

ILLINOIS POLLUTION CONTROL BOARD  
September 7, 1978

COMMONWEALTH EDISON CO., )  
 )  
 Petitioner, )  
 )  
 v. ) PCB 78-71  
 )  
 ENVIRONMENTAL PROTECTION AGENCY, )  
 )  
 Respondent. )

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

This matter comes before the Board on the March 14, 1978 Petition of Commonwealth Edison Company for a determination pursuant to Rule 203(i) (5) of Chapter 3 of the Regulations, that thermal discharges from its Dixon Generating Station have not caused and cannot reasonably be expected to cause ecological damage to the receiving waters. The Agency's Response, filed May 5, 1978, waived all right to file a Recommendation in the matter and requested a decision on the pleadings. A mandatory hearing was held on July 14, 1978. No members of the public were present. Petitioner's representative testified that the Dixon Station was to be retired from operation one week from the date of the hearing. No evidence was offered in addition to the report prepared by Petitioner in support of its petition and attached thereto. No challenge was made by the Agency at the hearing to any of the facts and conclusions stated in this report. Therefore, all data referred to in this opinion are found in Petitioner's report and it is the sole basis for the Board's determination under Sec. 203(i) (5).

The Dixon Generating Station is located on the Rock River at Dixon, Illinois. It contains two coal-fired units having a total net generating capacity of 119,000 kw. These units have been in commercial operation since 1945 and 1953, respectively. Plant capacity factor over the five year period 1972-1976 ranged from 62.5% (1973) to 27.2% (1976) with a projected future capacity factor of 30-35% until retirement in October, 1978 (p. 3). Each unit uses a once-through condenser cooling system, drawing water from the Rock River upstream from the station and discharging it downstream. Four circulating water pumps are used with maximum pumping rates of 50,000 gpm and 53,000 gpm respectively.

The Rock River is characterized as a moderately fast-moving river, with an average velocity of 2.4 fps (p. 13). However, since it is also relatively shallow (7-15 feet), current velocities are less near the edges than in the deeper centers. The Rock River experiences seasonal changes in flow, with annual high flows in spring and early summer and annual low flows in fall and winter (p. 11). The plant intake of cooling water parallels the seasonal flow; intake studies conducted at the station during 1975-6 showed plant average flow in fall and winter as roughly half that of spring and summer (Table 3, pp. 7-10). Comparison of average river flow with plant cooling water flow during repeated 24-hour periods throughout the year (see Table 3) showed that less than six percent of the Rock River was utilized in the cooling system over the test year, with a quarterly mean of less than 2% in all quarters except summer, 1975.

Plume Studies. A demonstration pursuant to Rule 203(i)(5) shall include the information delineated in Rule 602(a)-(d) of the Procedural Rules. The objective of requiring such material is to permit definition of the temperature effects on water quality and aquatic biota caused by the thermal discharge not only under conditions existing at the time of testing, but also under statistically determined typical seasonal and "worst case" conditions of river flow, ambient water temperature, and plant operation. These factors affect the area of the plume; i.e., the area in which heated discharges raise the temperature of the water greater than 5°F.

In this respect, the data submitted in Petitioner's report are incomplete. Inclusion of relevant data on flow, temperature, plant loading and meteorological conditions in the actual plume studies is haphazard and no data on plant loading are included. The information provided in Table 8 (p. 30) may comply with NPDES requirements but does not fulfill the requirements of Sec. 602(c) for theoretical plume studies under typical and worst case conditions. The actual plume studies conducted quarterly during the year April, 1975 - March, 1976 (Fig. 5-8, 26-29) demonstrate a relatively small thermal plume, ranging from 0.6 to 1.5 acres. However, Table 8 provides little basis for analysis of what changes in conditions either in the plant operation or river or climate produced estimated maximum increases in plume area to 5-10 acres during 1976-1977. Failure to include models for "average" and "extreme" conditions leaves the 1975-76/76-77 statistics without a frame of reference; i.e., to what extent they represent or deviate from normal seasonal conditions.

