ILLINOIS POLLUTION CONTROL BOARD
February 20, 1985

IN THE MATTER OF:	)	
	)	
PROPOSAL OF THE ILLINOIS POWER COMPANY FOR A SITE-SPECIFIC EFFLUENT RULE CHANGE (PROPOSED AMENDMENT TO ILL. ADM. CODE, TITLE 35, PART 304, SUBPART B)	)	R83-11

ADOPTED RULE. FINAL OPINION AND ORDER.

OPINION AND ORDER OF THE BOARD (By B. Forcade):

This matter comes before the Board on Illinois Power Company's ("IPC") proposal, filed May 17, 1983, to amend the Board's Water Pollution Regulations by adding a new Section 304.209. Under the proposed site-specific effluent rule change, the effluent limitation on the discharge of total suspended solids ("TSS") from the ash pond system of IPC's Wood River Station in East Alton, Illinois, into Wood River Creek would be raised from 15 milligrams per liter (mg/l) to 30 mg/l as an average of daily values for thirty consecutive days, and from 30 mg/l to 100 mg/l as a maximum for one day. (See: Exhibit 1).

On April 27, 1984, the Board adopted for first notice a new §304.209 to Subpart B of Part 304 of Title 35 of the Illinois Administrative Code. This new section would provide site-specific relief to IPC for their Wood River Station. First notice of this proposal was published at 8 Ill. Reg. 8116, on June 8, 1984. Under the rule proposed at first notice, the applicable TSS effluent limitations for the facility's ash pond system effluent would be 30 mg/l as an average of daily values for thirty consecutive days and 100 mg/l as a daily maximum. Comments were received, during the first notice period, from the Illinois Environmental Protection Agency ("Agency") and from IPC. The Administrative Code Unit submitted a comment on June 11, 1984, concerning the Illinois Register first notice format.

In response to the Agency's comments during first notice and on reexamination of the record, the Board changed the proposed rule by reducing the daily maximum from 100 mg/l to 50 mg/l. By Order of the Board, dated October 12, 1984, the proposed rule, as modified, was submitted to the Joint Committee on Administrative

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The Board wishes to acknowledge the contributions of David G. Mueller who was the administrative assistant for this rulemaking.

Rules ("JCAR"). JCAR 's second notice review commenced on November 5, 1984. JCAR issued a Certification of No Objection to this rulemaking on December 11, 1984, ending the second notice period.

The TSS standards proposed by IPC are the same as suggested by the United States Environmental Protection Agency ("USEPA") for the electric power generating point source category as set forth in 47 Fed. Reg. 52290 (November 19, 1983) (to be codified in 40 C.F.R. Part 423). The Petitioner believes that the Federal effluent standard of 30 mg/l is more appropriate in the instant situation because it was intentionally established by the USEPA as being the best practicable treatment currently available for one specific industry--the steam electric industry. (R. 137-138). The Petitioner asserts that the USEPA set the Federal effluent limits after carefully evaluating the fuel types, equipment, age and size of electric plants, water usage, and wastewater constituents involved in the steam electric cost of control and treatment technologies available for potential use in this particular industry. (R. 137-140; R. 156-162). Accordingly, IPC is requesting that it be granted a site-specific relaxation of the state effluent standard to the same level as the Federal standard. (See: Exhibit 5).

Two hearings on the merits of this regulatory proposal were conducted. The first merit hearing was held on August 22, 1983, in Alton, Illinois. The second hearing took place on August 26, 1983, in Chicago, Illinois. Members of the public were present at both hearings; two witnesses testified, and nine exhibits were admitted into evidence.

At these hearings, the Petitioner attempted to demonstrate that it has been unable to meet the existing statewide non-industry specific TSS limitation of 15 mg/l as set forth in 35 Ill. Adm. Code 304.124(a) despite the installation of numerous control measures. IPC indicated that the only economically feasible physiochemical wastewater treatment facility would cost $3.9 million to install and $145,000 annually to operate and maintain. (R. 35-36; see: Exhibits E & F).

