

ILLINOIS POLLUTION CONTROL BOARD  
August 26, 1993

IN THE MATTER OF: )  
 )  
PETITION OF ILLINOIS POWER COMPANY )  
(CLINTON POWER STATION) FOR )  
HEARING PURSUANT TO 35 ILL. ADM. ) PCB 92-142  
CODE 302.211(j) TO DETERMINE ) (Thermal Demonstration)  
SPECIFIC THERMAL STANDARDS )

OPINION AND ORDER OF THE BOARD (by G. T. Girard):

On September 30, 1992, Illinois Power Company (IPC) filed a petition for hearing to determine specific thermal standards pursuant to 35 Ill. Adm. Code 302.211(j) for its Clinton Power Station (station). On October 14, 1992, IPC filed a petition for hearing on heated effluent demonstration pursuant to 35 Ill. Adm. Code 302.211(f). On October 16, 1992, the Board consolidated the two matters into this docket. The Illinois Environmental Protection Agency (Agency) recommendation was received by the Board on April 26, 1993.

Hearing on this matter was held on April 27, 1993, in Clinton, DeWitt County, Illinois. No members of the public were present at the proceeding.

IPC filed a brief on May 25, 1993, and a reply brief on June 16, 1993. The Agency filed its brief on June 10, 1993.

BACKGROUND

The station is a nuclear-fueled electrical generating facility located six miles east of Clinton, DeWitt County, Illinois. The station operates 24 hours per day, seven days a week. Approximately 1,200 persons are employed at the station. (Pet. 1 at p. 2 ¶1.)<sup>1</sup> Initial criticality of the reactor occurred on February 27, 1987. The Nuclear Regulatory Commission issued the full power operating license for the station on April 17, 1987. The station became fully operational on October 15, 1987, and commercial operation commenced in November 1987. (Pet. 1 at p. 3 ¶5.)

The station's generating system consists of a boiling-water reactor, steam turbine generator, heat dissipation system, and

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<sup>1</sup> The Section 302.211(j) petition will be cited as "Pet. 1 at p. \_\_ ¶\_\_"; the Section 302.211(f) petition will be cited as "Pet. 2 at p. \_\_ ¶\_\_"; the IPC briefs will be cited as "Pet. Br. at \_\_" and "Pet. Rep. at \_\_"; the Agency recommendation will be cited as "Ag. Rec. at \_\_"; and the Agency brief will be cited as "Ag. Br. at \_\_".

associated auxiliary facilities. The boiling-water reactor produces steam for direct use in the steam turbine. During plant operation, steam expanding through the low pressure turbines is directed downward into the main condenser and is condensed. The condenser is designed for a maximum 22.5 degrees Fahrenheit rise in cooling water temperature at 100 percent station power levels and 100 percent cooling water flow. (Pet. 1 at p.2 ¶2-4.)

Heat from the station is dissipated by means of an artificial cooling lake known as Clinton Lake. (Pet. 1 at figure 2.) IPC constructed Clinton Lake at the same time it was constructing the station. The lake is a U-shaped impoundment, formed by damming Salt Creek and the North Fork Salt Creek immediately below their confluence. Clinton Lake is the fourth largest lake in Illinois. Waters from Clinton Lake are discharged to Salt Creek. (Pet. 1 at p. 3 ¶8.)

Condenser cooling water for the station is withdrawn from the North Fork Salt Creek leg of Clinton Lake by means of three circulating water pumps. After passing through the condenser, this water travels down a 3.1-mile earthen flume and is discharged to the Salt Creek leg of the lake. Between the point of discharge and the point of withdrawal, the distance on Clinton Lake is approximately 9.9 miles. This portion of the lake is known as the cooling loop. (Pet. 1 at p. 4 ¶9.)

