

ILLINOIS POLLUTION CONTROL BOARD

May 11, 1978

COMMONWEALTH EDISON COMPANY, )  
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 ) Petitioner, )  
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 )  
 v. ) PCB 77-309  
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 ENVIRONMENTAL PROTECTION )  
 AGENCY, )  
 )  
 ) Respondent. )

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

This matter comes before the Board on a November 28, 1977 petition for hearing filed by Commonwealth Edison Company pursuant to Rule 203(i)(5) of Chapter 3: Water Pollution Regulations. The rule requires the Petitioner to demonstrate that its thermal discharge has not caused and cannot be reasonably expected to cause significant ecological damage to the receiving waters. A hearing was held in Chicago on February 3, 1978.

Petitioner owns and operates Kincaid generating station in Christian County, a mine-mouth facility consisting of two generating units of 616 MW each. The 1975 plant capacity factor was 43%. Cooling water is drawn from Lake Sangchris, an impoundment created between 1964 and 1966 for this purpose by damming three branches of Clear Creek, an intermittent stream tributary to the Sangamon River. The lake surface is approximately 2700 acres with a maximum depth of 40 feet and an average depth of 15 feet.

Water is drawn from the west (intake) arm of the lake by four pumps, each with a 160,000 gpm capacity. Normally, only three of the four pumps are in operation, due to maintenance difficulties attributable to pump design. At full load, the combined heat rejection from the two generating units to the cooling water is  $5.44 \times 10^9$  Btu/hr. The heated water is discharged to a 3320 foot canal that empties into the middle (discharge) arm. Because of the lake's configuration, the cooling water system operates as a 10.7 mile loop with temperatures decreasing continually along the pond and a cycle time of 11 days. Water from the third (control)

arm of the lake does not circulate in the cooling cycle and has served as a control area in the studies prepared for Petitioner. Water is discharged to Clear Creek over a dam at the confluence of the arms of the lake; however, usually no discharge occurs during the period from June to mid-October, the time of greatest lake temperature.

Lake Sangchris is used extensively for recreational fishing, and some boating, generally related to fishing, is allowed. The lake and surrounding area also serve as a hunting ground. Swimming is not allowed because of possible hazards due to prolonged exposure to water heated in excess of 104°F and because of possible liability for accidents.

Lake Sangchris has been the subject of extensive studies in conjunction with cases previously before the Board. This facility has been considered in PCB 73-245, -248 (consolidated), R75-2, and R76-11. The extensive records of these cases were incorporated into the present proceeding. It was anticipated in R76-11 that the record already generated would suffice for purposes of a 203(i) (5) hearing, and the Board concludes that it does. Only a brief review of that information is necessary to determine that the operation of the Kincaid station has not caused nor can reasonably be expected to cause significant environmental harm. Thermal studies generated as part of R76-11 show that with an assumed average load of 844 MW (68.5% capacity factor), the temperature of the lake would be consistently higher than 90°F in July and August, and occasionally higher in June and September. Between December and March, the average lake temperature would be 60°F, exceeded occasionally in March. The thermal discharge standard adopted in R76-11, 99°F with an allowable excursion to 111°F during no more than 7% of the hours in any one year period, reflects historical operation. The 99°F standard is summer temperature; the generating facility lacks the capacity to raise the water temperature that high on a year-round basis. The period of July 1 to August 31, 1975 appears to form the basis for the regulation. The maximum discharge temperature recorded in that period was 110.5°F when the plant was generating 910 MW with three pumps in operation.

The highest discharge temperatures during the 1968-1975 period studied as part of R76-11 occurred during the summer of 1969. The hourly discharge temperature during that period exceeded 107°F 43% of the time, with a maximum discharge of 112.1°F. It was determined that meteorological conditions were not atypical as no low lake levels were present and near or slightly less than average air temperatures and precipitation were experienced. The high discharge temperatures are attributed to the high capacity factor experienced during that period; the maximum ever recorded at the

station, 74.9%, occurred during this time. Although excursions over the 99°F standard occurred during only 5.2% of the annual period, the 99°F standard was exceeded during 17% of the summer hours. Rather than establish a higher standard or require the installation of costly cooling devices, it has been determined that in situations where excursions above the Board standards would be likely the load at Kincaid will be reduced so that discharge temperatures remain within the permitted range. Such a procedure will not result in any loss of service to Petitioner's customers.

Extensive studies of the impact of the thermal discharge on the ecology of Lake Sangchris have been done. Three years of study by the Illinois Natural History Survey were reported in R76-11 and these studies were to have continued through June, 1978. Although admitted in R76-11 that it would probably be beneficial not to have temperatures over 99°F in the lake, the studies have shown little adverse impact.

The present fishery in Lake Sangchris is the result of Department of Conservation stocking. Fourteen species are reported; none have been eliminated due to thermal stress. Studies of particular species show that the largemouth bass remove themselves from stress-causing temperatures. This movement within temperature gradients has been shown to increase the reproductive area of the lake. The warm temperatures also accelerate plankton growth to provide a greater food supply. Studies of bluegill show some stunting but this is attributable to overpopulation rather than thermal effects. Similarly, carp reproductive problems have been observed.

The higher water temperatures produce a direct benefit by providing a winter habitat for fish that would not be otherwise present in central Illinois lakes. It has been determined that the fish population in Lake Sangchris is so good that it is atypical. The lake is at an age where fish populations generally decline, but that effect has not been observed during the period studied for R76-11 or from that proceeding through the present one.

The only adverse effect attributable to thermal discharges is the loss of Asiatic clams. During 1975, a kill was observed in the canal area when temperatures reached high levels. This loss does not appear significant because the Asiatic clams repopulate during cool weather. Additionally, they are not a beneficial use since the species tends to clog the intake structure and also competes with more desirable food sources.

The Board is aware that the cooling lakes present special considerations. The effects of their operation, particularly that of Lake Sangchris, have been sufficiently studied. The standard set in R76-11 is reasonable and possible adverse effects are controllable. In addition, the possibility of environmental harm during summer operation must be weighed against the definite environmental benefit presented during winter operation. In examining the record before us, we determined that no significant adverse environmental impacts have been experienced or are likely to occur.

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

ORDER

It is the Order of the Pollution Control Board that:

1. The Petitioner has satisfied the requirements of Rule 203(i)(5) of Chapter 3: Water Pollution Regulations.
2. The thermal discharge from Petitioner's Kincaid generating station has not caused nor can reasonably be expected to cause significant damage to Lake Sangchris.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 11<sup>th</sup> day of May, 1978 by a vote of 5-0.

  
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Christan L. Moffett, Clerk  
Illinois Pollution Control Board