The company contended that such a facility would deprive Wood River Creek of necessary phytoplankton and adversely affect the propagation and recruitment of juvenile fish from the new ash pond system by depriving these fish of a vital breeding ground. An engineering study by Sargent and Lundy was proffered to demonstrate that the physiochemical treatment system is the least costly alternative control measure to achieve compliance with the existing 15 mg/l TSS standard.

The Director of the Illinois Department of Energy and Natural Resources ("DENR") advised the Board on December 6, 1983, that the DENR had made a finding that an economic impact study on the regulatory proposal in R83-11 is not necessary. At its December 13, 1983 meeting, the Economic and Technical Advisory Committee

("ETAC") concurred in the DENR's finding.

IPC owns and operates a steam-electric generating plant in East Alton, Illinois, which discharges effluent pursuant to NPDES Permit NO. IL0000701. (R. 123-131; see: Exhibits 6, 7 and 8). The Petitioner's plant, which is known as the Wood River Station ("Station"), includes two large coal-fired electric generating units which provide 77% of the facility's maximum capacity to generate electricity, and three smaller units which burn oil or natural gas. (R. 14).

In the two coal-fired units, bottom ash and fly ash are (1) produced as by-products of coal combustion; (2) removed from the units by sluicing with water withdrawn from the Mississippi River; (3) transported by the sluice to an ash pond system; and (4) deposited in the ash pond system. (R. 14-15). TSS are first removed from the water which is channeled into the ash pond system. Then water is released from the ash pond system, which serves as part of the Station's pollution control equipment, and subsequently discharged through an earthen conveyance into an unnamed tributary of Wood River Creek, which flows into Wood River Creek and then to the Mississippi River. During the twelve-month period ending on December 31, 1982, effluent flows from the ash pond system averaged 2.74 million gallons per day (mgd) and ranged from 0.45 mgd to 5.10 mgd. (R. 14-15).

Bottom ash and fly ash were sluiced from the two coal-fired units into an older ash pond system (Old Ash Pond System) before the completion and utilization of IPC's New Ash Pond System. (R. 16). Because of its many years of service, the Old Ash Pond System had become nearly filled with ash by 1977, and dredging was necessary to keep it operative. Additionally, the concentration of TSS in the effluent from the Old Ash Pond System would sporadically exceed the 15 mg/l limit for TSS delineated in 35 Ill. Adm. Code 304.124(a). (R. 16).

To avoid the necessity of continual dredging operations and to reduce TSS excursions, IPC applied to the Agency and to the U.S. Army Corps of Engineers for the requisite construction permits to build the New Ash pond System early in 1977. (R. 16-17). On May 17, 1977, the Agency approved IPC's construction request. Similarly, in December of 1977, the Corps of Engineers issued IPC a construction permit. (R. 17). Construction of the New Ash Pond System began in June of 1978 and was completed on September 29, 1979. (R. 17-18). Discharge of water sluiced from the two coal-fired units first began from the New Ash Pond System on February 22, 1980. (R. 18-19).

Subsequently, in May of 1981, the Agency permitted IPC by permit modification approval for the rerouting of overflow water from the ash hopper boiler blowdown water, certain water treatment plant wastes, and demineralizer regenerate wastes to the New Ash Pond System. On November 6, 1981, the rerouting of these waters and wastes into the New Ash Pond System was

completed.

While the New Ash Pond System was under construction during the interim time period between June, 1978 and September, 1979, the Petitioner tried to control the TSS levels in its effluent by undertaking various measures such as (1) adding a polymer to the sluice water so that suspended solids might settle more rapidly; (2) installing gravel near the outfall to reduce ash resuspension brought about by the action of the wind and waves; (3) installation of utility poles in front of the overflow weir to combat wave action; (4) designing new skimmers for the existing pond outfalls; and (5) testing to see what further actions would be helpful. (R. 17-19). After construction of the New Ash Pond System was completed on September 29, 1979, the Petitioner capped the old ash pond on October 25, 1979. (R. 18).