The Board has had several proceedings to either determine, or grant relief from, the thermal standards applicable to IPC. The first occurred with IPC filing a petition in 1980 seeking alternative thermal limitations. (Illinois Power Company v. IEPA, (June 25, 1981), PCB, PCB 81-82.) The Board's order in that proceeding adopted alternative limitations providing that the daily average temperature of discharges shall not exceed 99 degrees Fahrenheit during more than 12 percent of the hours in a twelve-month period (i.e., 44 days) and shall at no time exceed 108.3 degrees Fahrenheit. (PCB 88-97, June 22, 1989.) Next IPC filed for relief from the thermal standards adopted in PCB 81-82 by filing a petition for a variance on June 3, 1988. (Illinois Power Company v. IEPA, (June 22, 1989), 100 PCB 177, PCB 88-97.) The Board granted that variance stating:

The daily average temperature of discharges at the second drop structure of the discharge flume shall not exceed 99 degrees Fahrenheit during more than 90 days in a twelve-month period and shall at no time exceed 110.7 degrees Fahrenheit during a fixed calendar year running from January 1 through December 31.

On December 21, 1989, IPC filed a request for an extension of the 1989 variance. The Board granted the extension and stated, "[i]f IPC submits a petition for permanent relief not later than October 1, 1992, this extension of variance shall

expire on October 1, 1993". (Illinois Power Company v. IEPA, (June 21, 1990) 112 PCB 373, PCB 89-213.) The filing of this matter on September 30, 1992, was in response to the Board's 1989 order.

#### REGULATORY FRAMEWORK

Section 302.211 sets forth the standards for temperature levels in artificial cooling lakes. Section 302.211(j) provides an exemption for cooling lakes provided that:

- 1) All discharges from the artificial cooling lake to other waters of the State comply with the applicable provisions of subsections (b) through (e).
- 2) The heated effluent discharged to the artificial cooling lake complies with all other applicable provisions of this Chapter, except subsections (b) through (e).
- 3) At an adjudicative hearing the discharger shall satisfactorily demonstrate to the Board that the artificial cooling lake receiving the heated effluent will be environmentally acceptable, and within the intent of the Act, including, but not limited to:
  - A) provision of conditions capable of supporting shellfish, fish and wildlife, and recreational uses consistent with good management practices, and
  - B) control of the thermal component of the discharger's effluent by a technologically feasible and economically reasonable method.
- 4) The required showing in subsection (j)(3) may take the form of an acceptable final environmental impact statement or pertinent provisions of environmental assessments used in the preparation of the final environmental impact statement, or may take the form of a showing pursuant to Section 316(a) of the Clean Water Act (CWA) (33 U.S.C. 1251 et seq.), which addresses the requirements of subsection (j)(3).
- 5) If an adequate showing as provided in subsection (j)(3) is found, the Board shall promulgate specific thermal standards to be

applied to the discharge to that artificial cooling lake.

In order for Clinton Lake to be granted an exemption, IPC must demonstrate that the discharge from Clinton Lake will comply with Sections 302.211(b)-(e). Subsections (b) through (e) of 302.211 provide that:

- 1) there be no abnormal temperature changes which may affect aquatic life (Section 302-211(b));
- 2) seasonal and daily temperature changes shall be maintained (Section 302-211(c));
- 3) the temperature of the lake shall not be higher than 5°F above the natural temperature (Section 302.211(d)); and
- 4) the temperature of the lake shall not exceed levels set forth in the rule more than one percent of the hours in the 12-month period ending with any month (Section 302.211(e)).

Section 302.211(f) provides:

The owner or operator of a source of heated effluent which discharges 150 megawatts (0.5 billion British thermal units per hour) or more shall demonstrate in a hearing before this Pollution Control Board (Board) not less than 5 nor more than 6 years after the effective date of these regulations or, in the case of new sources, after the commencement of operation, that discharges from that source have not caused and cannot be reasonably expected to cause significant ecological damage to the receiving waters. If such proof is not made to the satisfaction of the Board, appropriate corrective measures shall be ordered to be taken within a reasonable time as determined by the Board.

#### AGENCY RECOMMENDATION

The Agency indicated that it began reviewing the "extensive body of material" filed by IPC in 1992. (Ag. Rec. at 3.) The Agency requested additional materials on two occasions, which IPC provided. As a result of the Agency's review, the Agency stated that it "is satisfied that Illinois Power has demonstrated based on the available information a lack of any significant expected impact if the specific thermal relief is granted". (Ag. Rec. at 4.)

