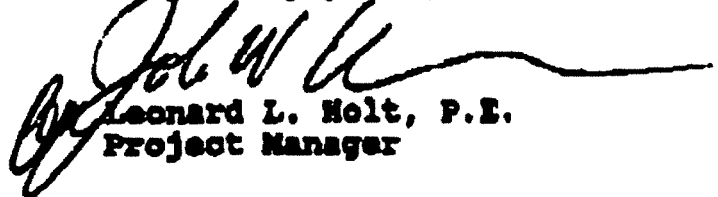
$$1.838 \times 10^7 \text{ BTU} + 9.84 \times 10^7 \text{ BTU/HR}$$

$$= 0.187 \text{ HR or 11 MIN}$$

In actual case the control valves will be throttled to control hot water flow, and a much greater time of heating is expected.

In summary, we have provided the additional information that you requested. If you have any questions please call, me or John Schaefer (312) 831-3836, otherwise we await the issuance of a permit to proceed with the thermal treatment of the Winnetka intake pipeline.

Very truly yours,



Leonard L. Holt, P.E.
Project Manager

LLH/ksb

cc: Mr. Bryan McInturff, Winnetka

0137-0100

October 19, 1992

Illinois Environmental Protection Agency
Division of Water Pollution Control
2200 Churchill Road
P.O. Box 19276
Springfield, IL 62794-9276

RECEIVED
Compliance Assurance Section

OCT 22 1992

Attention: Mr. Mark T. Books

Environmental Protection Agency
STATE OF ILLINOIS

RE: Request for Provisional Variance for
Zebra Mussel Control
NPDES Permit Application No. IL 0002364
IEPA Public Water Supply Log No. 93-0463

Gentlemen:

We are submitting an application pursuant to Section 180.202 of the procedures and criteria for reviewing applications for provisional variances on behalf of the Village of Winnetka, Illinois.

The lake intakes serving the Village of Winnetka water treatment plant and thermal electric power plant are infested with zebra mussels. Continued growth of mussels currently attached to inlets and within the intake pipelines will result in possible clogging of these intakes which would result in restriction to or loss of the village water supply. This would threaten the health, business and fire protection of the Village of Winnetka and the Village of Northfield.

This application requests permission from the State of Illinois Pollution Control Board and the Illinois Environmental Protection Agency to destroy the present infestation of zebra mussels by immediate hot water treatment using existing water plant and thermal power plant facilities and intake piping.

Allowing the hot water to flow from the thermal plant into the intake pipelines and out to the lake end of these pipes would kill the zebra mussels and provide relief from this threat for several months to one year. A current application for a NPDES permit when approved would then allow the Village to apply thermal treatment on a permanent basis, most probably one or twice a year.

Sears Tower 233 South Wacker Drive Chicago, Illinois 60606-6392
Tel: (312) 831-3800 Fax: (312) 831-3999 Telex: 25-3540

0137-0101

Alternative methods of zebra mussel control would either involve chemical treatment with a greater potential environmental impact; or could not be accomplished early enough to provide protection within the necessary time frame and would entail a cost of approximately \$500,000.

We have addressed the requirements of Section 180.202 paragraph b) as follows:

- 1) The Village of Winnetka proposes to perform thermal treatment of their two raw water intakes prior to issuance of the NPDES permit. This provisional variance would allow the operation to be completed this fall in lieu of the pending NPDES permit application received by the IEPA Industrial Division on February 21, 1992. The NPDES application will conform with all applicable regulations listed in the IEPA Water Quality Standards.
- 2) The Village's facilities consist of a water treatment plant and electric power plant located on Lake Michigan in the Village of Winnetka. The variance is requested to allow thermal treatment of two raw water intake pipelines for zebra mussel control. The treatment plant supplies water to all Winnetka and Northfield residents while the power plant generates power to supplement power supplied by Commonwealth Edison and purchased from the municipal grid to meet the Village's electrical needs. The 3000 ft long 20-inch intake exclusively supplies raw water for the water treatment plant. The 1200 ft long 60-inch intake supplies condenser cooling water for the electric power plant and branches to the water treatment plant via a 20-inch pipe in order to supplement the main 20-inch intake pipe supply during high periods of demand.
- 3&4) The Village listed, in their NPDES Permit application, condenser cooling water discharges of 7,920,000 gal/day (5,500 gpm) backfeeding through the 20-inch intake and 18,288,000 gal/day (12,700 gpm) backfeeding through the 60-inch intake.

20-inch Intake

During the thermal treatment operation, the most extreme case of the thermal process would be pumping 100°F maximum temperature recirculated raw water at a rate of 5,500 gpm for a 4 hour time period. The total volume of hot water discharged would be 176,500 cubic feet that would mix with ambient lake water creating a mixing zone near the intake inlet strainer. The resultant maximum mixing zone would have a cone shaped dispersion with a maximum

radius of 400 feet based on lake water temperature of 52°F. The lake water temperature at the edge of the mixing zone would be increased by no more than 3°F. The actual operation would be performed at a lower discharge rate by throttling control valves on shore with the mixing zone expected to be closer to 200 ft in radius.

