

ILLINOIS POLLUTION CONTROL BOARD
April 25, 1972

In the matter of)
)
JOINT APPLICATION OF) #71-20
COMMONWEALTH EDISON CO. AND)
IOWA-ILLINOIS GAS & ELECTRIC CO.)
(QUAD CITIES PERMIT))
(PETITION FOR MODIFICATION OF
PERMIT)

OPINION AND SUPPLEMENTAL ORDER OF THE BOARD (BY MR. LAWTON):

On November 15, 1971, a permit to operate a new nuclear generating station consisting of two 809-mw Boiling-Water Reactors at the Quad-Cities plant near Cordova, Illinois, on the Mississippi River was issued to Applicants. Section 5 of the permit provides as follows:

"[5. Heated Water Discharges]

(a) With the discharge improvements described in the Supplement to Appendix C of the Application as Amended, Units 1 and/or 2 may be operated until April 1, 1972, at a total output not to exceed 809 mw, without regard to the heat limitations of regulations SWB-12 as amended by #R70-16 or of successor regulations, provided that:

- (i) until operation of the diffuser is achieved, effluents shall not exceed ambient river temperatures by more than 12°F; and
- (ii) within thirty days after receipt of this permit, the permittees shall submit a statement regarding the feasibility and cost of installing spray modules to reduce the heat discharged in the interim before completion of the diffuser. The Board upon receipt of such statement will take such further action as appears appropriate.

(b) On and after April 1, 1972, Units 1 and 2 shall be operated only in full compliance with all provisions of SWB-12 as amended by #R70-16 or of successor regulations, with regard to heated discharges."

#R70-16 (Mississippi River Thermal Standards) now embodied in our comprehensive water regulation in addition to specifying monthly

temperature maximums prohibits an increase of water temperature above ambient in excess of 5°F. outside of the mixing zone.

On March 1, 1972, a petition for modification of paragraph 5 was filed with the Board seeking a variance from the Mississippi River Thermal Standards for a period between approximately April 20, 1972 until August 15, 1972, at which time the installation of the diffuser discharge contemplated by paragraph 5 above will have been completed.

Hearing was held on the petition.

The delay in the diffuser discharge installation is a consequence of the refusal until recently, on the part of the State of Iowa to allow construction of the diffuser discharge. Originally, it was contemplated that testing of the Quad-Cities units would be made during the winter months when the ecological impact would be minimal. However, the pendency of an injunction proceeding (now resolved) in the U. S. District Court for the District of Columbia prevented such testing from taking place. Petitioners propose a program of testing and use of the reactors to assure proper operation and to meet summer peak load demands prior to the installation of the diffuser discharge. We grant the modification, as proposed, in the form set forth in our order, for the reasons more fully discussed in this Opinion. We find that while permitting departure from the Mississippi River Temperature Standards will have some adverse effect on the biota, such damage is neither severe nor irreversible. We further find that failure to permit such departure from the Mississippi River Temperature Standards will impose restrictions on power generation having detrimental consequences to the entire community far in excess of the limited environmental damage consequential to the variation permitted.

Applicants request authority to continue the testing of units which began on April 1, 1972 when the AEC issued a 20% license for each unit, at a station capacity level not in excess of 809-MW. Petitioner anticipates that the AEC percentage allowance will be increased.

It is anticipated that 55 days will be needed for testing each unit in order to bring it up to full capacity although the testing of each will be carried on simultaneously and be coordinated so that the maximum output at no time of testing will exceed a total of 809-MW. Testing of Unit No. 2 might take less than the anticipated 55 days (R.2617). Applicants have contended that testing in order to demonstrate full power capabilities of both units is necessary to insure maximum station reliability and availability during system load emergencies or a forced outage of one unit. Subsequent to the completion of the testing operation, Applicants contemplate that each unit will operate normally at 200 mw capacity until the diffuser discharge

is in operation. One or both units will be brought up to 500 mw in the event weather forecast and early estimate of emergency help available from other companies indicate that the Quad-Cities capacity will be needed. Operation above 500 mw for either or both units, resulting in a total station output in excess of 1,000 mw will not occur until after Commonwealth Edison has interrupted service to those of its customers whose service agreements allow such interruption, and in no event, shall total station output exceed 1,000 mw for more than eight hours in any day.

