BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
WATER QUALITY TRIENNIAL REVIEW	)	R02-11
AMENDMENTS TO 35 ILL. ADM. CODE	)	(Rulemaking-Water)
302.208(e)-(g), 302.504(a),	)	
302.575(d), 303.444, 309.141(h);	)	
AND PROPOSED 35 ILL. ADM. CODE	)	
301.267, 301.313, 301.413,	)	
304.120 AND 309.157	)	

P.C. #23

COMMENTS OF THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO TO FIRST NOTICE OF OPINION AND ORDER

The Metropolitan Water Reclamation District of Greater Chicago ("District") has reviewed the First Notice, Opinion and Order of the Board, for Rulemaking R02-11, and is submitting the following comments regarding the Board's decision to reject the Illinois Environmental Protection Agency's ("Agency") proposal to revise the General Use Water Quality Standard for weak acid dissociable ("WAD") cyanide.

The District supports the Agency's proposal for the following reasons, and respectfully requests that the Board reconsider its rejection of the Agency's proposal regarding WAD cyanide, and accept the Agency's proposal to revise the WAD cyanide standard for General Use Waters.

The District has been very involved in the study of appropriate WAD cyanide water quality standards since 1993. In 1995, the District submitted a petition to the Illinois Pollution Control Board for a site-specific rulemaking regarding WAD cyanide water quality standards, captioned *In the Matter of: Petition of the Metropolitan Water Reclamation District of Greater Chicago for Site-Specific Water Quality Regulation*, Docket No. R95-14 ("Petition"). Prior to filing its Petition, the District conducted extensive laboratory studies regarding analytical methodologies for measuring WAD cyanide and retained nationally recognized consultants familiar with WAD cyanide chemistry and toxicity. In support of its Petition, the District submitted testimony from these nationally renowned experts in their fields. Attached hereto is a copy of certain testimony filed by the District as part of the R95-14 proceedings, which testimony summarizes the major issues covered in the District's voluminous Petition. (See Attachment 1)

In this testimony the District clearly demonstrated that the existing General Use Chronic Water Quality Standard for WAD cyanide of 5.2 µg/L was calculated using approved United States Environmental Protection Agency ("USEPA") methodology, but with the goal of protecting rainbow trout, which was considered the most sensitive species. If the rainbow trout, a non-indigenous species, is removed from the calculation, and approved USEPA methodology is utilized, the chronic water quality standard for WAD cyanide becomes 10 µg/L, which is the

standard that the Agency is now proposing. This 10 µg/L chronic standard is even protective of such cold water species as brook trout, which are included in the toxicity database in the USEPA guidance documents.

The District testimony also discusses the complexity of cyanide speciation and analyses and clearly points out that WAD cyanide is a conservative surrogate indicator for free cyanide which is the true toxic form of cyanide. Thus, using WAD cyanide as the constituent to be regulated, automatically assures that a safety factor is built into the water quality standard. The District testimony also points out the analytical uncertainties in measuring WAD cyanide concentration at levels below 10 µg/L.

On February 1, 1996, the Board published its Final Action for R95-14 and granted the District's request for a site-specific change in the General Use Chronic Water Quality Standard for WAD cyanide from a value of 5.2 µg/L to a value of 10 µg/L, which is the same value as the Agency now proposes. A copy of the Board's final action is appended hereto as Attachment II. In the Opinion and Order of the Board in the R95-14 Rulemaking, the Board substantially agreed with all of the District's testimony. Although the R95-14 Rulemaking only dealt with portions of the Des Plaines River, it is the District's contention that the Agency has correctly concluded that the same justifications presented in the R95-14 Rulemaking can be applied to the entire state of Illinois.

The District strongly supports Mr. Mosher's testimony in R02-11 regarding his use of approved USEPA methodology for calculating the appropriate toxicity values for WAD cyanide, and strongly disagrees with the Illinois Department of Natural Resources ("IDNR") position in R02-11 that unproven methodologies and/or speculations regarding the toxicity of WAD cyanide to freshwater mussels should be used in the R02-11 Rulemaking. It is the District's position that the Board should support the use of approved USEPA methodologies for determining water quality standards, and not second-guess the Agency based upon unsupported and unapproved methodology.

In conclusion, the District respectfully requests that the Board review the record of the R95-14 Rulemaking, reconsider its decision, and accept the Agency's proposal for a revised WAD cyanide General Use Water Quality Standard as it is based on sound science and proven USEPA methodology.

Metropolitan Water Reclamation District
of Greater Chicago,

By: R Lanyon
Richard Lanyon, Director of R&D

September 3, 2002

Metropolitan Water Reclamation
District of Greater Chicago
100 East Erie
Chicago, Illinois 60611
312.751.5190

ATTACHMENT I

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:	)	
	)	
Petition of the Metropolitan Water Reclamation District of Greater Chicago for Site-Specific Water Quality Regulation:	)	R95-14 (Site-Specific Rule-making 35 Ill. Adm. Code 302, 303, 304

NOTICE OF FILING

TO:

Mr. Bruce Carlson
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, IL 62794-9276

Mr. William Denham
Department of Energy and Natural Resources
325 West Adams Street
Springfield, IL 62704

Mr. William Seith
Illinois Attorney General Office
100 West Randolph Street
Chicago, IL 60601

Mr. Richard C. Warrington, Jr.
Division of Legal Counsel
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, IL 62794

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Pollution Control Board testimony of the Metropolitan Water Reclamation District of Greater Chicago and two of its consultants (Dr. Herbert Allen and Dr. Richard Luthy), a copy of which is herewith served upon you.