The Agency further indicated that it "believes that no significant ecological impact should result" from granting the standard. (Ag. Rec. at 4.) The Agency points out that Clinton Lake has been subjected to a thermal standard having the identical effect as the one requested here for roughly five years without exhibiting any major impacts. (Ag. Rec. at 5.) Further, the Agency stated that:

the Agency biologist agrees with the statements made by Mike Conlin, Chief of Division of Fisheries, Illinois Department of Conservation in his letter dated February 16, 1993, to Joel Cross Planning Section Manager at the Agency. (Ag. rec. at 5.)

Mr. Conlin indicated that based on the review of the information and the actions IPC indicates it will take to correct severe impacts on the fish population, IDOC finds "no reason to oppose the thermal discharge limits requested by IPC. (Ag. rec. at att. A.)

The Agency does express one area of concern. Specifically, the Agency points out that the NPDES permit pertaining to IPC requires a continuous monitoring program until the Board rules on the thermal standard. The Agency requests that the Board add a condition to address this concern. (Ag. Rec. at 5.)

Thus, the Agency recommends that the thermal determination be granted with the following condition:

Illinois Power is required to conduct a continuous Temperature Monitoring Program at site 1.5 that will be located at a submerged depth of 0.5 meters in Salt Creek approximately 100 feet down the stream from the bottom of the spillway of Clinton Lake during the months of June, July, and August of each year until such time as the National Pollutant Discharge Elimination System Permit No. IL0036919 is modified and finalized to include such monitoring as a special condition.

(Ag. Rec. at 6.)

#### DISCUSSION

IPC presented significant documentation in support of its petitions for relief. The documentation included extensive studies of the effect of the thermal level being sought by this petition. We will not discuss in detail all the information provided to the Board; however, we will summarize certain of the demonstrations as set forth by IPC.

In demonstrating that the discharges from Clinton Lake meet the criteria established in Section 302.211(b)-(e), IPC indicates that the data collected from Salt Creek indicates that no abnormal temperature changes occurred in Salt Creek immediately below the Clinton dam during 1988-1991. (Pet. 1 at p. 6 ¶15.) Further, normal seasonal fluctuations occur in Salt Creek below the dam and the temperatures were more than 5 degrees greater than background temperatures on only four days during the years between 1988-1991. (Pet. 1 at p. 6 ¶15.) Further, the temperatures never exceeded the levels set forth in Section 302.211(d) and (e). (Pet. 1 at p. 6 ¶15.)

IPC demonstrates that it will comply with all other water quality criteria by using the results of monitoring required by the current NPDES permit issued to IPC for the station. The NPDES permit imposes effluent limitations on the discharge from the flume for two parameters, pH and total residual chlorine (TRC). (Pet. Br. at 11.) "Since January 1988, only one exceedance of either the pH or TRC numerical effluent limitation has occurred at this outfall." (Pet. 1 at 22 ¶62; Pet. Br. at 11.) Thus, IPC believes that it complies with Section 302.211(j)(2).

IPC presented evaluations, prepared by Environmental Science and Engineering, Inc., of the projected impacts of once-in-thirty year summer lake temperatures on several species of fish. The evaluation was conducted by reviewing the observed effects of station operation on biota during the last five years of operation. (Pet. Br. at 14.) The impacts range from minimal to substantial. (Pet. Br. at 14.) However, the only species which would be impacted substantially is the white crappie. (Pet. Br. at 14.) IPC states that the evaluations show that the conditions in Clinton Lake are capable of supporting fish and other aquatic biota and although some species could be eliminated these same species would be eliminated even under ambient, nonoperational conditions. (Pet. Br. at 15.)

IPC specifically studied the potential impact of the 110.7 degree fahrenheit maximum temperature limit, and of the 99 degree fahrenheit 90 day limit, requested in this petition, for six species of fish representative of Clinton Lake. (Pet. 1 at p. 28-29 ¶77.) These species include gizzard shad, common carp, channel catfish, blue gill, largemouth bass, and white crappie. (Pet. 1 at p. 28-29 ¶77.) The USEPA protocol was used to assess impacts on reproduction, growth, and survival for each species using temperature data from an extensive literature database and the preferred habitats of each species. (Pet. 1 at p. 28-29 ¶77.) IPC's evaluations indicate that minimal impacts would be incurred for gizzard shad, common carp, and blue gill for reproduction, growth, and survival. For channel catfish and largemouth bass minimal impacts would occur for growth and survival. Reproduction would be somewhat limited for a par

the spawning season. (Pet. 1 at p. 29 ¶78.) IPC's evaluations show that white crappie may not survive in Clinton Lake. The evaluations also suggest that crappie may not survive under severe ambient summer conditions at Clinton Lake, even without discharges from the station. (Pet. 1 at p. 29 ¶78.)

