ILLINOIS POLLUTION CONTROL BOARD
October 13, 1977

IN THE MATTER OF:	)	
	)	
PROPOSED SPECIFIC THERMAL STANDARDS FOR LAKE SANGCHRIS	)	R76-11

OPINION AND ORDER OF THE BOARD (by Mr. Goodman):*

The Proposal for Regulatory Amendment in this matter was filed by Commonwealth Edison Company (Edison) on April 19, 1977, accompanied by the signatures of more than 200 citizens requesting its consideration and adoption. Ill. Rev. Stat., Ch. 111-1/2, §1028 (1977); Ill. PCB Regs., Ch. 1, §204(a)(1977). At its regular meeting of April 22, 1976, the Board authorized hearings on the matter. The Board also ordered publication of Edison's Proposal, which was published in Environmental Register #124, published April 27, 1976.

On September 1, 1977, the Board entered an Order setting a proposed final draft of the Regulation for publication and a 30-day public comment period. The proposed final draft was published in Environmental Register #155, dated September 12, 1977. No comments were received. The Board therefore adopts as final this Opinion and Order, ending over four years of consideration in this matter.

Edison's Petition, filed under Rule 203(i)(10) of Chapter 3: Water Pollution, asks that the Board set specific thermal standards for discharges from Edison's Kincaid power generating station to the lake. Edison asked that the Board set such limits by amending** Rule 203(i)(11), Exceptions to Rule 203(i), to include new Rules 203(i)(11)(bb)(1) and (2), as follows:

(bb) Lake Sangchris:

The thermal discharge to Lake Sangchris shall meet

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* The Board wishes to thank Vincent P. Flood, Jr., Attorney, Hearing Officer in this matter, for his assistance in the preparation and drafting of this Opinion and Order.

** The procedures for proceedings under Rule 203(i)(10) of Chapter 3 have been changed since the inception of this case, that change to effect only cases filed after April 1, 1977. See, Ill. PCB Regs., Ch. 1, Part VI(A), §§1-4, R77-11 adopted May 12, 1977. See, also, PCB R77-7, adopted June 28, 1977, amending Rule 203(i)(10)(cc); future proceedings will be adjudicatory, and not Regulatory; see, also, R77-1 (March 17, 1977).

the following standards and conditions:

(1) The effluent temperature shall not exceed 99°F. during more than seven percent of the hours in the 12-month period ending with any month and shall at no time exceed 111°F.

(2) All conditions adopted by Board Order in PCB R76-[this proceeding].

BACKGROUND

The thermal discharge from Edison's Kincaid station into Lake Sangchris has been before the Board on two prior occasions. In Citizens for a Better Environment v. Commonwealth Edison, PCB 73-245, -248 (consolidated), 13 PCB 69 (1974), the Board determined that the thermal discharges from Kincaid station are in fact subject to the Board's thermal limitations. Ill. PCB Regs., Ch. 3, §203(i)(1-4) (1977). Although the Board did not find that the thermal discharges into Sangchris had caused any environmental damage, 13 PCB at 80, 81, the Board nonetheless stated that Edison's discharge must (1) comply with Rule 203(i); (2) become subject to a Variance pending implementation of a compliance plan for such discharges; or (3) be the subject of a Regulatory change if Edison thought the thermal limitations were neither necessary nor reasonable.

We noted in Sangchris' next appearance before the Board that Edison chose the last of those possibilities. On January 22, 1975, Edison submitted a Regulatory Proposal to exempt all "artificial cooling lakes"* from the Board's thermal discharge limitations. In the Matter of: Water Quality and Effluent Standards Amendments, Cooling Lakes, R75-2, 18 PCB 381 (Order), 18 PCB 681, 686 (Opinion) (1975).

Although the Board did not grant the general relief requested by Edison in that Proposal, we did set standards by which individual artificial cooling lakes could receive specific thermal standards appropriate under the circumstances. While Edison had also asked for such standards for Lake Sangchris,** the Board found that Edison had failed in one specific regard: While Edison had successfully shown that thermal discharges into the lake had not historically

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* Sangchris falls within the class, "artificial cooling lakes"; see, 18 PCB at 686.