Quad-Cities power capacity is needed to assure the meeting of summer peak electrical loads resulting from the projection of the probable power demands and anticipated outages. Total owned and purchased capacity of Commonwealth Edison is 14,286 megawatts (Commonwealth Edison Exhibit 100). The predicted peak load is 12,600 megawatts while the projection of outages varies from 2,100 mw to 3,900 mw. A figure of 2,600 mw is assumed for purposes of this proceeding. This anticipated reduction in power-generating capacity is a consequence of low sulphur coal limitation, non-turbine temperature limitations, fast start peaking units, miscellaneous limitations and forces outages of entire units. With a total capacity of 14,286 mw, a peak load of 12,600 mw and a projected outage of 2,600 mw, Commonwealth Edison would need a total of 914 mw from Quad-Cities to meet the peak. It is anticipated that this would occur on approximately seventeen occasions, being the average number of weekdays on which 90° F. is exceeded in Chicago (R.2583).

From the foregoing, it would appear that an amount in excess of 300 mw and on occasion in excess of 900 mw would be required by Edison from Quad-Cities Station during the hot summer period of 1972. The evidence also supports the position that the load demands and capacities of Iowa-Illinois, Iowa Pool and MAIN are such that the Quad-Cities capacity will be necessary to insure adequate power availability from these sources for emergency situations, particularly during the summer months in order to meet peak demands (R.2590-2607).

The consequence of the increased power generation prior to the installation of the diffuser discharge must be considered in terms of the increase in temperature at the various levels of power generation and its anticipated affect on the biota.

Frank A. Palmer, Superintendent of the Quad-Cities Station testified that with the power generation indicated, the water temperature at the plant discharge point for the two units is estimated as follows (R.2618):

Two units at 200 MW: 8 degrees
One unit at 200 and the second at 500 MW: 12 degrees
Both units at 500 MW: 16 degrees
One unit at 500 and one at 809 mw: 19.5 degrees
Both units at 809 mw: 23 degrees

Evidence in the record indicates that the river flow at the end of April will be 170,000 cfs, declining to as low as 26,000 cfs in August. The shape and direction of the plume from the side jet discharge suggests that the flow will be along the Illinois shore and that one-half of the water having discharge temperature will encompass the small islands on the Illinois side downstream from the plant (R.2643). The report on biological effects submitted at the hearing indicates a possibility of slight changes in spawning time and maturation rates for fish spawning at that location but little likelihood of a change in total fish population or a change in the population dynamics. Lethal temperature effects are not likely to occur during the testing period because the water temperature during that time would range from 55° in April to 80° in late June. Some concern was expressed over the biological effects during the period of July and August prior to the operation of the diffuser discharge. During this period some young of the year of walleye Sauger pike, white crappie and black crappie, may be killed if the ambient temperature is greater than 91°F. The net result would be a shift in the species composition of the community favoring the more temperature tolerant types (carp, carpsucker, large-mouthed bass, bluegill and drum) over those less tolerant (northern pike, crappie, sauger and walleye.) However, the environmental report states that after the use of the side-jet discharge is discontinued in August, 1972, any displaced species will repopulate the affected area within a relatively brief period. Nor will temperature decrease following decrease in power generation appear to have any substantial adverse effect. While elevated temperatures may disrupt behavioral habits associated with spawning, reduce the rate of fertilization, increase egg mortality, increase the rate of development to a point that hatching occurs at an unfavorable time and lower the viability of the larvae, even a limitation on production in this region during the test period will have little or no effect on the fish population dynamics within Pool 14 (R. 2648).

Further, the island area where the thermal impact would be most pronounced accounts for less than 10% of the habitat in Pool 14 below the Quad-Cities station and any changes that may occur in the biota will be of little significance in the total ecology of this pool. Any damage to the benthic communities is likewise expected to be minimal.