The New Ash Pond System which is currently in use at IPC's generating station consists of three interconnected compartments which are operated in series. (R. 15). Initially, water is passed into the first compartment which has a surface area of 66 acres and a design volume of 539 acre-feet. This water is next channeled into a smaller, second compartment which has a surface area of 5.2 acres and a design volume of 16 acre-feet. The water then flows into a third compartment which is smaller than the other two ponds and has a surface area of 4.7 acres and a design volume of 14 acre-feet. (R. 15-16).

Mr. Thomas L. Davis, P.E., the supervisor of water quality for IPC's Wood River Station, testified extensively on behalf of the proponent. (R. 9-36; R. 122-155; see: Exhibit 2). In reference to various tables in Exhibit B indicating the monthly average and daily maximum TSS concentration values of the effluent from both the old and new ash pond systems during the time period from January, 1976, to June, 1983, Mr. Davis indicated that (1) 60% (24 of 40) of the monthly average effluent TSS concentration values from the New Ash Pond System exceeded 15.0 mg/l and 12.5% (5 of 40) were also greater than 30 mg/l; (2) 85% (34 of 40) were also greater than 30.0 mg/l; (3) only one daily maximum TSS value exceeded 100.0 mg/l and this occurred in April, 1980; and (4) these percentages are comparable with the Old Ash Pond System. (R. 18-20; see: Exhibit B and Exhibit 9).

Mr. James A. Smithson, a certified fishery scientist who is presently the supervisor of field biology for IPC, testified about the biological monitoring, testing, and treatment programs conducted at the Petitioner's facility. (R. 37-107; R. 156-162; see: Exhibit 3). Mr. Smithson stated that, although water quality in the New Ash Pond System has promoted the development of a diverse fish community, "the use of green sunfish and large-mouth bass in the second and third ponds has generally prevented the populations of bottom dwelling species from becoming abundant enough to cause a major elevation in TSS." (R. 44).

Mr. Smithson noted that, even though the TSS in the effluent

from the New Ash Pond System often has exceeded the 15 mg/l level, a diverse aquatic community has thrived over the last three years in the New Ash Pond System and in the ditch running from it to the Wood River Creek. (R. 45).

After conducting an in-depth biological survey in July, 1982 to examine the aquatic communities existing in the New Ash Pond System, Mr. Smithson determined that the system was analogous to an "artifical back water area" where Mississippi River water with a high TSS is used to move ash into a retention area and the ash and silt then settle out. (R. 59-62).

Consequently, the phytoplankton thrive due to the increased addition of nutrients and improved water clarity. The flourishing phytoplankton in turn provide the primary energy source for the rest of the aquatic community. (R. 61). Juvenile fish, which are produced and thrive in the New Ash Pond System, can escape through the discharge pipe and enter the ditch running from the system and eventually reach Wood River Creek and the Mississippi River. (R. 61).

Thus, "the very richness of the aquatic community in the New Ash Pond System has helped to create a situation where the System's effluent cannot meet the present limit for TSS set in the Board rules." (R. 63). Accordingly, Mr. Smithson concluded that "the biological community in the receiving waters would benefit more from the biological contributions from the New Ash Pond System as they currently exist than from receiving water which has been treated and filtered to reduce the TSS below fifteen milligrams per liter." (R. 63-64).

