ILLINOIS POLLUTION CONTROL BOARD
August 24, 1995

IN THE MATTER OF:,	)	
	)	
PETITION OF THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO FOR ADJUSTED STANDARD FROM 35 Ill. Adm. Code 811, 812, and 817 (Sludge Application)	)	AS 95-4 (Adjusted Standard - Land)

OPINION AND ORDER OF THE BOARD (by G. T. Girard):

This matter is before the Board on a petition for an adjusted standard filed by Metropolitan Water Reclamation District of Greater Chicago (District). The District asks that the Board grant an adjusted standard to the Board's rules of general applicability found at 35 Ill. Adm. Code 811.204, 811.314(c)(3), 812.313(d), 817.303 and 817.410(c)(2) and (3). Those sections of the Board's regulations set forth requirements for the use of soil as final cover at landfills in Illinois. The District is seeking an adjusted standard so that the District's air-dried sludge material can be used at nonhazardous waste landfills in lieu of soil material for the top protective layer for final cover to support vegetation.

The District filed its petition on March 31, 1995. The Illinois Environmental Protection Agency (Agency) filed a response to the petition on May 2, 1995. The District sought leave to file a reply, which was granted, and filed such reply on May 8, 1995. The Agency also sought leave and was granted a reply which was filed on June 12, 1995. The petitioner filed an amended response to the Agency's reply on June 12, 1995. The District waived hearing and the Board did not receive a request for a hearing. Therefore no hearing was held.

Based upon the record and upon review of the factors involved in the consideration of adjusted standards, the Board finds that the District has demonstrated that factors relating to the District are "substantially and significantly different from the factors relied upon by the Board in adopting the general regulation". Accordingly, the request for adjusted standard is granted with conditions for the reasons discussed below.

ADJUSTED STANDARD PROCEDURE

The Board's responsibility in this matter arises from the Environmental Protection Act (Act) (415 ILCS 5/1 et seq.). The Board is charged therein to "determine, define and implement the environmental control standards applicable in the State of Illinois" (415 ILCS 5/5(b)) and to "grant *** an adjusted standard for persons who can justify such an adjustment" (415

ILCS 5/28/1(a)). More generally, the Board's responsibility in this matter is based on the system of checks and balances integral to Illinois environmental governance: the Board is charged with the rulemaking and principal adjudicatory functions, and the Agency is responsible for carrying out the principal administrative duties.

The Act provides that a petitioner may request, and the Board may impose, an environmental standard that is different from the standard that would otherwise apply to the petitioner as the consequence of the operation of a rule of general applicability. Such a standard is called an adjusted standard. The general procedures that govern an adjusted standard proceeding are found at Section 28.1 of the Act and within the Board's procedural rules at 35 Ill. Adm. Code 106.

Where, as here, the regulation of general applicability does not specify a level of justification required for a petitioner to qualify for an adjusted standard, the Act at Section 28.1(c) specifies four demonstrations that must be made by a successful petitioner:

1) Factors relating to that petitioner are substantially and significantly different from the factors relied upon by the Board in adopting the general regulation applicable to that petitioner;

2) The existence of those factors justifies an adjusted standard;

3) The requested standard will not result in environmental or health effects substantially or significantly more adverse than the effects considered by the Board in adopting the rule of general applicability; and

4) The adjusted standard is consistent with any applicable federal law.

RULES OF GENERAL APPLICABILITY

35 Ill. Adm. Code 811.204, Final Cover:

> A minimum of 0.91 meter (three feet) of soil material that will support vegetation which prevents or minimizes erosion shall be applied over all disturbed areas. Where no vegetation is required for the intended postclosure land use, the requirements of Section 811.205(b) will not apply; however, the final surface shall still be designed to prevent or minimize erosion.

35 Ill. Adm. Code 811.314(c)(3):

> The final protective layer shall consist of soil material capable of supporting vegetation.

35 Ill. Adm. Code 812.313(d):

> A description of final protective cover, including a description of the soil and the depth necessary to maintain the proposed land use of the area;

35 Ill. Adm. Code 817.303:

> Unless otherwise specified in a permit or other written Agency approval, a minimum of 0.46 meters (1.5 feet) of soil material that will support vegetation which prevents or minimizes erosion shall be applied over all disturbed areas.