IPC considered several alternative methods to reduce the temperatures at Clinton Lake, including cooling towers at approximate costs of between \$13,505,000 for mechanical-draft cooling towers to \$52,300,000 for the gravity-flow natural draft cooling towers. (Pet. Br. at 17.) In addition, the cost for passive cooling with fins was approximately \$10,000,000. (Pet. Br. at 17.) Two options which would have cost considerably less, shading the flume and natural spray devices, would have resulted in only limited heat loss. (Pet. Br. at 17.) Thus, IPC asserts that the analysis demonstrates the "significant costs and lack of feasibility associated with alternative means of controlling the recirculated condenser cooling water discharge from the Station to Clinton Lake". (Pet. Br. at 18.)

The Agency supports granting the of the thermal standard and states that it "does not believe based on the information provided that there will be a significant ecological impact on Lake Clinton if the relief is granted". (Ag. Br. at 3.) The Agency does ask that a condition requiring temperature monitoring be added until such time as the NPDES permit can be modified to include such a condition. (Ag. Br. at 5.)

IPC states that it does not object to the additional condition regarding temperature monitoring as proposed by the Agency. (Pet. Br. at 21.) The current NPDES, permit which currently sets forth the monitoring requirements for the discharge from Clinton Lake, requires continuous monitoring until the Board rules on the thermal standard. IPC states that it is IPC's understanding that any temperature monitoring ordered by the Board in this proceeding is an interim requirement only and that the NPDES permit, once modified, would determine the temperature monitoring requirement applicable. (Pet. Br. at 21-22.) The Board agrees that the NPDES permit modification should take precedence over this order as this proceeding is only indirectly reviewing the material relating to an NPDES permit for Clinton Lake.

IPC has presented extensive documentation to support its request for relief. The Board concludes that the requested thermal standard would have no significant ecological harm and further that alternatives are not technically feasible or economically reasonable, considering the minimal reduction in temperature that would occur. IPC has satisfactorily demonstrated that the thermal standard will not inhibit the propagation of fish or other aquatic biota. Therefore, the will grant the requested thermal standard for Clinton Lake

the condition that temperature monitoring occur in Salt Creek.

The Board finds, pursuant to Section 302.211(f), that IPC has demonstrated that the heated effluent discharges from the station have not caused a significant ecological damage nor can the heated effluent reasonably be expected to in the future.

#### CONCLUSION

After careful review of the extensive data provided to the Board by IPC, the Board finds that the requested thermal standard will have no significant ecological harm. Further, the alternatives examined to reduce temperatures are not economically reasonable or technically feasible. The Board also finds that IPC has demonstrated satisfactorily that the heated effluent discharge has not and cannot be reasonably expected to cause significant ecological harm. Therefore, the Board will grant the thermal standard requested.

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

#### ORDER

Illinois Power Company is hereby granted the following thermal standard with conditions for its Clinton Power Station, located in Clinton, Dewitt County, Illinois:

- a) The temperature of the discharge to Clinton Lake from Clinton Power Station, as measured at the second drop structure of the discharge flume, shall be limited to a daily average temperature which (1) does not exceed 99 degrees Fahrenheit during more than 90 days in a fixed calendar year running from January 1 through December 31, and (2) does not exceed 110.7 degrees Fahrenheit for any given day; and
- b) Illinois Power is required to conduct a continuous Temperature Monitoring Program at site 1.5 that will be located at a submerged depth of 0.5 meters in Salt Creek approximately 100 feet down the stream from the bottom of the spillway of Clinton Lake during the months of June, July, and August of each year until such time as the National Pollutant Discharge Elimination System Permit No. IL0036919 is reissued to include such monitoring as a special condition.



IT IS SO ORDERED

Section 41 of the Environmental Protection Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 1041) provides for the appeal of final Board orders within 35 days. The Rules of the Supreme Court of Illinois establish filing requirements. (See also 35 Ill. Adm. Code 101.246, Motions for Reconsideration.)

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 26<sup>th</sup> day of August, 1993, by a vote of 6-0.

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