In summary, it is the conclusion of the witness testifying on an ecological impact that the anticipated affects of the interim operation of the side-jet discharge on the total ecology of Pool 14 appear to be minimal during the testing period when an increase of 11.5° F. will not be exceeded. If the units are operated so that an

increase is above 11.5° F., some environmental impact is likely. Assuming maximum operation of the station will cause increase to 23° above ambient, immature fish unable to move from the area would be killed and benthic populations would be affected. Likewise, depletion of dissolved oxygen would have an adverse effect.

Notwithstanding the foregoing consequences of such temperature increase, it is believed that the repopulation will occur and that recovery of the fishery would result within a period of two to three years (R.2656).

In order to minimize such environmental impact, Applicants propose to keep plant operation at or below 400 mw, increasing it beyond this point only to the extent load demands require such increase. An eight hour limit on capacities above a total of 1,000 MW generation is also provided and service to interruptible customers would be interrupted when total output exceeds 1,000 megawatts.

We grant the modification as proposed because in our view the impact on the community likely to result from the suspension of electrical power during peak demands as a consequence of outages and other emergency situations is far greater than any likely damage to the ecology resulting from temperature increases of the river prior to installation of the diffuser discharge which damage, while substantial, would be reversible.

Our original permit, which is modified by this Order, was granted pursuant to Section VI(a) of the Environmental Protection Act and related essentially to radioactive emissions. Because of the affirmance by the Supreme Court of the United States of the 8th Circuit Court's decision in Minnesota v. Northern States Power Company, 447 Fed. 2d 1143 (1971), holding that regulation of radioactive emissions from power plants is preempted by the Federal Government, jurisdictional doubts have been raised concerning our permit authority generally. However, what Applicants seek by the present proceeding is, in substance, a variance from the limitations of #R70-16 limiting thermal emissions into the Mississippi River. Our jurisdiction to promulgate and vary regulations of this nature is in no way affected by the Northern States Power Company decision, irrespective of what our permit authority may be as a consequence of the case. Applicants have correctly pursued their remedy before us. We treat petitioner's request as a variance petition and grant it on that basis.

This opinion constitutes the findings of fact and conclusions of law of the Board.

SUPPLEMENTAL ORDER

Paragraph 5(b) of the permit dated November 16, 1971 is deleted and in lieu thereof, the following paragraph is added allowing a variance from the Mississippi River Temperature Standards, #R70-16:

5. (b) On and after the date of this order, Units 1 and 2 shall be operated in full compliance with all provisions of SWB-12 as amended by #R70-16 and or successor regulations with regard to heated discharges, except that until the diffuser discharge is installed and operating, but no later than August 15, 1972, Units 1 and 2 may be operated:

(1) For the purpose of testing either Unit up to its rated capacity of 809 MW, effluent temperatures during this period shall not exceed ambient river temperatures by more than 12 degrees F.;

(2) For the purpose of meeting customer demands for electrical power, in accordance with the following operating steps:

- (a) At a total output not to exceed 400 MW; or
- (b) On any day when the applicants' daily load forecasts (including bona fide requests for emergency power from other companies) exceeds the total estimated capacity available to them from any source (not including the last 182 MW of capacity from Powerton Units 1 through 4), at a total output sufficient to meet the daily load and in no event more than a total output of 1,000 MW, or
- (c) On any day when the applicants' load forecasts (including bona fide requests for emergency power from other companies) exceed the total estimated capacity available to them from any source (not including the last 182 MW of capacity from Powerton Units 1 through 4) by an amount sufficient to require more than 1,000 MW total output from Units 1 and 2, at any level of output required to meet the load, provided that total station output shall not be raised over 1,000 MW until after Commonwealth Edison has interrupted service to those of its customers whose service agreements allow for such interruptions. In no event shall total station output exceed 1,000 MW for more than eight hours in any day.

- (d) The biological effects of operation at more than 400 MW without the diffuser discharge shall be monitored by the applicants, and the results of such monitoring program shall be reported to the Environmental Protection Agency not later than December 1, 1972.

I, Christan Moffett, Clerk of the Illinois Pollution Control Board, certify that the above Opinion was adopted on the 23rd day of April, 1972, by a vote of 4 to 1.

Christan Moffett