35 Ill. Adm. Code 817.410(c)(2) and (3):

> 2) The thickness of the final protective layer shall be sufficient to protect the low permeability layer from freezing and minimize roof penetration of the low permeability layer, but shall not be less than 0.46 meter (1.5 feet).
>
> 3) The final protective layer shall consist of soil material capable of supporting vegetation.

FACILITY DESCRIPTION

The District is located within the boundaries of Cook County, Illinois, and serves an area of 872 square miles including the city of Chicago and 124 suburban communities with a combined population of 5.1 million people. (Pet. at 2.)[1] In addition, a waste load equivalent to 4.5 million people is contributed by industrial sources. (*Id.*) On a daily basis, the District treats an average of about 1500 million gallons per day (MGD) of wastewater. (Pet. at 2-3.) This wastewater flow is treated at the District's seven water reclamation plants that range in size from 3.4 MGD to 1200 MGD. (Pet. at 2-3, 15.)

Initial treatment at the water reclamation plants consists of coarse and fine screens and grit chambers followed by primary

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[1] The petition for adjusted standard will be cited as "Pet. at __; the petitioner's reply to the Agency's response will be cited as "Pet. R. at __"; the petitioner's amended response to the Agency's reply, filed on June 12, 1995 will be cited as "Pet. RR at__"; the Agency's response to the petition will be cited as "Ag. Resp. at __"; the Agency's reply to the petitioner's reply will be cited as "Ag. RR at __".

settling tanks. (Pet. at 16.) Next the water reclamation plants employ the activated sludge process for secondary treatment. (*Id.*) Tertiary treatment is employed at the John E. Egan and Kirie water reclamation plants using dual media filters, while the Hanover Park water reclamation plants employs single media filters. (*Id.*) The final effluents from the Hanover Park, John E. Egan and Kirie water reclamation plants are first chlorinated and then dechlorinated before discharge. (*Id.*)

The District generates yearly about 200,000 dry tons of sludge. (Pet. at 3, 16.) Although each water reclamation plant handles its sludge in somewhat different ways depending upon local factors, the District generally processes its sludge using the following sequence of unit operations:

1. Gravity Thickening
2. Centrifuge Thickening
3. Anaerobic Digestion
4. Centrifuge or lagoon dewatering
5. Lagoon storage
6. Air-drying

(Pet. at 17.)

Solids processing at the District begins with the concentration of primary and secondary sludge in gravity concentration tanks. (*Id.*) The sludge is then anaerobically digested in heated ($95^\circ \pm 1^\circ$F) high rate digesters for approximately 20 days, to reduce odor potential and destroy pathogens. (*Id.*) After anaerobic digestion, the liquid sludge (approximately four percent solids) is either mechanically dewatered using high speed centrifuges to approximately 25 to 30 percent solids or lagoon dewatered to produce 15 percent solids. (*Id.*) Both the liquid sludge and the dewatered centrifuge sludge is stored in lagoons to reduce its odor potential and further destroy pathogens. (Pet. at 17.) The sludge stored in lagoons is air-dried on asphalt paved drying beds, using a mechanical agitation process to accelerate drying and further reduce pathogens. (*Id.*) All air-dried sludge has a high solids content of about 60 percent, is soil-like in appearance, low in pathogens and high in plant nutrients. (*Id.*)

The District ultimately utilizes the majority of its sludge as a fertilizer, soil amendment, or soil substitute. (Pet. at 17.) After years of planning, the following are the options which the District presently has chosen for final disposition of its sludge product:

1. Sludge application to land in Fulton County, Illinois.

2. Sludge application to land at the Hanover Park water reclamation plant, Hanover Park, Illinois.

3. Landscaping at district water reclamation plants.

4. Distribution to large-scale users for landscaping purposes (e.g., Underwriters Laboratories, Worth Park District, Russell Road Interchange for the Illinois Tollway Commission).

5. Final protective layer for landfills.

6. Daily cover for landfills.

(Pet. at 17-18.)