** The standard asked by Edison in R75-2 was:

The temperature of the condenser cooling discharge from Kincaid station shall not exceed 107°F except that for 5 percent of the hours in any 12-month period ending with any month during which time excursions shall be allowed up to a temperature not to exceed 122°F.

caused environmental problems, Edison had not demonstrated that the requested specific thermal discharge limitations were those which had led to our environmental findings. The Board stated that, "[a]ny standard which we may set for Lake Sangchris would be, in effect, the historic fact for that lake." 18 PCB at 712.

Not having received the requested specific thermal standard in R75-2, Edison saw its burden in this matter as threefold:

> 1. A demonstration that the environmental findings of the Board with regard to Lake Sangchris had not changed since our decision in R75-2.
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> 2. A demonstration that the cost of alternative or supplementary cooling methods for condenser cooling water discharges from Kincaid to Sangchris remains, as found in R75-2, unreasonable.
>
> 3. A demonstration of the actual discharge temperatures from Kincaid to Sangchris during the period for which we found no environmental harm (the "historic fact").

Edison's case in this matter was organized accordingly, and we shall follow the same order in reviewing the evidence before us.

ENVIRONMENTAL CONSIDERATIONS

In Both PCB 73-245, -248 (consolidated) and R75-2, the Board found that Lake Sangchris was "environmentally acceptable." That finding was more conclusive in R75-2, where the Board examined extensive testimony and documentary evidence regarding the lake. (In fact, most of the evidence received by the Board in R75-2 either concerned Sangchris directly or extrapolated from data gathered there.)*

Although the Record in R75-2 contained other useful reports concerning Sangchris, the most valuable testimony came from studies performed by the Illinois Natural History Survey, which was then (and still is) engaged in a long-term study of the lake. We shall not reiterate all of our findings with regard to Lake Sangchris in this Opinion. Our Opinion in R75-2 contains numerous specific discussions and should be referred to for more complete coverage. E.g., 18 PCB at 695, 696-700, 702-705, 707-712.

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* The Board noted in R75-2 that Edison "bore the brunt of the evidentiary burden" there and commended it for the completeness and comprehensiveness of its presentation. 18 PCB at 695.

Instead, we need note only those findings with regard to Sangchris which have been updated by the Natural History Survey and/or discussed in this proceeding. There have been, since the Board's consideration in R75-2, few changes in Lake Sangchris' biota, (R.75). A representative of the Natural History Survey characterized the lake as "remarkably stable" with few changes during three years of sampling, (id.). While fish populations fluctuate, this is thought to be a natural condition, unrelated to operations at Kincaid or its thermal load upon the lake, (R.76-77). The only general anomaly noted in the Record was to the effect that the lake is apparently aging slowly; it is "of an age where the fish population ought to be going drastically downwards, and it is not." (R.84).

In fact, some of the potential problems noted in our Opinion in R75-2 have apparently been resolved. We noted, 18 PCB at 709, that there was a problem in the lake with bluegill stunting. Testimony indicated, however, that this is a common problem with lakes and reservoirs in Illinois; the fish simply outbreed the available food supply, (R.72,73). Carp reproduction failure, also noted as a problem, may in fact be due to pesticide discharges into the lake from surrounding farmlands, (Economic Impact Ex. 1, p.32). At any rate, the presence of carp is not necessarily desirable.

Exhibit 9 in this proceeding, the Annual Report for FY 75, submitted by the Natural History Survey, contains an extensive description of the ecology of Lake Sangchris covering most fish, as well as all other flora and fauna of the lake, (see, §§2-4, 6-10). That report covers much that was discussed in R75-2, as well as considerable new data, and does not indicate any significant problem. Although there are thermal effects, they are not deleterious. (See, e.g., pp.4.42-4.44).

The conclusions we reached in R75-2 remain unchanged.

COMPLIANCE COSTS

In R75-2 the Board also examined closely the costs of compliance without existing thermal standards by Kincaid station. The Board discussed various alternatives, including cooling towers, spray canals, and variations on those methods. 18 PCB at 689-695. In this case we have not only more extensive data on the costs and problems associated with those technologies, but also have the costs or problems which might be associated with other potential compliance methods, principally modification of station operation to assure compliance. The source of this additional data is the Economic Impact Study prepared by the Illinois Institute for Environmental Quality under Public Act 79-790, (requiring such studies). In addition to meeting the requirement of P.A. 79-790, the Institute study gives considerable, helpful detail from the technical/merits records concerning Sangchris to illustrate and justify the economic alternatives presented.