Michael Rosenberg
Signature

June 9, 1995

Michael Rosenberg
Attorney
Metropolitan Water Reclamation District of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611
(312)751-6565

[THIS FILING IS SUBMITTED ON RECYCLED PAPER]

PROOF OF SERVICE

I, the undersigned, on oath state that I have served the testimony of the METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO and two of its consultants (Dr. Herbert Allen and Dr. Richard Luthy) by first class mail upon the following persons:

Mr. Bruce Carlson
Illinois Environmental
Protection Agency
2200 Churchill Road
Springfield, IL 62794-9276

Mr. William Denham
Department of Energy and
Natural Resources
325 West Adams Street
Springfield, IL 62704

Mr. William Seith
Illinois Attorney General
Office
100 West Randolph Street
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Mr. Richard C. Warrington, Jr.
Division of Legal Counsel
Illinois Environmental
Protection Agency
2200 Churchill Road
Springfield, IL 62794

Signature

Bernard Sawyer
Metropolitan Water Reclamation
District of Greater Chicago
100 East Erie Street
Chicago, Illinois 60611
(312)751-6565

Subscribed and sworn before me this

9th day of June, 1995.

Notary Public

OFFICIAL SEAL
ROSALIE BOTTARI
NOTARY PUBLIC, STATE OF ILLINOIS
MY COMMISSION EXPIRES:04/10/98

[THIS FILING IS SUBMITTED ON RECYCLED PAPER]

TESTIMONY OF DR. CECIL LUE-HING
BEFORE THE ILLINOIS POLLUTION CONTROL BOARD
IN THE MATTER OF: PETITION OF THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO FOR SITE-SPECIFIC WATER QUALITY REGULATION (R95-14)
JUNE 6, 1995

Introduction

My name is Dr. Cecil Lue-Hing, and I am the Director of Research and Development at the Metropolitan Water Reclamation District of Greater Chicago (District).

In this petition, the District is asking the Board to grant a site-specific regulation. The District asks the Board to do the following:

1. Revise the existing numerical General Use chronic water quality standard for weak acid dissociable (WAD) cyanide from 5.2 µg/l to 10.0 µg/l for the:
   a. West Branch of the DuPage River
   b. Higgins Creek
   c. Salt Creek
   d. Des Plaines River (within Cook County)

The existing General Use chronic water quality standard for WAD cyanide is 5.2 µg/l, and was adopted as a result of the Board's Hearings in R88-21. The Board's existing General Use chronic water quality standard for cyanide uses the laboratory analytical test method for WAD Cyanide (Storet Number 00718) to determine compliance.

Background

DESCRIPTION OF THE DISTRICT

The District is located within the boundaries of Cook County Illinois and serves an area of about 872 square miles. The area served by the District includes the city of Chicago and 124 suburban communities with a combined residential population of 5.1 million people and a waste load equivalent to 4.9 million people contributed by industrial sources. The District, on a daily basis, treats an average of 1,500 million gallons per day of wastewater at its seven water reclamation plants (WRPs).

DISTRICT WRPs ON GENERAL USE STREAMS

Three of the District's seven WRPs discharge to General Use streams. These WRPs, the streams to which they discharge, and their average daily flows, are as follows:

WRP	1994 Average Daily Flow	Receiving Stream
Hanover Park	8.87 MGD	West Branch DuPage River
John E. Egan	24.5 MGD	Salt Creek
James C. Kirie	31.8 MGD	Higgins Creek

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY PERMITS

In 1993, the Illinois Environmental Protection Agency (Agency) issued renewed National Pollutant Discharge Elimination (NPDES) permits for the Hanover Park and James C. Kirie WRPs which, for the first time, included numerical effluent

limits based upon the General Use Chronic Water Quality Criteria for Cyanide adopted by the Board in R88-21.

The Agency placed the following limits in the NPDES permits for the Hanover Park and James C. Kirie WRPs:

WRP	NPDES Permit Number	Monthly Average Effluent WAD Cyanide (µg/l)
Hanover Park	IL0036137	5.2 µg/l
James C. Kirie	IL0047741	5.0 µg/l

The numerical effluent limits were set equal to the Board's General Use chronic water quality standard for WAD cyanide since the West Branch of the DuPage River and Higgins Creek have a 7-day, 10-year low flow of zero. In these NPDES permits, the District is required to measure the WAD cyanide concentration in the effluents from these WRPs to determine compliance. This is in keeping with the Board's existing General Use chronic water quality standard for WAD cyanide.