60-inch Intake

During the most extreme case of the thermal process for the 60-inch intake the Village would be discharging 100°F maximum temperature recirculated raw water at the rate of 12,700 gpm for a 4 hour time period. The total volume of hot water discharged would be 407,500 cubic feet that would mix with ambient lake water creating a mixing zone near the intake inlet cones. The resultant mixing zone would have a cone shaped dispersion with a maximum radius of 700 feet based on lake water temperature of 52°F. The lake water temperature at the edge of the mixing zone would be increased by no more than 3°F. Likewise, the actual operation would be performed at a lower discharge rate by throttling control valves on shore with the mixing zone expected to be closer to 400 feet in radius.

- 5) All operations will be within the limits established in the IEPA Water Quality Standard regulations, as listed in the NPDES permit application submitted to the IEPA. All requirements of the IEPA Public Water Supply Division will be met with regards to treating the resulting hot water after the thermal treatment operation is completed. There will be no effect on the Village's drinking water supply.
- 6) The thermal discharge will be limited to only enough hot water as is necessary to kill the adult zebra mussel infestation in the intakes. Water between 95°F to below 100°F will be used for a period of approximately four hours to provide an assured kill of the mussels. The process will be monitored by use of a remote reading thermometer attached to the intake inlet (the point of hot water discharge) by a diver and read at the surface by personnel in a boat as described previously to IEPA. Temperature will also be monitored at various depths and locations in the lake surrounding the point of discharge and communicated to the shore where valves will be operated to maintain the desired temperature within the required range and to minimize the thermal effect in the Lake.

The warmer water will rise away from the point of discharge and the effect of hot water on and near the lake bottom will be minimal. We expect little or no effect on aquatic life other than zebra mussels inside the plant intakes.

- 7) The Village has applied for a NPDES permit for thermal discharge at the plant intake inlets. It is not expected this permit will be issued in time to allow thermal treatment this fall.

Continued growth of mussels currently attached to inlets and within the intake pipelines will result in possible clogging of these intakes which would result in restriction to or loss of the Village water supply. This would threaten the health, business and fire protection of the Villages.

Alternative methods of zebra mussel control would either involve chemical treatment with a greater potential environmental impact; or could not be accomplished early enough to provide protection within the necessary time frame and would entail a cost of approximately \$500,000.

- 8) When the pending NPDES permit is approved; which is expected this winter; the Village will be able to apply the thermal method of controlling zebra mussels once or twice a year using the same environmentally sound method to be used on the trial one time basis requested in this variance.
- 9) Since all thermal treatment operations will comply with the required regulations governing the IEPA NPDES permit application, no other alternatives have been investigated for the thermal backwashing of the intake pipelines.

The Village could consider alternate hot water treatment options such as installation of small diameter hot water lines within the intake pipe that would add hot water near the intake inlet, or hot water injection via a heat exchanger and pumps on shore to provide hot water. The option of conveying a chlorine solution to the intake inlets would cost approximately \$500,000. Other options are not applicable since the proposed operation complies with the IEPA regulations.

The provisional variance is needed to allow the Village to proceed with the thermal treatment operation this fall in lieu of the pending NPDES permit application. An "unreasonable hardship" exists in this case as described in 7) above.

- 10) The variance is requested to perform the planned operation in two (2) four hour treatments in one day or two (2) four hour treatments on successive days. We are requesting the full 45 days allowed, to be certain the operation can be completed with Lake Michigan working limitations. When the NPDES permit application is approved, the work will be accomplished under that permit.
- 11) The Village has not been granted any provisional variances within the calendar year.
- 12) The Village's NPDES permit application was received by the IEPA on February 21, 1992. The application is pending approval based on the IEPA issuing the 30-day public notice period, the Village answering any comments received, and the IEPA issuing the permit. The approved permit is not anticipated to be issued until mid December or later under normal application procedures. Lake temperatures will then be lower (34°F) and the process will be virtually impossible. The Village will be forwarding some additional information as required to the IEPA Industrial Division so that the application can be evaluated and a public notice issued.
- 13) No other matters are before the Board in the behalf of the Village of Winnetka.

We believe the strong potential for danger to the public water supply and the thermal electric power plant justifies a provisional variance be issued on a one time basis.

If additional explanation or information is required please contact myself at (312) 831-3813 (FAX - 312-831-3999) or Mr. John Schaefer at (312) 831-3836. We would be pleased to discuss this application at your convenience. We await your prompt action in issuance of the Provisional Variance.

Very truly yours,


Leonard L. Holt, P.E.
Section Head/Environmental Design

LLH/se
DATE: 10/19/92

0137-0105