Effects on water quality and aquatic biota. Petitioner's report summarizes results of biological and water quality studies conducted by Espey, Huston and Associates from March, 1975 to February, 1976. Sampling for phytoplankton, zooplankton, periphyton, benthos and fish was done quarterly from three locations: at the intake area, discharge area and at a point 800 meters downstream of the station (see fig. 9). They conclude that the plant's thermal discharges have no significant effect on the growth, density or species diversity of the above populations.

Phytoplankton was observed to produce large blooms in the fall, and were largely dominated by diatoms in all three locations. Very low densities of zooplankton were found during summer, fall and winter. Summer samples included only two species of crustaceans, found only at the downstream sampling location. Abundant populations were found in the spring, however, with the same organisms dominant and in nearly identical proportions at each sampling location and no significant variation in density attributable to thermal discharge (fig. 12). Macroinvertebrate population was studied by sampling the river bottom at sampling locations (fine sediment) and providing artificial substrate samples. Although the "natural substrate" benthos showed a depressed population at the discharge location (see fig. 15, p. 46) as against the downstream and intake (control) points, no corresponding depression was found on the artificial substrate collections which had been placed near the discharge and directly exposed to the thermal effluent. The same species dominated at all three locations and no consistent pattern of species diversity between locations receiving thermal effluent and the control located upstream of the intake point was found.

Fish sampling in the spring, summer and fall showed a predominance of rough and forage species over game species. Although sampling showed lower numbers of species and individuals in the discharge area than in the upstream control location in the summer months, indicating an avoidance of the discharge area, the downstream location also produced significantly fewer individuals in summer and fall, suggesting that differences may have been due to factors other than temperature (Table 12, p. 51). The study concludes that since such a small area of the Rock River is involved with the thermal plume, little impact to the fish of the area is expected (p. 55,57).

It should be noted that these studies were conducted during the period of time actual plume studies indicated very small plume area greater than the 5° isotherm being produced by the Dixon Stations's discharge in all seasons. Petitioner's report does not discuss possible thermal effects on river biota caused by the 5-10 acre plume area predicted to occur after 1975, or under theoretical extreme conditions. For example, the one day samplings taken in July, 1976 and July, 1977 (Table 8) show significantly lower river flow than during July, 1975 (Table 3, p. 8 which must be converted to cfs for comparison purposes). That of July 6, 1977 is less than the 7 day, 10 year flow of 1,444 cfs (p.11). According to Table 8, cooling water utilized by the station on that date would equal approximately 20% of the Rock River flow. (Average use in July, 1975 was 3.65%.) The report gives no indication of whether such a combination of low river flow and high temperatures approach theoretical "worst case conditions" as shown by historical records or is closer to typical for the month of July; nor the frequency with which such conditions can be expected to occur over the years. No information was given as to what percentage of the total river flow would be occupied by the estimated 10-acre plume in summer months. Such information is significant when temperatures within the plume may reach the high 90's and cause morbidity among nonmobile organisms.


In sum, Petitioner's submitted report demonstrates that as of the date of the studies, no significant impact was observed on river quality and aquatic biota as a result of the Dixon Station's thermal discharges into the Rock River. The demonstration, however, does not meet the requirements of Rule 602(d)(1), (2) and (3). Absence of a consideration of potential effects under "typical" and "worst case" conditions, and of a discussion of factors causing estimated plume areas significantly larger in recent years than those actually observed in earlier years, renders it difficult to make a determination that Petitioner's Dixon Station discharges cannot reasonably be expected to cause significant ecological damage to the receiving waters under 203(i)(5).

Nevertheless, if the Dixon Generating Station is in fact retired from operation on October 1, 1978, as scheduled, or on July 21, 1978 (R.8) as testified, the need for any further studies is rendered academic. Thus it is not necessary for the Board to make a finding on the merits because the plant is presumed to be no longer in operation.

ORDER

It is the Order of the Pollution Control Board that the instant proceeding be dismissed as moot.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify the above Opinion and Order were adopted on the 7<sup>th</sup> day of September, 1978 by a vote of 4-0.

  
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Christan L. Moffett, Clerk  
Illinois Pollution Control Board