Because the District had never before measured the WAD cyanide concentration in the effluent from the James C. Kirie and Hanover Park WRPs, a 12-month delay in the imposition of the effluent limits for cyanide in the new NPDES permits was requested. The Agency granted the District's request, and the effective date for the new WAD cyanide limits in these NPDES permits was changed to April 1, 1995.

In anticipation of these Board proceedings, the District recently requested that the Agency again change the effective

date for the new WAD cyanide limits to October 1, 1996. The Agency has granted this extension.

DISTRICT STUDIES

During the past 24 months, the District has been conducting routine monitoring of the WAD cyanide level in the effluents from the James C. Kirie and Hanover Park WRPs.

In addition, the District has conducted studies on the following topic areas:

1. Inputs of WAD cyanide from industrial sources to the James C. Kirie and Hanover Park WRPs.
2. Effect of wastewater treatment on WAD cyanide levels.
3. Accuracy and precision of the laboratory analytical method for WAD cyanide.
4. Chlorine interference in the WAD cyanide analysis.

The District has also investigated the following:

1. Basis for the existing General Use chronic water quality standard for WAD cyanide.
2. Basis for using the WAD cyanide analytical protocol for determining compliance with the General Use chronic water quality standard for WAD cyanide.

In the above mentioned studies and investigations, the District has used the services of two experts. They are:

1. Dr. Richard Luthy
   Professor and Head
   Department of Civil and Environmental Engineering
   Carnegie Mellon University
   Pittsburgh, Pennsylvania

2. Dr. Herbert E. Allen
   Professor
   Department of Civil Engineering
   University of Delaware
   Newark, Delaware

Dr. Luthy is a nationally recognized expert on cyanide chemistry and analytical measurements, and is currently the Chairman of the Standard Methods Joint Task Group on Cyanide. He has published many papers on these topics.

Dr. Herbert Allen is a nationally recognized expert on speciation chemistry, including chemical analysis. He has extensively studied the fate of pollutants in receiving streams and treatment plants, and the effect of pollutants on aquatic life. He is currently the Principal Investigator on the following two United States Environmental Protection Agency (USEPA) sponsored research projects.

1. Speciation of Metals in Effluents and Receiving Waters.
2. Speciation, Bioavailability, and Fate of Contaminants in the Aquatic Environment.

Both of these individuals are present and will be testifying today.

Summary of Site-Specific Relief Sought

The District asks that the Board revise the existing General Use chronic water quality standard for WAD cyanide from 5.2 µg/l to 10.0 µg/l for the following streams:

1. West Branch DuPage River
2. Higgins Creek
3. Salt Creek
4. Des Plaines River (in Cook County)

The District has found that the existing numerical chronic water quality standard of 5.2 µg/l WAD cyanide assumes that the receiving stream is capable of supporting a large population of the cold water fish species of rainbow trout. These streams, in fact, do not support such populations. Using USEPA approved procedures, and the fact that rainbow trout are not indigenous to the waterways in question, a General Use chronic water quality standard for cyanide of 10.0 µg/l WAD cyanide is justified.

With respect to this Petition, three District WRPs will be directly impacted. They are the John E. Egan, James C. Kirie, and Hanover Park WRPs, all of which discharge to General Use waters of the state of Illinois. The John E. Egan WRP discharges to Salt Creek, the James C. Kirie WRP discharges to Higgins Creek, and the Hanover Park WRP discharges to the West Branch of the DuPage River. All of these waterways eventually flow into the Des Plaines River.

Water Reclamation Plant WAD Cyanide Concentrations

Tables 1 and 2 present detailed data on WAD cyanide concentrations in the raw sewage, and final effluent from the Hanover Park and James C. Kirie WRPs for 1994 and five months of 1995. WAD cyanide is the parameter of concern in this Petition.

As there had been no previous standard for WAD cyanide, the District had not analyzed the final effluents from its WRPs for WAD cyanide prior to receiving the new NPDES permits. Therefore, no database was available on WAD cyanide levels in WRP effluents. It quickly became apparent that final effluent WAD cyanide concentrations at both WRPs measured well below 22 µg/l on a daily basis, but were often equal to or greater than 5 µg/l, making compliance with the proposed monthly average NPDES permit limits problematic. As so little information was available on the sources and fate of WAD cyanide in the wastewater treatment process, discussions were held with the Agency relative to the NPDES permit limits for WAD cyanide. The Agency stated that the WAD cyanide effluent limits were water quality driven based upon the General Use standards for cyanide, and could not be changed without Board action. The Agency agreed, however, to add a Special Condition to the NPDES permits for both WRPs which changed the effective date for complying with the WAD cyanide standard from April 1, 1994 to April 1, 1995. This