We estimated in R75-2 that a mechanical draft cooling tower at Lake Sangchris would cost approximately $25 million. 18 PCB at 690. Edison's estimates of $22.086 million and $24.646 million are reported in the Institute's Economic Impact Study, (Economic Impact Ex. 1 at 23,26). A similar sized mechanical draft cooling tower for Central Illinois Public Service Company's Newton power station is estimated at $27.976 million, and the Institute gave an estimate of $12/kW which, in 1976 construction dollars, would amount to $24.8 million.

The figures given in R75-2 for natural draft cooling towers have similarly inflated. We there estimated, 18 PCB at 691, a cost of approximately $31 million; estimates in the Economic Impact Study are greater, amounting to $43.417 million (Economic Impact Ex. 1, Table 5), or $37.156 million for Newton, (id., Table 8).

Since our last discussion of spray canals, the cost has also gone up; the Institute has found that, "The unit did not meet the manufacturer's expectations...at least 520 modular spray units would be required at the Kincaid station." (Economic Impact Ex. 1 at 26.) In R75-2 we estimated that only 130 modules would be required for Kincaid. Although the costs have not risen proportionately (from 38 million to 40 million), it would appear that spray modules would probably be an extremely expensive alternative to Lake Sangchris as a cooling mechanism for the station.

The Institute estimated that if Kincaid were to attempt to meet existing standards by modifying operations at Kincaid, the maximum plant loading would be 275 mW with three pumps operating, and 360 mW with four pumps, (id., at 11). Using an average auxiliary power cost to estimate the cost of such reduced operation, the Institute estimated that annual costs for such compliance would be $25.6 million for a three pump operation and $18.9 million for a four pump operation, (id., at 14).

Without reiterating the Institute's entire study, we should note that it also discussed other alternatives, such as the cost of compliance with an absolute standard of 99°F., (e.g., Table 14, alternative C, D). The Institute also considered the cost to consumers, business, and industry for the various possible alternatives, on total and annual bases. The study went so far as to consider replacement costs, which are not included in rate-making calculations, (id., at 54). The study noted that, "[t]he real impact will be felt when replacement generating capacity is built at a cost increase of about 4.6 times." (Id., at 64.)

Although the Institute did initially question Edison's proposal of 111°F., preferring an excursion figure of 107°F., this was later somewhat modified at hearing, (Economic Impact Ex. 1, p.64; Economic Impact R.14,45). The essence of the Institute's study was that, "Both economic and environmental considerations favor the proposed standard." (Economic Impact Ex. 1 at 64.) Ernest L. Hardin, the study's principal author, stated at hearing that, "[i]n the absence of significant environmental damage, the proposed standard is clearly the least costly." (Economic Impact, R.19.)

The Institute did qualify its recommendation in the Economic Impact Study, however, to the extent that it felt that more study is needed with regard to the effects of very high temperatures on the aquatic biota, (id.). The Institute stated that, while Sangchris is "certainly the most studied cooling lake in Illinois," it would still prefer the Board to "defer setting a maximum temperature limit until more is known of the effects of peak and sustained high temperature discharges. Lessons learned at Lake Sangchris can be applied elsewhere." (Id.)

OTHER ECONOMIC IMPACT

The Institute study also discusses the economic impact of the proposed Regulation, other alternatives, and compliance with the existing standard on the various sectors delineated in Section 6(b) of the Act. This analysis weighed both the costs and benefits associated with the various alternatives with respect to the entire spectrum of possibilities shown there. In essence, that analysis showed that while there might be little immediate effect on electric utility rates, a longer term examination of the costs associated with compliance at any standard other than that proposed by Edison is unfavorable. Although the study is designed so that costs and benefits can be independently weighed (see, p.48), the study, "suggests that the environmental certainties of the existing cooling lake operation are to be slightly preferred over the more costly alternatives which would limit the heat discharged into the lake by modifying the load carried by Kincaid station. The offstream cooling alternative shows a significant increase in the environmental costs and a declining trend in benefits..." (Id.)

We agree. Our analysis of the Institute's study and the testimony presented with regard to it by the Institute and Edison leads us to conclusion that no significant environmental benefit is to be gained by requiring discharge temperatures lower than those historically experienced, and that the high costs associated with such additional limitations are therefore unjustifiable.

