ILLINOIS POLLUTION CONTROL BOARD
November 15, 1971

in the matter of	)	
JOINT APPLICATION OF COMMONWEALTH EDISON CO. AND IOWA-ILLINOIS GAS & ELECTRIC CO. (QUAD-CITIES PERMIT)	)	PCB 71-20

Dissenting opinion by Mr. Dumelle:

The Board, by a 3-1 vote on this date has granted the permit for the Quad-Cities reactors to operate. I dissented for the following reasons in this order of importance.

1. The lack of time in which to adequately assess the Emergency Core Cooling System (ECCS) testimony received only eight working hours previous to the decision.

2. The excessive and unnecessary radiation dosage to the public in the vicinity of the Quad-Cities nuclear plant under the permit.

3. The opinion that the jet diffuser will serve as a barrier to the passage of fish in the Mississippi River.

I. The Emergency Core Cooling System

On Thursday, November 11, the Board heard Dr. Henry Kendall, Chairman of the Union of Concerned Scientists, and a physicist at the Massachusetts Institute of Technology, tell why his group feels that present Emergency Core Cooling System design is not adequate. His testimony, which was well researched and impressive, detailed the consequences of an ECCS failure.

If a Loss of Coolant Accident occurs, the uncovered fuel rods in the core would heat up, distort, rupture and thus block coolant flow into the hot spots of the core. Metal-water reactions will add to the heat present; embrittlement of the cladding will occur and eutectic alloys will form. All of this could lead to an irreversible reaction--a molten core at 3,000F. to 5,000F, which would rupture both the inner and outer contaminant vessels and release clouds of radioactive gases to the atmosphere. Depending

upon the winds at the time, these lethal clouds could travel over highly populated areas and cause lethal doses of radiation within a 60-70 mile radius. Hundreds of thousands of people might be killed if such a sequence occurred at either Quad-Cities or its twin at Dresden (R. 2467-8, 2527-30).

Commonwealth Edison Company and Iowa-Illinois Gas & Electric Company (the Utilities) and their vendor, General Electric Company, point to the several core cooling or feedwater systems which would energize and cool the core before the fatal 60 seconds of uncovered core has passed. Accepting as true the uncontroverted testimony that after the initiation of an incident requiring Emergency Core Cooling, 30 seconds elapse before the core sprays are activated, leaving only another 30 seconds for the ECCS to do its job (R.2475, 2491) we must take note of the import of Dr. Kendall's testimony.

Dr. Kendall tells us that even if the ECCS system functions it may not stop the excursion and consequent disaster. The ECCS system is like the emergency brake system on our cars. We may put it on and the brakes may engage but just as the mechanical momentum impels the car forward so too may the reaction in the core be unstoppable and proceed to total core meltdown. That is the meaning of all the testimony by Dr. Kendall about test results and computer codes and blithe assumptions that are not realistic.

The next logical question is "What are the chances of a Loss-of-Coolant-Accident?" Dr. Kendall puts them at being very high when he says "I expect an incident (of core uncovering) in the next few years" (R. 2532). If we take a "few years" as being three years and compare the seven existing power reactors in Illinois soon to be on line (Dresden 3, Quad-Cities 2, Zion 2) with the 121 reactors listed by Dr. Kendall (Bd. Ex. #2 Supp. 2 p.1) the chances are simply 7 in 121 that this incident will occur in Illinois or a 1:17 chance. These are very high odds. And if the "brake" does not work then monumental tragedy may ensue.

The short time left after Dr. Kendall's testimony was finished was simply not enough to read the Final Safety Analysis Report or the Edison report to the Atomic Energy Commission of the previously not publicly known ECCS activiation incident at Dresden 2 on June 5, 1970. From these documents, at the very least, a fuller picture would have emerged that might have resulted in some core temperature restriction or, a speedup in the sensor testing program, or both. I had asked to defer consideration of the permit application until the next Board meeting a week hence and that motion, by a 2-2 vote was lost. With so much at stake the Board should have granted the additional study time.

II. Excessive Radiation Doses to the Public

The permit as passed by the Board will permit dosages to the public living nearby of 80 millirems when full power on both reactors

is achieved, supposedly after April 1, 1972. From this date, until September 1973, the amended date at which the gas cleaning system is to be operative, an approximate 120 millirems dose will be delivered to the public living nearby. In other words, these people will receive an unnecessary dose of radiation equal to a year's normal background level. Put another way, in the year-and a half of full power, the nearby public will receive two and one half years of radiation. Since most scientists hold that no acceptable threshold values exist for unnecessary radiation exposure, it follows that there is some unnecessary risk of induction of leukemia, other cancers and genetic defects.