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 1

MONTHLY AVERAGE OF RAW SEWAGE AND FINAL EFFLUENT WAD CYANIDE AT THE HANOVER PARK WRP

Month	Raw Sewage WAD Cyanide (µg/l)	Final Effluent WAD Cyanide (µg/l)
January 1994	1.0	1.0
February	1.0	1.0
March	1.0	1.0
April	1.0	1.0
May	1.0	4.0
June	2.0	5.0
July	2.0	6.0
August	1.0	5.0
September	1.0	5.0
October	1.0	5.0
November	1.0	1.0
December	1.0	1.0
January 1995	1.0	1.0
February	1.0	1.0
March	2.0	2.0
April	2.0	2.0
May 1-18	2.0	5.0

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

TABLE 2

MONTHLY AVERAGES OF RAW SEWAGE AND FINAL EFFLUENT WAD CYANIDE AT THE JAMES C. KIRIE WRP

Month	Raw Sewage WAD Cyanide (µg/l)	Final Effluent WAD Cyanide (µg/l)
January 1994	2.0	2.0
February	3.0	2.0
March	4.0	2.0
April	2.0	2.0
May	1.0	3.0
June	2.0	4.0
July	5.0	4.0
August	14.0	4.0
September	2.0	3.0
October	1.0	2.0
November	2.0	1.0
December	1.0	1.0
January 1995	2.0	2.0
February	3.0	2.0
March	3.0	3.0
April	2.0	2.0
May 1-18	3.0	2.0

was done to allow the District adequate time to assess the occurrence, fate, treatability, and distribution of WAD cyanide throughout the Hanover Park and James C. Kirie WRP systems.

From September 1993 to the present, the District has been studying the WAD cyanide issue relative to the Hanover Park and James C. Kirie WRPs. These studies have involved the wastewater treatment processes at the WRPs, laboratory research work, industrial waste monitoring, and literature searches.

These studies revealed an unexpected result which can be seen from the WAD cyanide data presented in Tables 1 and 2. From November through April, when the chlorination/dechlorination system is not in use, the final effluent WAD cyanide concentrations measured at the Hanover Park WRP (Table 1) averaged either 1.0 or 2.0 µg/l each month. The raw sewage WAD cyanide concentrations also averaged either 1.0 or 2.0 µg/l. For May through October when the chlorination/dechlorination system is operational, the monthly average final effluent WAD cyanide concentrations increased to the 4.0-6.0 µg/l level, even though the raw sewage WAD cyanide concentrations remained at the 1.0 or 2.0 µg/l level. These monthly average values were equal to or exceeded the proposed NPDES permit limit for WAD cyanide of 5.2 µg/l at the Hanover Park WRP.

A similar, though not as pronounced, pattern occurred at the James C. Kirie WRP (Table 2) where November through April effluent WAD cyanide concentrations typically averaged either 1.0 or 2.0 µg/l versus May through October typical monthly averages of 3.0 and 4.0 µg/l.

In the summer of 1994 when the correlation between chlorination/dechlorination and effluent WAD cyanide concentrations was becoming evident, a more comprehensive sampling program was begun at both WRPs to study the fate of WAD cyanide through the wastewater treatment process. This involved collecting special samples for one month of raw sewage, primary effluent, secondary effluent, chlorine contact tank effluent, and dechlorinated effluent, and analyzing them for WAD cyanide. The results verified that chlorination is causing an increase in WAD cyanide as measured by the WAD cyanide analytical methodology.

Efforts Needed to Comply With Existing Board Regulations, Compliance Alternatives and Costs

As documented above, the District believes that the Hanover Park and James C. Kirie WRPs cannot consistently achieve a monthly average effluent WAD cyanide concentration of 5.2 and 5.0 µg/l, respectively, as specified in their NPDES permits.

In order to reduce effluent WAD cyanide concentrations to levels which will meet the current standards, three potential options were identified.

1. Add an additional treatment process to the WRP to remove WAD cyanide from the effluent.
2. Reduce the raw sewage loading of WAD cyanide to each WRP by amending the District's Industrial Waste Ordinance relative to cyanide discharges.
3. Replace the existing chlorination/dechlorination system with a different disinfection process such as ozonation or ultraviolet light.

With respect to option 1 above, a review of the technical literature indicated that no technologically feasible treatment processes exist for removing WAD cyanide from municipal wastewater at the low µg/l levels, which enter these WRPs.

In respect to option 2, the District has a rigorous program in place to control discharges from industry including those that contain cyanide.

Dedicated continuous monitoring is now being performed at 69 industries in the north service area. This requires the District to maintain 83 dedicated automatic samplers in continuous operation, since some industries have multiple discharge points.

The District's dedicated continuous monitoring program has identified two industrial dischargers of cyanide in the Hanover Park WRP service area, and six industrial dischargers of cyanide in the James C. Kirie WRP service area.

The highest WAD cyanide concentration measured in the industrial discharges to the Hanover Park WRP tributary sewers was 4.0 µg/l, with most values at the 1.0 µg/l level. Taking dilution from the domestic wastewater into account, the industrial contribution of WAD cyanide to the Hanover Park WRP is insignificant.

For the six companies discharging to the James C. Kirie WRP, typical WAD cyanide concentrations are in the 0.2 to 0.4 mg/l range, with the highest observed value being 0.76 mg/l. However, taking flow dilution into account, the industrial contribution of WAD cyanide at the James C. Kirie WRP would only contribute 1.0 to 2.0 µg/l of WAD cyanide to the raw sewage.