TEMPERATURE EXPERIENCE

As noted above, the Board found in R75-2 that the only ingredient missing and needed for the Board to set a specific thermal standard was hard evidence as to the actual temperatures of Kincaid thermal discharges. Based on our analysis above, that remains true: The environmental quality of Lake Sangchris remains good, and the costs and economic impact associated with meeting existing standards are unreasonable. In this case, however, Edison has supplied the necessary discharge temperature data.

Edison used 1975 to provide temperature figures in addition to those submitted in R75-2. Data from that year indicated that 99°F. was exceeded 5.2 percent of the time, with a maximum temperature experience in 1975 of 110.5°F. (rounded to 111°F.). (See, e.g., R.17).

Edison found, however, that the 1975 capacity factor of Kincaid was only 43 percent, as compared to a five-year average of 64 percent. Edison therefore arrived at the requested 7 percent excursion limit by multiplying the 5.3 percent excursion experience of 1975 by the ratio of that five-year average capacity factor to the 1975 capacity factor, (id.).

The Record in R75-2 did contain a significant number of temperature readings for Kincaid and Sangchris, (including locations in Sangchris so close to the discharge canal as to effectively reflect discharge temperatures, there being little temperature change in the discharge canal). (See, e.g., Exhibits 6-E, 6-I, 6-J, 6-K, 7, 10, and various testimony in R75-2.) In this case Edison has also entered exhibits demonstrating discharge temperatures, (Exs. 6, 8). These exhibits support the testimony referred to above on discharges from Kincaid into Sangchris. Additional data for 1969 and 1973 was also supplied, (Ex. 11).

Apparently to assure itself of receiving the requested limit, Edison has been quite conservative in its request. Edison discounted some very high readings as "aberrations," assuming that the monitoring equipment was not functioning, (e.g., Economic Impact R.52). Similarly, the 1969 data indicates that it could be difficult to meet the requested standard; in 1969, 107°F. was exceeded 322 times.

In addition, the Institute has assumed that higher temperatures than those requested either have been or would be experienced during hot, dry summers. To meet the requested standard, there is a potential annual cost for load reduction of about $2.8 million, (Economic Impact Ex. 1 at 18).

We find that the temperatures requested in Edison's Proposal here are in fact temperatures conservatively representative of historic operating conditions at Kincaid station. In light of that finding, and in conjunction with our other findings as to environmental and economic effects of the existing and proposed standard, we feel that Edison's Proposal has been justified.

The Agency, while recommending a change in its "comments" in lieu of a Brief, has suggested that the Board set either month-by-month discharge limitations or condition the specific standard requested upon a requirement that the capacity and operating load of Kincaid station remain unchanged. We feel that neither of these limitations is necessary inasmuch as the standard requested by Edison will itself limit the station during the critical summer months to historic operating conditions, and temperatures deleterious to aquatic life are unlikely to occur outside of the summer months. It is plain that the limits requested by Edison pertain primarily to the hot summer months, and that the 7 percent excursion limit will be used largely during those months. We shall, therefore, set the standard as requested by Edison.

We also note that the standard set here effectively removes any thermal limitations which might be implied from Rules 201 (mixing zones) and 402 (violation of water quality standards). Inasmuch as we have set no conditions as a part of this proceeding, the second portion of Edison's request is superfluous and shall be dropped.

Finally, the Hearing Officer denied, (R.13), Commonwealth Edison's motion of July 27, 1976, requesting that the hearings in this matter be held jointly and concurrently with those required under Rule 203(i)(5) of Chapter 3. It is expected, however, that the existing Record with regard to Lake Sangchris will satisfy the showing requirements of that Rule and that Edison's burden under 203(i)(5) may be satisfied at hearing by a motion to include the existing record into the record of any such proceeding.

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

ORDER

The following new Rule 203(i)(11)(bb), Lake Sangchris, is hereby adopted, and the existing Regulations of Chapter 3: Water

Pollution, are amended in conformity therewith:

(bb) Lake Sangchris

The thermal discharge to Lake Sangchris shall meet the following standards and conditions:

(1) The effluent temperature shall not exceed 99°F. during more than seven (7) percent of the hours in the 12-month period ending with any month and shall at no time exceed 111°F.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 13th day of October, 1977 by a vote of 5-0.

Christan L. Moffett, Clerk
Illinois Pollution Control Board