BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

PROPOSED 35 Ill. Adm. Code 304.123(g), 304.123(h), 304.123(i), 304.123(j), and 304.123(k)	))	R04-26 (Rulemaking - Water)

NOTICE OF FILING

Dorothy Gunn, Clerk
Pollution Control Board
100 West Randolph Street
Suite 11-500
Chicago, Illinois 60601

Legal Service
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702-1271

Mathew Dunn
Illinois Attorney General's Office
Environmental Control Division
James R. Thompson Center
100 West Randolph Street
Chicago, Illinois 60601

John Knittel
Hearing Officer
Illinois Pollution Control Board
2125 South First Street
Champaign, Illinois 61820

See Attached Service List

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Pollution Control Board the **MOTION FOR LEAVE TO FILE *INSTANTER* AND THE WRITTEN TESTIMONY OF ROBERT MOSHER AND PAUL J. TERRIO** of the Illinois Environmental Protection Agency, a copy of which is herewith served upon you.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

By: _____
Sanjay K. Sofat
Assistant Counsel
Division of Legal Counsel

Dated: August 25, 2004
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, Illinois 62794-9276
(217) 782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

PROPOSED 35 Ill. Adm. Code 304.123(g), 304.123(h), 304.123(i), 304.123(j), and 304.123(k)	))	R04-26 (Rulemaking - Water)

MOTION FOR LEAVE TO FILE INSTANTER

The Illinois Environmental Protection Agency ("Illinois EPA"), through its attorney, Sanjay K. Sofat, moves the Illinois Pollution Control Board ("Illinois PCB") to allow the filing of the written testimony of Robert Mosher and Paul J. Terrio in the above matter *instanter*. In support thereof, the Illinois EPA states as follows:

1. On May 14, 2004, Petitioner, the Illinois EPA, filed a proposal to establish an interim phosphorus effluent standard at 35 Ill. Adm. Code 304.123.
2. On June 3, 2004, the Illinois PCB directed that a hearing be scheduled on the Illinois EPA's proposal. The Hearing Officer scheduled the first hearing on August 30-31, 2004 in Chicago.
3. The Hearing Officer directed the parties interested in testifying at the hearing to prefile the testimony with the Illinois PCB and the Hearing Officer by August 16, 2004.
4. The undersigned attorney was unable to help prepare the written testimony of Robert Mosher and Paul J. Terrio by the due date due to the conflict with other time sensitive obligations.
5. However, no harm will result to the interested parties as the delay is minimal and the Illinois EPA will be at the hearing to answer any questions the interested parties may have.

Therefore, the Illinois EPA moves to allow the filing of the written testimony of Robert Mosher and Paul J. Terrio instanter.

Respectfully Submitted

Sanjay K. Sofat
Assistant Counsel
Division of Legal Counsel

Dated: August 25, 2004

Illinois Environmental Protection Agency
1021 N. Grand Ave. East
Springfield, Illinois 62794-9276
(217) 782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

PROPOSED 35 Ill. Adm. Code 304.123(g), 304.123(h), 304.123(i), 304.123(j), and 304.123(k)	))	R04-26 (Rulemaking - Water)

TESTIMONY OF ROBERT MOSHER

My name is Robert Mosher and I have been employed by Illinois EPA for almost 19 years. I have been assigned to the Water Quality Standards Unit for 18 of those years and have participated in the development and adoption of numerous water quality and effluent standards. Prior to my employment by the Agency I worked for Monsanto Company in the development of laboratory toxicity tests using aquatic organisms and the determination of the aquatic toxicity values for individual chemicals and industrial wastewater effluents. I hold a M.S. degree in zoology from Eastern Illinois University where I specialized in the effects of wastewater discharges on stream ecology.