Thus, increased industrial waste enforcement activities would not be a solution to the WAD cyanide problem at these two WRPs, as maximum effort is currently being expended to control such discharges by the District's Industrial Waste Division.

With respect to option 3, technically feasible disinfection alternatives exist as substitutes for chlorination/dechlorination in the wastewater treatment process. Since District data indicates that the chlorination/dechlorination process is causing the increase in effluent WAD cyanide, replacing this process with an alternate technology may reduce effluent WAD cyanide concentrations. However, since the reasons for the increase in WAD cyanide due to chlorination/

dechlorination are not known, there is no guarantee that an alternative disinfection process would not also cause similar increases.

The District has developed a cost estimate for replacing the chlorination/dechlorination system at the Hanover Park and James C. Kirie WRPs. This cost estimate indicates that ozonation would be the least costly alternative if the existing chlorination/dechlorination systems had to be replaced. For the Hanover Park WRP an ozone disinfection system is estimated to have a total construction cost of $1,294,228, and an annual operating cost of $35,400. The total annualized construction plus operating cost is $186,604. For the James C. Kirie WRP an ozone disinfection system is estimated to have a total construction cost of $4,405,500, and an annual operating cost of $128,800. The total annualized capital plus operating cost is $643,493.

Thus, the total cost to the District for replacing the chlorination/dechlorination system with an ozonation system would be a construction cost of $5,699,728, and an annual operating cost of $164,200. The total annualized capital plus operating cost for both WRPs would be $830,097. It should be noted that these costs do not include costs for replacing the existing chlorination/dechlorination system at the John E. Egan WRP. However, it is the District's understanding that when the current NPDES permit for the John E. Egan WRP expires on September 30, 1995, the new permit will

contain a WAD cyanide effluent limit similar to that of the Hanover Park and James C. Kirie WRPs. Therefore, the District anticipates even greater costs than those listed here for complying with the existing WAD cyanide standard.

However, there is no guarantee that an ozonation system would not produce increases in WAD cyanide as observed for chlorination/dechlorination.

The current NPDES permits for the Hanover Park and James C. Kirie WRPs contain monthly average WAD cyanide limits equal to the existing General Use chronic water quality standard, as no instream dilution factor is available. Since the District anticipates that a similar NPDES permit limit for WAD cyanide will be imposed at the John E. Egan WRP when its permit is renewed, the John E. Egan WRP and Salt Creek are included in this Petition.

Impact of Site-Specific Rulemaking on the Environment

No qualitative impact on the environment would occur if the proposed site-specific regulation is adopted since the waterways in question do not contain rainbow trout. Trout are not indigenous to these waterways and would not populate these waterways, even if the existing cyanide standard is retained. No adverse qualitative effects on the environment are anticipated if the proposed site-specific regulation is adopted.

No quantitative impacts on the environment are expected as a result of adopting the site-specific regulation as no

change in District WRP operations would occur. Thus, WRP effluent quality would remain the same even after the site-specific regulation is adopted.

Biomonitoring Tests

The District has conducted extensive biomonitoring tests on WRP effluents as part of an integrated approach consisting of whole effluent and chemical-specific analyses as a means of protecting aquatic life and human health. These biomonitoring tests give a better picture of the true effect which effluents have on the aquatic community than do chemical-specific data alone. In 1993 and 1994, 76 biomonitoring tests were conducted on effluent and upstream receiving water from the John E. Egan, Hanover Park, and James C. Kirie WRPs. The data indicate that neither acute nor chronic toxicity is associated with the effluents from these three WRPs.

TECHNICAL JUSTIFICATION FOR PROPOSED REGULATIONS

The District has identified four factors in its proposal which it believes significantly distinguishes it from those relied on by the Board in the R88-21 rulemaking relative to WAD cyanide. These are:

1. The indigenous species criteria used in calculating fish toxicities are not applicable to the waterways named in the District's proposal.

2. Use of WAD cyanide for determining water quality standards is not directly related to toxicity as compared to use of free cyanide.
3. Chlorine interferes with the WAD cyanide test.
4. The regulatory limits are at or below the limit of detection.

Each of these factors is discussed in the following sections.

The Use of Nonindigenous Species in Calculating Fish Toxicities

In reviewing the record of the Board's R88-21 rulemaking it can be seen that the Board adopted the Agency's recommendations relative to the General Use water quality standards for WAD cyanide. The Agency recommendations were based upon two USEPA documents.

1. Ambient Water Quality Criteria for Cyanide - 1984, EPA-440/5-84-028.
2. Guidelines for Deriving National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, NTIS, PB85-227049.

Dr. Herbert Allen was retained by the District to review how the information contained in these two documents was applied in the R88-21 rulemaking, and how this methodology relates to the District's request for an adjusted standard.