During the time period between April of 1980 and September of 1982, IPC spend over $125,169 on corrective measures to reduce the TSS levels in effluents from its New Ash Pond System. However, all such corrective actions have proved futile. (R. 31; R. 34-35; see: Exhibits E & F). The seven major factors which possibly have been contributing to high concentrations of TSS in IPC's effluent include (1) berm damage caused by burrowing muskrats; (2) feeding activities of bottom fish; (3) floating fly ash and waves; (4) wind and wave action causing bank erosion and ash resuspension; (5) dramatic increases in the abundance of one or more algal species (i.e., "algal bloom"); (6) non-uniform distribution of influent flow through the basin (i.e., "short-circuiting") and (7) insufficient hydraulic detention time in the basin which limits the amount of suspended solids which can settle out of suspension. (R. 30-31). Although the Petitioner has taken various steps to lessen the effects of these seven primary contributing factors to the TSS problem, it has not been able to substantially reduce the total levels of TSS in effluent from its New Ash Pond System.

To alleviate the berm damage caused by the burrowing activities of muskrats, IPC trapped these muskrats during the winters of 1980 and 1981. The Petitioner has also attempted to

limit the possible effects of the feeding activities of bottom fish by conducting fish eradications and by adding several hundred green sunfish, a natural predator, to aggressively feed upon the eggs, fry, and young bottom-dwelling fish. (R. 32-33; R. 42).

To lessen the possible effects of floating fly ash and waves, IPC has (1) installed boards around the skimmers in the first and second compartments of the New Ash Pond System in October of 1980; (2) located a diagonal row of floating utility poles in the second and third compartments of the New Ash Pond System in July of 1981; and (3) installed floating utility poles near the outfall of the first compartment of the New Ash Pond System in September of 1981. (R. 32). To reduce the effects of wind and waves, along with the concomitant effects of bank erosion and ash resuspension, rip-rap was placed along the banks in the first compartment (reduce shoreline erosion) during June, 1981 and additionally utility poles were installed in rows across the surface of the third compartment to combat wave action. (R. 32).

Additionally, IPC considered using an algicide or biocide to control algal blooms. These blooms, which frequently result in decreased water transparency and a visible layer of algae at the surface, contribute to the volatile organic portions of TSS. However, this control measure was not implemented because it would not reduce any of the non-volatile inorganic portions of TSS. Moreover, its long-term use would have a detrimental effect on the biological communities in the New Ash Pond System and in waters receiving effluent from the ash pond. (R. 34; R. 44-45).

Moreover, a forty-five degree diversionary elbow was installed in July, 1981, on the inlet pipe to the second compartment in an attempt to reduce the possible effects of short-circuiting. (R. 33). However, on August 31, 1982, and September 1, 1981, IPC conducted a dye-tracer study of the flow patterns in each compartment which showed that the influent was not short-circuiting. (R. 33-34).

Similarly, IPC's evaluation of the theoretical and actual hydraulic retention times of the New Ash Pond System concluded that the 67-day retention time was adequate and was not responsible for the high concentrations of TSS. (R. 33-34).

IPC has maintained that, although the studies and corrective measures that it implemented have resulted in increased control over some of the possible sources of TSS, its expenditures of $125,169 and the efforts to bring the concentration levels of TSS in the effluent from the New Ash Pond System into consistent compliance with the 15 mg/l standard of Section 304.124(a) have not been successful. (R. 34-35).

According to IPC, the only other possible corrective action which could offer reliable assurance of the reduction of TSS in

the effluent from the New Ash Pond System to meet the 15 mg/l limit would be treatment by means of a physiochemical wastewater treatment plant so that chemical coagulation, flocculation, and precipitation followed by filtration could occur. However, IPC has asserted that such a facility would prove effective only at the cost of a number of adverse economic and environmental effects. (R. 35-36). IPC has estimated that the installation of the physiochemical wastewater treatment facility will cost approximately $3,904,000 in capital expenditures plus $145,000 per year for opertion, maintenance and chemicals. (R. 35-36).

In addition to the high capital and maintenance costs of physiochemical wastewater treatment, IPC believes that treatment of the high level of TSS in the New Ash Pond System by the use of chemicals, and mechanical filtration would deprive the receiving waters of the "primary energy subsidy" from the phytoplankton and of the recruitment of juvenile fish from the New Ash Pond System. (R. 45-64).