My testimony today will describe the proposed changes to the phosphorus effluent standard. Underlying principles behind the rule, brought forth in subsection (g), are that certain wastewater discharges are significant sources of phosphorus and that facilities that are new or undergoing expansion are opportune venues for building in phosphorus removal capabilities. Costs for the addition of phosphorus removal equipment will be most reasonable when they can be designed into the original construction. Therefore, only new or expanding municipal wastewater treatment facilities with a design average flow of one million gallons per day (MGD) are subject to the proposed phosphorus effluent limit of 1.0 mg/L total phosphorus on a monthly average basis. Likewise, other types of new or expanded wastewater treatment facilities are subject to the limit if

they would discharge phosphorus at the same pound loading as a one MGD municipal sewage treatment plant. The value of 25 pounds per day was determined from the pound loading of a typical municipal wastewater effluent that contains, with no special phosphorus removal equipment in place, on average about 3.0 mg/L total phosphorus. Both the size of facilities covered and the concentration of phosphorus to be met in subject effluents have precedent in the existing phosphorus effluent standard.

Subsection (h) recognizes the fact that sometimes the generally prescribed phosphorus effluent limit will be either unnecessarily stringent or not protective enough depending on the nature of the receiving water body. Phosphorus is generally believed to be the nutrient in shortest supply in freshwater ecosystems, i.e., the limiting nutrient factor, and therefore its concentration may often limit plant growth. If it can be demonstrated that a water body receiving an effluent has algae or noxious aquatic plant growth that is not limited by phosphorus, but rather another nutrient or water quality factor, then no phosphorus effluent limit must be imposed. On the other hand, if it is demonstrated that 1 mg/L total phosphorus will be inadequate to control noxious plant growth in the receiving water and further phosphorus control below a monthly average of 1.0 mg/L is feasible at a facility, the Agency may impose a lower phosphorus limit to protect that water body.

Subsection (i) is intended to clarify which wastewater treatment facilities are not subject to the phosphorus effluent limitation.

Subsection (j) stipulates that compliance with the effluent phosphorus standard fulfills the obligation of the discharger to meet water quality standards, specifically, the narrative standard prohibiting offensive conditions that includes a statement on unnatural plant or algal growth.

Subsection (K) recognizes that the phosphorus effluent standard will likely someday be supplemented by water quality standards for phosphorus that may dictate the removal of these proposed effluent limits, other effluent phosphorus limits or water quality based effluent limits. At

such time the phosphorus standard will probably be reworked to compliment the new water quality standards.

ILLINOIS ENVIRONMENTALPROTECTION AGENCY

By:_____

Sanjay K Sofat
Assistant Counsel
Division of Legal Counsel

DATED: August 25, 2004

Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:

PROPOSED 35 Ill. Adm. Code 304.123(g), 304.123(h), 304.123(i), 304.123(j), and 304.123(k)	))	R04-26 (Rulemaking - Water)

TESTIMONY OF PAUL J. TERRIO

My name is Paul Terrio and I am a Hydrologist with the U.S. Geological Survey (USGS) in Urbana, Illinois. I have worked with the USGS for just over 20 years and the majority of that time has been in Illinois. For the past 12 years, I have served as the Water Quality Specialist for the Illinois District of the USGS. I hold a degree in Hydrology from the University of Arizona.

My testimony today will consist of brief statements regarding the rationale for the proposed interim phosphorus standard; including the role of phosphorus in the aquatic environment, the reasoning behind proposing a standard for total phosphorus, and the basis for the proposed effluent standard of 1 mg/L (milligram per liter).

Nitrogen and phosphorus are the primary nutrients required for virtually all plant life on earth, both terrestrial and aquatic (Hem 1982, American Public Health Association 1998, Terrio1995). These nutrients are each available to water bodies naturally, as well as through anthropogenic inputs to watersheds such as commercial fertilizer and wastewater effluent. Other elements, such as carbon and potassium, are also required for biological organisms, but generally are present in natural waters in amounts sufficient to support biological growth and seldom are "limiting" nutrients. A limiting nutrient is the nutrient present in shortest supply and that which will be exhausted first, limiting further growth potential (O'Shaughnessy and McDonnell 1973).

Nitrogen is also typically present in concentrations sufficient to support aquatic algal and

plant growth, but might be the limiting nutrient in some locations or at some times, such as during low-flow periods when the supply of soluble nitrogen is exhausted from the water column (American Public Health Association 1998, Dodds and Welch 2000, Francoeur et al 1999). Because of its' soluble nature and plentiful sources, nitrogen concentrations in Illinois water bodies are virtually always sufficient for aquatic plant growth (Terrio 1995). Concurrent non-limiting levels of nitrogen and phosphorus can result in excessive and problematic plant and algal growth, a condition known as eutrophication. In most fresh water environments, phosphorus is considered to be the limiting nutrient or the nutrient in shortest supply (American Public Health Association 1998, Hem 1982, U.S. Geological Survey 1999). Because the available supply of phosphorus in water bodies is typically less than that of nitrogen, further reductions in the sources of phosphorus might prevent the occurrence of problematic or eutrophic conditions in water bodies receiving wastewater treatment effluents.