Dr. Allen's findings can be summarized as follows. Using the cyanide toxicity data presented in the Ambient

Water Quality Criteria for Cyanide - 1984, and the methodology specified in the Guidelines for Deriving National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, the Final Chronic Value for cyanide using the four most sensitive fish species (rainbow trout, brook trout, yellow perch, and bluegill which are the national default species) can be calculated to equal 7.32 µg/l. However, the Guidelines document states that if the species Mean Acute Value of a commercially or recreationally important species is lower than the calculated Final Acute Value, then the Species Mean Acute Value can replace the calculated value in order to provide protection for that one important species. The R88-21 record indicates that the Agency made the decision to use rainbow trout as the most important species, and substituted rainbow trout toxicity data for the calculated Species Mean Acute Value. This Species Mean Acute Value was then used to calculate a new Final Chronic Value for cyanide of 5.2 µg/l. The Agency then recommended the 5.2 µg/l value to the Board, instead of the national default value of 7.32 µg/l contained in the USEPA Guidelines document.

The USEPA Guidelines document allows for the calculation of a site-specific toxicity value, if sufficient data exists for the rivers in question. The methodology for determining a site-specific toxicity value is contained in the USEPA document entitled Guidelines for Deriving Numerical Aquatic Site-Specific Water Quality Criteria (EPA-600/3-84-099). The

methodology allows indigenous fish species to be substituted for the national default four most sensitive species mentioned previously. Based upon the allowed USEPA methodology, the four most sensitive fish species which may actually exist in the rivers covered by this Petition are brook trout, black crappie, bluegill, and yellow perch. Rainbow trout do not exist in the waters covered by this petition. Using the cyanide toxicity data for these four fish species, the calculated Final Chronic Value for cyanide is 9.799 µg/l. Thus, the existing chronic standard for WAD cyanide of 5.2 µg/l is inappropriate.

It is the position of the District that the use of rainbow trout as the sole species for determining a chronic water quality standard for WAD cyanide in the rivers under question in this Petition is incorrect due to the fact that rainbow trout are not indigenous to Salt Creek, Higgins Creek, the West Branch of the DuPage River, or the Des Plaines River in Cook County.

For the past 20 years, as part of its environmental monitoring programs, the District has conducted fish collections in the rivers of Cook County. A total of 18,308 fish composed of 61 species and seven hybrids have been collected by the District from the Des Plaines River, Salt Creek, and the DuPage River during the period 1974 through 1994. Fishing gear used included boat and backpack electrofishers, 15-foot and 25-foot minnow seines with 3/16-inch

square mesh, and an electric seine. The results of these fish collections are summarized as follows:

1. Des Plaines River: 15,392 fish composed of 57 species and 4 hybrids were collected from the Des Plaines River and its tributaries in Lake, Cook, DuPage, and Will Counties during 1976, 1977, 1978, 1979, 1992, and 1993.
2. Salt Creek: 865 fish composed of 18 species and two hybrids were collected from Salt Creek and its tributaries in eastern DuPage County and north and central Cook County during 1974, 1975, and 1976.
3. DuPage River: 2,051 fish composed of 39 species and seven hybrids were collected from the DuPage River, including the east and west branches, and tributaries contained in DuPage County and northwestern Will County during 1976 and 1994.

Neither rainbow trout, nor any other species of trout, were ever present in any of these collections.

The Des Plaines River, Salt Creek, and the DuPage River are sluggish low gradient warm water streams. Warm water streams have more severe fluctuations of water temperature, chemical conditions, water volume, current velocity, and bottom contours than do cold water trout streams. Warm water

streams are generally more turbid and deeper than cold water trout streams.

Cold water streams are suitable for trout while warm water streams are not. Trout require cold water streams containing riffles with good water and oxygen flow through the gravel on the stream bottom for embryo survival. Temperature influences fish by controlling reproductive cycles, feeding and metabolic rates, swimming performance, growth rates, and distribution. Temperatures below or above the general range of 10°C to 20°C have unfavorable consequences on the development and growth of trout.

The Des Plaines River, Salt Creek, and the DuPage River have summer temperatures exceeding 20°C and contain only warm water fish species. The silty deposition of sluggish low gradient streams also prevents good water and oxygen flow for trout embryo survival. No species of trout was ever found in any of the collections from the Des Plaines River, Salt Creek, or the DuPage River. The habitat in these streams and their tributaries is not suitable for trout to successfully maintain sustainable populations.

This same general position has recently been affirmed by the Agency, as evidenced by the Agency's recent testimony before the Board in the R94-1 rulemaking. In the Agency's testimony, the Agency clearly stated that it is improper to use cold water species toxicity data in calculating General Use water quality standards for ammonia nitrogen. The Agency

also stated that cold water species are not resident in Illinois waters except for Lake Michigan.

The District believes that the above information clearly demonstrates that the existing General Use chronic water quality standard for WAD cyanide was based upon factors significantly different than those relating to the District's situation.

Use of WAD Cyanide Instead of Free Cyanide for Determining Water Quality Standards

The R88-21 rulemaking established General Use water quality standards for cyanide based upon the measurement of WAD cyanide. However, the USEPA Ambient Water Quality Criteria for Cyanide - 1984 states that:

> "...free cyanide would provide a more scientifically correct basis upon which to establish criteria for cyanide."