If it were necessary that this radiation occur then the balance might be somewhat easier. The Board could then balance the effects from the smoke from the Moline power plant and the leukemia-cancer-genetic defects against the necessity for power. But it is wholly unnecessary. Edison's own witness, Mr. Harold Williamson testified that fuel rods did not deteriorate in storage and could be used again (Dresden Record, October 19, 1971 p. 75-79). All that would be necessary for the Utilities to do would be to refuel when emissions exceeded 25,000 μCi/sec. per reactor at full load, retain the "dirty" fuel, load with new fuel, and use the "dirty" fuel after September 1973 when the off-gas control system would be operative. The only cost to the Utilities would be the interest on the fuel rod investment plus the cost of the additional down time required for refueling. Since we have been told by Edison that it took the unusual step of completely refueling Dresden 2 after the June 5, 1970 incident,refueling as a precaution is certainly possible and indeed has been done in the past.

I would have retained the 25,000 μCi/sec. limit on the uncontrolled Quad-Cities reactors as a maximum, similar to the limit we set on the Dresden 3 reactor in March 1971. I think the Board has now set a precedent, in permitting 80,000 μCi/sec. for a single Quad-Cities reactor (more than a 200% increase) that will haunt the Board. The Board next week may decide a further order on Dresden 3 and the pressure will be on to relax the limit in that permit and to go with the looser (and "dirtier") Quad-Cities level.

III. The Jet Diffuser as a Barrier to Fish

The Board has given its permission to the Utilities to use a jet diffuser to dissipate the heat from their operation. The effluent is permitted to be 23°F. above river temperature. It has not been proven to me that fish will in fact go through the diffuser's considerable turbulence (which is the reason for its effectiveness as a heat spreader). Just because there may be interstices of cool water between the individual hot plumes does not mean that a fish will seek them out any more than a horse may willingly run between burning trees in a forest fire. Furthermore, the jets will create some underwater noise and fish are notoriously

sensitive to noise. What is called for and what is lacking, are actual experiments with full-width diffusers to determine if fish will in fact willingly go through them. The Board should not permit a barrier to be constructed and then be under the considerable pressure of making worthless this substantial investment if it is shown to greatly impair natural fish movement.

IV. Conclusion

Between the November 11 testimony of Dr. Kendall and the Board action of November 15 the Chicago Daily News (November 13) ran a perceptive editorial as follows:

Nuclear power dilemma

> From the testimony adduced so far there appears no reason to deny the Commonwealth Edison Co. a permit to build its projected new Quad Cities nuclear plant at Cordova. Edison, speaking through Asst. to the President Byron Lee, told the Illinois Pollution Control Board that at no time during a pre-operational accident at the Dresden plant in June, 1970, was there any hazard to the public. At that time a safety valve was accidentally opened by a "spurious" electronic signal. The steam turbine and reactor were shut down instantly. Had the water level receded enough to expose the reactor fuel core, the core could have overheated and sent radioactive gas clouds over the adjacent countryside.
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> Members of the Union of Concerned Scientists have testified that, while "fail-safe" mechanisms operated in this case, the sum-total of existing precautions are not sufficient to ensure such an accident will not recur and "lead to complete core uncovery". It questions the feasibility of proceeding with new plants of the Dresden design until and unless greater safety can be built into the designs.
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> Com Ed says that this is the only time a safety valve has failed to function properly, and there is no reason to suppose that if it ever did fail again, the built-in precautions wouldn't operate as they did in this case.
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> Wrapped up in this single example is the whole dilemma facing government, industry and the public: Granting the deadly potentials of the fuels used in nuclear power plants, how safe is "safe enough?"

There can hardly be any turning back from the course of development charted by the power companies. Increasingly, the public is being locked into absolute dependency upon the power from the great nuclear plants that are mushrooming adjacent to the principal lakes and rivers. In Illinois the Pollution Control Board and nationally the Atomic Energy Commission have the job of making as certain as possible that the risk of contamination is kept at the absolute minimum. In a situation where disasters can result either from too little or too much caution, the public can only hope that their judgment is good.

The Board by its Dresden decision in March 1971 and under Title VI-A of the Environmental Protection Act has responsibilities in the area of nuclear plant regulation. With these responsibilities comes the "job of making as certain as possible that the risk of contamination is kept at the absolute minimum". I feel that we should have done more in this proceeding to be "certain".

Jacob D. Dumelle

I, Christan Moffett, Acting Clerk of the Illinois Pollution Control Board, hereby certify that the above Dissenting Opinion was submitted on the 19 day of November, 1971.

Christan Moffett, Acting Clerk
Illinois Pollution Control Board