The presence and behavior of phosphorus in the aquatic environment is complex (Hem 1985, U.S. Geological Survey 1999). Phosphorus can be present in organic and inorganic form, in plant and animal matter, absorbed to particulate material, sequestered in benthic sediments, or in the water column in particulate or dissolved form. Phosphorus is transformed and cycled between organically bound forms and oxidized inorganic forms and occurs in natural waters and wastewater primarily as phosphate (American Public Health Association 1998 and Hem 1982). Orthophosphate, often referred to as soluble reactive phosphorus, is the form most readily available for incorporation by organic life forms. However, because of the continual cycling of phosphorus and the presence of inorganic, organic, soluble, and absorbed phosphorus forms in water bodies, the orthophosphate form alone does not provide an accurate and complete assessment of phosphorus in an aquatic environment. Total phosphorus analysis provides a more comprehensive quantification because it incorporates phosphorus present in dissolved, particulate, and biological forms.

Several investigations regarding the practicality, feasibility, and economics of treating municipal wastewaters to low levels of phosphorus have been or are being conducted, including studies by the Illinois Association of Wastewater Agencies (IAWA) and the Water Environment Research Foundation. A report commissioned by the IAWA, "*Technical Feasibility and Cost to Meet Nutrient Standards in the State of Illinois*", states that most existing treatment facilities in Illinois could be retrofitted or augmented with biological or biological and chemical processes to achieve monthly average effluent total phosphorus concentrations of 0.5 mg/L on a reliable and consistent basis. Most existing wastewater treatment facilities would need additional tankage to incorporate anaerobic and anoxic systems into the treatment process to increase phosphorus removal.

Many Midwestern states (Indiana, Wisconsin, Michigan, Kentucky, Ohio) have some form of a 1.0 mg/L total phosphorus effluent standard in place, while other states (Minnesota) have pending revisions to incorporate such a standard (USEPA website: http://www.epa.gov/waterscience/wqs/).

The costs of achieving an average of 1.0 mg/L total phosphorus in affected sewage treatment plant effluents may be estimated from recent examples. Two principal methods for phosphorus removal, biological removal and chemical precipitation, are available. While biological phosphorus removal may be a superior method in terms of lower final effluent concentrations and minimal operations and maintenances costs, this method would probably entail higher capital costs, would not be compatible with all existing plant configurations and will not be necessary to meet the proposed phosphorus effluent standard. Biological phosphorus removal may become the method of choice for new or extensively updated plants looking to future nutrient removal requirements beyond the proposed effluent standard. These facilities would be designed with additional tankage and related needs. Many existing plants would have to add tankage to achieve biological

phosphorus removal, thus accounting for the higher cost. An estimate of the costs of this method of phosphorus removal combined with nitrogen removal is available (Zenz, 2003) but this estimate is not specifically relevant to the instant proposed phosphorus effluent standard.

The chemical precipitation method will therefore usually be chosen for expanded treatment plants. The capital improvements for chemical precipitation equipment at recently designed treatment plants in the 1 to 5 million gallon per day (MGD) design average flow range would cost $50,000 to $60,000 if an existing building is available for chemical storage tank and equipment housing and $200,000 to $300,000 if a new building must be added. Additional wastewater treatment tankage is usually not required to install this equipment, which consists of a chemical storage tank for the precipitation chemical, secondary tank containment and a chemical feed pump. Yearly chemical costs will vary based on plant flow and phosphorus concentration in the pre-phosphorus removal final effluent. For an existing 5.9 MGD plant required to meet the 1.0 mg/L effluent standard, with average operating flows at the design capacity and using ferric chloride as the precipitation chemical, the chemical cost is approximately $50,000 per year. Approximately 15 to 30% more sludge by weight is generated when chemical precipitation phosphorus removal is applied. The increased amount and physical characteristics of the sludge following phosphorus removal may require an upgrade of sludge handling facilities as well as slightly increased sludge handling operations and maintenance costs.