IPC has maintained that the New Ash Pond System is ecologically important because it currently serves as a spawning and rearing area (i.e., "nursery") for various species of fish and is an abundant source of phytoplankton. (R. 46; R. 50-60; R. 61-62). Phytoplankton, the passively floating plant life of a body of water, acts as a primary energy source for the surrounding aquatic ecosystem and provides foods and energy for growth and development of aquatic life. (R. 67). Because Wood River Creek, which receives the effluent from the New Ash Pond System, is very limited in its natural ability to maintain its own biological and aquatic community, the juvenile fish and phytoplankton produced in the New Ash Pond System greatly contribute to the aquatic life in the creek. (R. 54); R. 61-62; R. 68; see: Exhibit 4). Concomitantly, the increase in the abundance of phytoplankton also is a contributing factor in the increase in the volatile, or organic, portion of the TSS in the New Ash Pond System. (R. 62-63).

The Petitioner has also indicated that its utilization of green sunfish and largemouth bass as biological controls in the New Ash Pond System have provided Wood River Creek and the Mississippi River with an additional source of these important game fish. (R. 44; R. 62).

Additionally, IPC emphasized that its New Ash Pond System provides a mechanism for withdrawing water from the Mississippi River which is high in TSS and holding the water for a while so that silt is settled out and nutrients in the water can be utilized by the aquatic organisms in the ash pond. When water is discharged to the unnamed tributary of Wood River Creek, juvenile fish, phytoplankton, and other organisms leave the ash pond system and eventually enter Wood River Creek and the Mississippi River. Accordingly, IPC argues that treatment of the TSS in the New Ash Pond System by the use of chemicals and mechanical filtration would deprive the receiving waters of the primary

energy subsidy from the phytoplankton and the recruitment of juvenile fish from the New Ash Pond System. (R. 83; R. 98-101). Conversely, IPC contends that the discharge of effluent containing 30 mg/l of TSS would have no adverse effect on the aquatic community in Wood River Creek. (R. 36-37; R. 45-46; R. 63).

IPC has noted that it must currently comply with the general TSS standard of 15 mg/l set forth in 35 Ill. Adm. code 304.123(a) which applies statewide to all types of industry and facilities without making any realistic distinction as to variations which may occur in the technologies employed or in existing physical conditions. (See: January 6, 1972 Opinion of the Pollution Control Board in R70-8). Thus, IPC believes that the Federal effluent limitation is more apropos to conditions experienced by electric utilities and more relevant to the control and treatment technologies which are effective and available to the Station than is the limitation contained in Section 304.124(a). (R. 137-140); R. 156-162; see: Exhibit 5; 39 Fed. Reg. 36, 186 (October 8, 1974); 45 Fed. Reg. 68, 331 (October 14, 1980)) Moreover, IPC feels that the data used to develop the Federal effluent standard is more representative than the historical data on TSS compiled from pollution control equipment at the Station over a relatively short four year period, since the Federal standard represents an across-the-board evaluation of data from many sources throughout the country over the life of multifaceted control equipment. (R. 139-140; R. 142-163).

In its written comment of January 10, 1984, the Agency did not dispute the basic facts presented by the Petitioner and did not disagree with IPC's cost estimates. The Agency also concluded that "the effluent from outfall 002 of the new ash pond does not appear to be having a deleterious effect on the aquatic life of the receiving stream." (Agency Comment p. 1).

Although the Agency has endorsed the 30-day average effluent limit of 30 mg/l of TSS as being appropriate, the Agency has advocated that the daily maximum effluent limit for TSS applicable to IPC's Station should be 50 mg/l, rather than the requested Federal standard of 100 mg/l. (Agency Comment p. 3). Although some daily maximum concentrations of TSS in excess of 50 mg/l occurred at IPC's facilities, the Agency notes that these excursions happened before "final control measures" were taken in March, 1982 and the Agency believes that a 50 mg/l daily maximum effluent standard for TSS will be adequate to allow IPC to continue operations without requiring further treatment. (Agency Comment p. 3).