Free cyanide is defined as $HCN + CN^-$, whereas WAD cyanide is defined as $HCN + CN^- +$ weak metal cyanide complexes. Thus, it is clear that WAD cyanide is a conservative measure of the truly toxic form of cyanide, i.e., free cyanide, and thus overestimates its presence.

Unfortunately, there is no USEPA-approved method for the analysis of free cyanide. Therefore, it is understandable that the Board chose WAD cyanide as a regulatory measure. However, the District requests that the Board take this added

measure of conservatism into account when evaluating the District's request for a site-specific rulemaking.

Chlorine Interference in the WAD Cyanide Test

As discussed above, the District believes that chlorination of WRP effluents causes analytical interferences which result in increased WAD cyanide concentrations, as determined by the accepted WAD cyanide analytical method. During 1994 the District conducted a number of bench-scale laboratory experiments in an attempt to determine whether the chlorine interference was strictly a methodology related problem, or if the chlorine was actually affecting the cyanide speciation in the WRP effluent. The District also retained Dr. Richard Luthy to visit the District's laboratory and evaluate the WAD cyanide analytical procedures.

The data from these laboratory experiments indicates that chlorination/dechlorination interferes with the analytical test and causes an increase in WAD cyanide concentrations in some cases, but the magnitude of the increase in the laboratory did not always correspond to the field data observed at the District WRPs. The data also shows that there was no cyanide contamination in any of the chemicals being used at the two WRPs.

The District believes that this unanticipated chlorine interference at low WAD cyanide concentrations was not known to the District, the Agency, or the Board during the R88-21

Rulemaking, and requests that this problem be taken into account when the Board reviews this Petition.

Setting Regulatory Limits at or Below the Limit of Detection

The current General Use chronic water quality standard for WAD cyanide is 5.2 µg/l. Standard Methods for the Examination of Water and Wastewater, 18th Edition, lists the limit of detection of the WAD cyanide analysis as 5 to 20 µg/l depending on the sample matrix. Thus, by adopting the 5.2 µg/l limit, the Board unwittingly placed a considerable burden on the District to accurately analyze WAD cyanide in the effluents from its WRPs, perhaps beyond the limits of existing laboratory analytical methodology.

Dr. Richard Luthy, who is the chairman of the Standard Methods Committee on Cyanide Analysis will be discussing the difficulties of accurately analyzing WAD cyanide at these low concentrations. In particular, it should be noted that the precision of the WAD cyanide analysis at the limit of detection is ± 8.0 µg/l. Thus, at the lower limit of detection of 5 µg/l, the true value could be between -3.0 and 13.0 µg/l, and at the upper limit of detection of 20 µg/l, the true value could be between 12.0 and 28.0 µg/l. For this reason, a regulatory limit of 5.2 µg/l is not meaningful.

Indeed, the District believes that a reasonable conclusion here would be that even the more conservative 7.32 µg/l WAD cyanide value, which is a calculated value designed to

protect rainbow trout, falls below the accepted analytical range of precision of ± 8.0 µg/l.

In early 1994, as the District gained experience with the Standard Methods WAD cyanide procedure, it became clear that with our sample matrix, some modifications of the Standard Methods procedure would be required to allow the District to analyze for WAD cyanide at concentrations below 5 µg/l. This methodology was reviewed by Dr. Luthy when he visited our laboratory, and as he will testify, he approves of our procedures.

It is the District's understanding that no other municipal wastewater dischargers in the state of Illinois are required to achieve a detection limit below 10 µg/l for WAD cyanide. The District believes that requiring the development of special analytical methodology to demonstrate compliance with an inappropriate regulatory limit places an undue burden on its resources as compared to other dischargers in the state, and is a significant factor to take into account.

Also, while the District is disappointed that it is being singled out to develop methodology to measure WAD cyanide concentrations below 10 µg/l, we believe that a WAD cyanide limit of 10 µg/l would be more meaningful for the following reasons:

1. Dr. Allen's calculated chronic value of 9.799 µg/l, which is indistinguishable from 10 µg/l, will protect all species except rainbow trout.
2. Dr. Luthy's determination that at the detection limit (5-20 µg/l) for WAD cyanide the precision is ±8.0 µg/l.
3. The District's demonstration, supported by Dr. Luthy, that chlorine interference is significant for WAD cyanide measurements below 10 µg/l.
4. The analytical burden of constantly trying to measure WAD cyanide concentrations below 10 µg/l.
5. The fallacy that reported WAD cyanide values of <10.0 µg/l, obtained by existing methodology, provide any meaningful basis for technical discussions relative to indigenous aquatic species toxicity.
6. The Agency's affirmation that cold water species such as rainbow trout are not indigenous to the water bodies in this Petition.
7. The value of 10.0 µg/l more properly targets the aquatic species of concern in the affected waterways.

Thus, notwithstanding the fact that the District is prepared to be cooperative regarding analytical methodology

development, the need for a WAD cyanide limit of <10.0 µg/l is not warranted.