References

1. American Public Health Association, 1998, *Standard Methods for the Examination of Water and Wastewater, 20th Edition*, Washington, D.C., variously paged.

2. Dodds, W.K. and Welch, E.B., 2000, Establishing Nutrient Criteria in Streams, Journal of the North American Benthological Society, Volume 19, pages 186-196.

3. Francoeur, S.N., Biggs, B.J.F., Smith, R.A., and Lowe, R.L., 1999, *Nutrient Limitation of Algal Biomass Accrual in Streams: Seasonal Patterns and a Comparison of Methods*, Journal of the North American Benthological Society, Volume 18, pages 242-260.

4. Hem, J.D., 1985, *Study and Interpretation of the Chemical Characteristics of Natural Water*, U.S. Geological Survey Water-Supply Paper 2254, 263 p.

5. McNeely, R.N., Neimanis, V.P., and Dwyer, L., 1979, *Water Quality Sourcebook, A Guide to Water Quality Parameters*, Environment Canada, Ottawa, 88 p.

6. O'Shaughnessy, J.C. and McDonnell, A.J., 1973, *Criteria for Estimating Limiting Nutrients in Natural Streams*, The Pennsylvania State University, Research Publication Number 75, 91 p.

7. Terrio, P.J., 1995, *Water-Quality Assessment of the Upper Illinois River Basin in Illinois, Indiana, and Wisconsin: Nutrients, Dissolved Oxygen, and Fecal-Indicator Bacteria in Surface Water, April 1987 Through August 1990*, U.S. Geological Survey Water-Resources Investigations Report 95-4005, 79p.

8. U.S. Geological Survey, 1999, *The Quality of our Nation's Waters, Nutrients and Pesticides*, U.S. Geological Survey Circular 1225, 82 p.

9. Zenz, David R., *Technical Feasibility and Cost to Meet Nutrient Standards in the State of Illinois*, 2003, Report commissioned by the Illinois Association of Wastewater Agencies.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

By: _____

Sanjay K Sofat
Assistant Counsel
Division of Legal Counsel

DATED: August 25, 2004

Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276
(217) 782-5544

STATE OF ILLINOIS)
) SS
COUNTY OF SANGAMON)

PROOF OF SERVICE

I, the undersigned, on oath state that I have served the attached **MOTION FOR LEAVE TO FILE *INSTANTER* AND THE WRITTEN TESTIMONY OF ROBERT MOSHER AND PAUL J. TERRIO** upon the person to whom it is directed, by placing a copy in an envelop addressed to:

Dorothy Gunn, Clerk
Pollution Control Board
100 West Randolph Street
Suite 11-500
Chicago, Illinois 60601
(Overnight)

Legal Service
Illinois Department of Natural Resources
One Natural Resources Way
Springfield, Illinois 62702-1271

(Overnight)

Mathew Dunn
Illinois Attorney General's Office
Environmental Control Division
James R. Thompson Center
100 West Randolph Street
Chicago, Illinois 60601
(Overnight)

John Knittle
Hearing Officer
Illinois Pollution Control Board
2125 South First Street
Champaign, Illinois 61820

(Overnight)

See Attached Service List

and mailing it from Springfield, Illinois on August 25, 2004, with sufficient postage affixed as indicated above.

Nancy J. Lamport

SUBSCRIBED AND SWORN TO BEFORE ME

this day of August 25, 2004.

OFFICIAL SEAL
BRENDA BOEHNER
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES 11-14-2006

Brenda Boehner
Notary Public

Service List

Albert Ettinger
Environmental Law and Policy Center
35 East Wacker Drive, Suite 1300
Chicago, Illinois 60601

Roy Harsch
Garden, Carton and Douglas
191 North Wacker Drive, Suite 3700
Chicago, Illinois 60601

David Horn
Assistant Professor of Biology
Aurora University
347 Gladstone Avenue
Aurora, Illinois 60506

John McMahon
Wilkie and McMahon
8 East Main Street
Champaign, Illinois 61820