On the other hand, IPC has contended in its Second Written Submission filed on January 20, 1984, that the evidence presented at the hearings indicates that the daily maximum effluent limit on TSS should be 100 mg/l, rather than the 50 mg/l figure suggested by the Agency.

The Agency, in its first notice comment, filed July 17, 1984, agreed that IPC is entitled to site-specific relief. They disagreed, however, as to the degree of relief that should be granted. The Agency's position is that the proposed 100 mg/l daily maximum is less stringent than the levels of treatment that are demonstrably achievable. Three years of data indicates that the system can consistently achieve effluent under 50 mg/l. Consequently, this demonstrated ability should be the basis for the site-specific rule (Agency Comments on First Notice, p. 3).

IPC, in its first notice comment filed July 23, 1984, argued that the ash pond treatment system is a dynamic process that is influenced by many factors, including factors not within IPC's control. Thus, IPC contended the proposed daily maximum of 100 mg/l provides a reasonably achievable limitation that will provide relief over the life of the system and latitude during periods of uncontrolable fluctuation.

In its first notice Opinion, the Board requested the participants to address the possibility that pontoons with silt curtains, or rafts or utility poles might improve solids settling. IPC responded that these systems, collectively, referred to as "floating baffles," had proved ineffective.

It is the opinion of the Board that the 50 mg/l daily maximum limitation as the more appropriate standard is better supported in the record. Data submitted at hearing by IPC clearly shows the system's performance capability since construction was completed in May of 1982 (Petitioner's Exhibit 9). Effluent has not exceeded 50 mg/l for three years. In support of the 100 mg/l standard, IPC has argued that it is more likely that the 50 mg/l standard will be violated than the 100 mg/l standard (R. 146). While this is most certainly a true statement, it is also likely that the system will continue to achieve TSS concentrations below 50 mg/l. Site-specific relief here cannot be based on abstract and unsupported statements regarding "probabilities" where the data clearly supports another conclusion.

IPC testified that it is probable that as the ash lagoon system fills over time, TSS concentrations will increase (R. 136). IPC, however, also testified that these future concentrations are presently unquantifiable. Because of this uncertainty and because of the ten to twenty year life expectancy of the lagoon system, the Board is unable to fashion a TSS limitation that will account for potential changes in the lagoon system's efficiency in the distant future. At present, there is no support in the record for any limitation other than 50 mg/l. While site-specific rules are intended to provide long-term relief, there are limits to the Board's ability to do so where future conditions cannot be predicted. A more important factor, when creating site-specific rules, is to base them on system capabilities and limitations as reflected by the available data. Today's rule reflects this principle.

ORDER

The Board hereby adopts the following rule, to be codified as 35 Ill. Adm. Code 304.209, and instructs the Clerk of the Board to file this rule with the Secretary of State:

TITLE 35; ENVIRONMENTAL PROTECTION
SUBTITLE C: WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 304
SITE-SPECIFIC RULES AND EXCEPTIONS
NOT OF GENERAL APPLICABILITY

Section 304.209 Wood River Station Total Suspended Solid Discharges

The limitation on the discharge of Total Suspended Solids contained in Section 304.124(a) shall not apply to the discharge from the ash pond system of Illinois Power Company's Wood River Station, located in East Alton, Illinois. Instead, the concentration of Total Suspended Solids shall not exceed 30 mg/l as an average of daily values for thirty (30) consecutive days and shall not exceed 50 mg/l as a maximum for any one (1) day.

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certifies that the above Opinion and Order was adopted on the 20th day of February, 1985, by a vote of 5-0.

Dorothy M. Gunn
Dorothy M. Gunn, Clerk
Illinois Pollution Control Board