RELIEF REQUESTED

The District is seeking an adjusted standard which would allow the District to use its air-dried sludge product as "an innovative technology for certain applications at nonhazardous waste landfills". (Pet. at 5.) Specifically, the District is asking the Board to allow the use of the air-dried sludge in the final protective layer supporting vegetation. (*Id.*) The specific language of the requested adjusted standard is as follows:

A. Pursuant to the authority of Section 28.1 of the Environmental Protection Act, the Board hereby adopts the following adjusted standard. This adjusted standard applies only to the air-dried sludge product generated by the Metropolitan Water Reclamation District of Greater Chicago (District).

B. District sludge that complies with the conditions in paragraph C below is approved as an alternative to the soil material standard at the inert waste, the putrescible (MSWLF) and chemical waste landfills, or the steel and foundry industry potentially usable and low risk waste classes of landfills regulated at 35 Ill. Adm. Codes 810-815 and 817, for application as the final protective layer, as the final cover. The sections where the soil material standard is used are: 35 Ill. Adm. Codes 811.204, 811.314(c)(3), 812.813(d), 817.303 and 817.410(c)(2) and (c)(3).

C. When providing sludge for the applications enumerated in Paragraph B, the District shall provide air-dried sludge as described in its petition for adjusted standard and processed in accordance with the following conditions:

1. Anaerobic digestion at 95° ± 1°F for a minimum of 15 days or longer, as necessary to ensure that the District's air-dried sludge product will meet the USEPA's Part 503 pathogen requirements for a Class B sludge; and

2. Storage in lagoons for a minimum of 1 and 1/2 years after the final addition of sludge; and

3. Air-drying for a minimum of 4 weeks, or as necessary to achieve a solids content of 60 percent.

D. When providing sludge for the applications enumerated in Paragraph B, the District shall limit the amount provided to what it estimates is sufficient to comply with the minimum depth required in the Board regulations, or in greater amounts as needed to accommodate the intended land-use including appropriate contours, final slopes, vegetation, drainage and erosion controls, and to protect the final low permeability layer against such threats as freezing and root penetrations.

(Pet. at 28-29.)

AGENCY RESPONSE

The Agency generally supports the District's request for an adjusted standard. The Agency points out that all regulatory informational requirements have been fulfilled by the District. (See generally Ag. Resp. at 4-7.) The Agency states that it "is not concerned about the District management of their sludge" and the Agency "has no technical problem with the proper use of the District sludge as a soil alternative". (Ag. RR at 2.) The Agency does, however, have one area of concern remaining. Specifically, the Agency is concerned about the ability of the Agency to monitor the use of the District's sludge at landfills which need not be permitted pursuant to Section 21(d) of the Act. (Ag. Resp. at 4.) The Agency is concerned that the use of sludge could be abused at permit exempt facilities. (*Id.*) Therefore, the Agency asks that the following conditions be added:

D. Any facility utilizing District sludge for final cover is limited to a final depth of 3 feet of sludge compacted using normal landscaping practices;

E. The District will report to the Agency the start up, discontinuance, and quantity of sludge deliveries to each facility;

F. District sludge, when used in compliance with this adjusted standard, is not a waste.

(Ag. RR at 2.)

COMPLIANCE ALTERNATIVES

The District indicates that it believes a discussion on compliance alternatives is inapplicable as no amount of effort would result in compliance with the regulation of general applicability on the part of the District. (Pet. at 25.) The material generated by the District is air-dried sludge which is not soil. The District does not assert that the air-dried sludge is soil; rather the District maintains that the sludge can comply with the same regulatory design and performance requirements expected of soil. (*Id.*)

The District maintains that an adjusted standard allowing substitution of sludge for soil material in landfill closure as final protective layer would result in substantial cost savings to the District. The District indicated that in 1991, 1992 and 1993 the District utilized 115,118 dry tons, 25,415 dry tons and 167,053 dry tons of sludge for final protective layer for landfills in the Chicago area. (Pet. at 24.) If the District had been precluded from utilizing its sludge during that time, the District would have been required to dispose of the sludge at a cost of approximately $22 per dry ton. (Pet. at 25.) Thus, the use of sludge in 1991, 1992 and 1993 saved the District an expenditure of 6.77 million dollars. (*Id.*)

HEALTH AND ENVIRONMENTAL EFFECTS

District sludge has been routinely analyzed by both the EP toxicity test and, subsequently, the Toxicity Characteristic Leaching Procedure (TCLP) test, and has always been found to be nonhazardous. (Pet. at 34.) The District has found that air-drying to 60 percent solids produces a material with no free water as demonstrated by results of the paint filter test and, according to the District, its sludge meets all the analytical requirements for use at nonhazardous waste landfills, and it is soil-like in appearance. (Pet. at 34.) Weekly, the District analyzes sludge from each of its water reclamation plants to monitor metal content. Sludge quality has generally met the federal (40 CFR 503) high quality sludge regulation limits for land application since 1993, as a result of rigorous monitoring and enforcement conducted by the District's Industrial Waste Division. (Pet. at 34.)

The District's sludge production and management activities are covered by the federal regulations (40 CFR Part 503), as well as the Agency's sludge management permits. (Pet. at 35.) The District, therefore, routinely reports sludge analyses to both the Agency's Bureau of Water, Division of Water Pollution Control, and Region V of the United States Environmental Protection Agency. (Id.)

In 1982, the District began to participate in the closure of the municipal solid waste landfill at 103rd and Doty Avenue in Chicago. (Pet. at 35-36.) Closure was performed by contouring the site, establishing surface runoff controls, covering with a two-foot clay seal, and then applying sludge. (Pet. at 36.) As each area was completed, grass and shrubs were planted to control erosion. The result has been an aesthetically pleasing site with environmental safeguards. (Id.) Part of the closure plan called for installation of four monitoring wells installed in the limestone aquifer underlying the sites; the wells are sampled quarterly, and results are sent to the Agency Division of Land Pollution. (Pet. at 36.) There has been no significant change in groundwater quality in the ten years of monitoring. (Pet. at 36.)

The District has also been using sewage sludge for establishing a final protective layer on three coal refuse piles at its Fulton County, Illinois, land reclamation site since 1987. (Pet. at 36.) Initial reclamation activity started in 1987 at the St. David, Illinois, coal refuse pile. (Pet. at 36.) The approved reclamation procedure consisted of preliminary grading, application of agricultural limestone, application of sludge at the rate of 1,000 dry tons per acre, planting of a vegetative cover, and mulching the planted area. (Pet. at 36-37.) Planting of vegetative cover consisted of seeding with cereal rye grass as a cover crop followed by seeding with alfalfa, alsike clover, bromegrass, and tall fescue. (Id.) The St. David, Illinois, coal refuse pile was completely reclaimed with excellent vegetation cover using the described procedure by 1990. (Id.) Reclamation of a second coal refuse pile at the Morgan Mine site, consisting of 27 acres, was completed in 1991 with the approval of the Agency. (Pet. at 37.) And a third coal refuse pile known as United Electric coal refuse pile, consisting of 125 acres, was reclaimed. (Pet. at 37.)

The District's petition also addressed the potential concern that utilizing municipal sludge for productive purposes at nonhazardous waste landfills could produce leachate which would have a negative impact upon the quality of groundwater. (Pet. at 38.) Obviously, leachate can affect the groundwater under these

landfills. However, there has been a USEPA study[2] of the quality of leachate, where both municipal sludge and municipal solid waste were placed in a landfill, which should alleviate these concerns. (Id.) The USEPA study reported that the addition of municipal sludge to landfills in fact improved the quality of leachate. (Pet. at 38.) During a 20-month study, test cells containing municipal sludge, and municipal solid waste produced a leachate exhibiting a chemical oxygen demand (COD) of 1500 mg/L in comparison to a leachate COD of 30,000 mg/L produced from test cells which did not have the municipal sludge. (Pet. at 38.) This represents a COD reduction of 95 percent. In addition, as shown in Attachment 12 to the District's petition, concentrations of metals such as cadmium, chromium, copper, lead, nickle, iron, and zinc were lower in the leachate from the cells containing municipal sludge than those which did not. The reductions in metals ranged from a low of 19 percent in the case of copper to a high of 97.5 percent for zinc. (Pet. at 38-39.)

The USEPA study concluded:

> It is a common misconception that introducing sludge into landfills degrades leachate quality. This study shows the reverse to be true. Results of this investigation should be made widely available to EPA and state authorities concerned with landfill regulations to improve the scientific bases for their decisions.

(Pet. at Attachment 11.)

The District asserts that using the District's sludge at landfills for final protective cover would produce results consistent with the conclusions of the USEPA study. (Pet. at 39.) The District also believes that the groundwater and surface water protection requirements of the Board's landfill regulations ensures that the use of District sludge will not adversely impact surface and groundwater quality at nonhazardous waste landfills. (Pet. at 39.) Any surface water runoff from the final protective layer containing sewage sludge should be classified as storm water runoff that can be captured in control structures built for a 25-year storm. (Id.)

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[2] Farrell et al. "The Effects of Sewage Sludge on Leachates and Gas from Sludge Refuse Landfills", Presented at the Residuals Conference of the Water Pollution Control Federation, Atlanta, Georgia, April 19, 1988. (Pet. at Attachment 11.)

JUSTIFICATION

Substantially and Significantly Different Factors

The District maintains that the use of the District's air-dried sludge was "never discussed in the landfill regulatory proceedings and, thus, those factors relating to the use of District sludge are substantially and significantly different from those relied on in relation to the soil requirement." (Pet. at 55.) The District argues that during the time the Board was developing landfill regulations the District was uncertain how ongoing state and federal regulatory proceedings would address management of landfills and sludge. (Pet. at 55-56.)

Existence of the factors justifies an adjusted standard

The District maintains that the petition demonstrates the District's long-time investment in innovative technologies in order to put sludge to productive uses. (Pet. at 56.) The District argues that the loss or the beneficial productive uses of the District's air-dried sludge would be significant both environmentally and in economic terms. (*Id.*) The District asserts that air-dried sludge is "at least environmentally equivalent to soil, and is economically superior, and is consistent with both state and federal stated beneficial use policies". (Pet. at 56.)

Environmental and Health Effects

The District maintains that the petition has "amply" demonstrated that there are no substantially or significantly more adverse environmental or health effects from the rule of general applicability. (Pet. at 57; see *infra* pgs 7-9.)

Consistency with Federal Law

The District points out that sludge and use of sludge for final cover are regulated under two federal programs. The first is the RCRA Subtitle D program, under which an "alternative final cover design" which meets certain criteria may be allowed. (Pet. at 4, citing 40 CFR 258.60(a)(3).) The second is the under 40 CFR 503 which sets forth regulations for "the use and disposal of municipal sludge". (*Id.*) In the preamble to the final promulgation of the Part 503 regulations the USEPA specifically endorses the use of municipal sludge as a cover material in nonhazardous waste landfills. (*Id.*) The preamble states:

> While the use of sewage sludge for beneficial purposes is primarily related to farm and home garden use, use of sewage sludge to aid in the growth of a final vegetative cap for municipal solid waste landfills is also considered a beneficial use of sewage sludge and

> should be encouraged. By taking advantage of the nutrient content and soil amendment characteristics of sewage sludge, a vegetative cover or cap can be quickly grown to facilitate the municipal solid waste closure plan. (58 Fed. Reg. 9258.)

(Pet. at 4.)

Thus, the District maintains that the adjusted standard is consistent with federal law. (Pet. at 58.)

DISCUSSION

First, the Board notes that this adjusted standard request by the District is somewhat unique. Rather than request an adjusted standard for the use of sludge as a soil alternative at a specific site in Illinois, the District is seeking an adjusted standard which would apply throughout the State. However, the Board is convinced that the adjusted standard mechanism is appropriate to this proceeding. Although the standard is not for one specific "site", the standard is for the use of the District's air-dried sludge. The sludge will be subject to specified criteria before leaving the District's management for use as a soil alternative at landfills in Illinois. Further, the standard will only apply to sludge managed by the District and not to municipal sludge in general. Therefore, the Board believes an adjusted standard is the appropriate mechanism for relief.

The District and the Agency agree that the adjusted standard mechanism is appropriate. In fact, the Agency supports granting the adjusted standard, but is asking that certain conditions be included. (See *infra* 6-7.) While the District accepts two of the conditions as written, the District is concerned over the suggested condition "D". (Pet. RR at 3.) The Agency's condition D states:

> D. Any facility utilizing District sludge for final cover is limited to a final depth of 3 feet of sludge compacted using normal landscaping practices.

(Ag. RR at 2.)

The Agency is seeking imposition of this condition because of concerns about the ability of the Agency to monitor the use of the District's sludge at landfills which need not be permitted pursuant to Section 21(d) of the Act. (Ag. Resp. at 4.) The District objects to the Agency's proposed condition "D" because it would impose requirements on the operator of the facility using the sludge. (Pet. RR at 2.) The District states:

> The Condition D in the District's petition and the amended condition D in the District's Reply are limitations the District voluntarily place on itself, not arbitrarily place on the landfill operator choosing to use sludge.

(Pet. RR at 2.)

The District proposes that the condition be amended to state:

> When providing sludge for the applications enumerated in Paragraph B, the District shall limit the sludge provided to amounts that are sufficient for a final depth of three feet as compacted using normal landscaping practices.

(Pet. RR at 3.)

The Board is persuaded that the District's condition D is more appropriate. Condition D as offered in the petitioner's amended response should alleviate the concerns expressed in the Agency's reply, while at the same time placing the limitation on the District. As the District is the party seeking the adjusted standard and the District is the party which is responsible for the management of its sludge, limiting the amount of sludge the District can provide to an amount sufficient for a final depth of three feet of compacted sludge is more suitable.

CONCLUSION

The Board finds that the District has demonstrated that the adjusted standard is warranted. The District has established that the use of the District's air-dried sludge is a viable alternative to soil cover at landfills in the State of Illinois. The use of the sludge will not result in substantially or significantly more harmful health and environmental effects. In fact, the District has provided information that the use of sludge may even reduce the potential for leachate contamination of surface and groundwater at landfills by improving the quality of any leachate generated.

The District has also established that the Board did not consider the use of sludge as final cover in adopting the regulation of general applicability. Thus, the Board finds that the factors surrounding this request are substantially and significantly different from those considered by the Board in adopting the rule of general applicability. Further, the District has demonstrated that the use of sludge is beneficial and cost-efficient. Therefore, the Board finds that the factors relating to the adjusted standard request justify such an adjusted standard.

This opinion constitutes the Board findings of facts and conclusion of law.

ORDER

The Board hereby adopts the following adjusted standard, pursuant to the authority of Section 28.1 of the Environmental Protection Act:

1. This adjusted standard applies only to the air-dried sludge product generated by the Metropolitan Water Reclamation District of Greater Chicago (District).

2. District sludge that complies with the conditions in paragraph 3 below is approved as an alternative to the soil material standard at the inert waste, the putrescible (MSWLF) and chemical waste landfills, or the steel and foundry industry potentially usable and low risk waste classes of landfills regulated at 35 Ill. Adm. Codes 810-815 and 817, for application as the final protective layer, as the final cover. The sections where the soil material standard is used are: 35 Ill. Adm. Codes 811.204, 811.314(c)(3), 812.813(d), 817.303 and 817.410(c)(2) and (c)(3).

3. When providing sludge for the applications enumerated in Paragraph 2, the District shall provide air-dried sludge as described in its petition for adjusted standard and processed in accordance with the following conditions:

   a. Anaerobic digestion at 95° ± 1°F for a minimum of 15 days or longer, as necessary to ensure that the District's air-dried sludge product will meet the USEPA's Part 503 pathogen requirements for a Class B sludge; and

   b. Storage in lagoons for a minimum of 1 and 1/2 years after the final addition of sludge; and

   c. Air-drying for a minimum of 4 weeks, or as necessary to achieve a solids content of 60 percent.

4. When providing sludge for the applications enumerated in Paragraph 2, the District shall limit the sludge provided to amounts that are sufficient for a final depth of three feet as compacted using normal landscaping practices.

5. The District will report to the Agency the start up, discontinuance, and quantity of sludge deliveries to each facility;

6. District sludge, when used in compliance with this adjusted standard, is not a waste.

IT IS SO ORDERED.

Section 41 of the Environmental Protection Act (415 ILCS 5/40.1) provides for the appeal of final Board orders within 35 days of service of this decision. The Rules of the Supreme Court of Illinois establish filing requirements. (But see also, 35 Ill. Adm. Code 101.246, Motions for Reconsideration.)

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 24th day of August, 1995, by a vote of 7-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board