Summary Comments

The District has an outstanding record in providing high quality wastewater treatment to the residents of Cook County. The addition of an extremely conservative WAD cyanide limit to the NPDES permits, for two of the District's WRPs, has created a situation where potential permit violations could occur even though effluent quality remains high, and reported WAD cyanide values would not endanger indigenous species. This could result in an unnecessary expenditure of taxpayer dollars for unneeded modifications to the WRPs.

The District believes that this Petition clearly demonstrates that the existing General Use chronic water quality standard for WAD cyanide was promulgated based upon incomplete and overly conservative assumptions which do not relate to the District's true situation. The District believes that it has provided ample justification in its Petition to demonstrate that it is technically feasible and economically reasonable, for a grant by the Board of a site-specific regulation, and respectfully asks the Board to so grant its Petition.

TESTIMONY OF DR. HERBERT E. ALLEN
IN THE MATTER OF
R95-14 (SITE SPECIFIC RULEMAKING)
A PROPOSAL BEFORE THE ILLINOIS POLLUTION CONTROL BOARD
JUNE 6, 1995

My name is Dr. Herbert Allen. I am testifying on behalf of the Metropolitan Water Reclamation District of Greater Chicago, who have retained me as a consultant on this project. I am Professor of Environmental Engineering at the University of Delaware. I received my Ph.D. from the University of Michigan in 1974. Prior to joining the faculty of the University of Delaware I served on the faculties of the Illinois Institute of Technology in Chicago and Drexel University in Philadelphia. I have an active research program concerned with the fate and effects of pollutants in water, sediment and soils. A major thrust of my programs has been directed toward the development of information that can be used to establish appropriate environmental criteria and standards. My research, and that of many others, has shown that the total or the dissolved fraction of a pollutant is not equivalent to the fraction which is bioavailable to aquatic organisms, thus producing a toxic response. My research has been supported by over fifty grants and has resulted in the publication of over 115 books and papers. Since 1984 I have been a member of the research team concerned with the development of national sediment quality criteria. I head a consortium of eight universities in a project titled "Bioavailability, Trophic Transfer and Fate of Pollutants in the Aquatic Environment" that is funded by the U.S. Environmental Protection Agency's Office of Water. A principal objective is the development of the information that can be used to develop a water quality criteria for copper based on bioavailable forms of the metal. I have frequently served as a consultant to industrial and governmental groups on water quality issues.

My activities for the Metropolitan Water Reclamation District of Greater Chicago have included reviewing the speciation (or chemical form) of cyanide in water and the effects of this speciation on the toxicity of cyanide to aquatic organisms. I have used the data presented in the

U.S. Environmental Protection Agency's Ambient Water Quality Criteria for Cyanide - 1984 (EPA-440/5-84-028) and the procedures described in the U.S. Environmental Protection Agency's Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses which is published as NTIS PB85-227049 to derive appropriate water quality standards for cyanide for the protection of aquatic life in the West Branch of the DuPage River, Higgins Creek, Salt Creek, and the Des Plaines River. This testimony summarizes the information contained in my report to the Metropolitan Water Reclamation District of Greater Chicago which is presented as Attachment 10 in the District's Petition.

Cyanide, in the forms of cyanide ion, CN^-, and hydrogen cyanide or hydrocyanic acid, HCN, is termed free cyanide. Cyanide reacts with metal ions to form complexes, the stability of which varies with the metal. Some, such as the zinc and cadmium complexes are virtually completely dissociated in water while the iron complexes are virtually non-dissociated. The cyanide complexes of other metals, such as nickel, are partly dissociated in natural waters and the degree of dissociation The toxicity of cyanide species to aquatic organisms has been the subject of a number of studies. The U.S. EPA has concluded in the Criteria Document that "The apparent toxicity to aquatic organisms of most simple cyanides and metallocyanide complexes is due mainly to the presence of HCN ... Most metallocyanide complexes are not very toxic." The Criteria Document states "EPA believes that a measurement such as free cyanide would provide a more scientifically correct basis upon which to establish criteria for cyanide. The criteria were developed on this basis." Because there is no EPA approved method for the measurement of free cyanide implementation has been on the basis of other measurements of cyanide such as total cyanide or Weak Acid Dissociable (WAD) cyanide. Because these measurements include forms other than free cyanide, they overestimate the concentration of bioavailable cyanide and thus are conservative measurements.

In the Criteria Document the National Water Quality Criterion for cyanide was developed following the Guidelines. All aquatic toxicological data were collected and subjected to a data

quality assurance review. Those which do not meet requirements were not included. The requirement of a minimum data base in the Genus Mean Acute Values (GMAVs) of at least one species of freshwater animal in at least eight of the required different families was met. GMAVs for freshwater organisms meeting data quality requirements were computed and listed in rank order, from high to low, as shown in the following table.

Rank	Genus Mean Acute Value (µg/L)	Species	Species Mean Acute Value (µg/L)
15	2,490	Midge, *Tanytarsus dissimilis*	2,490
14	2,326	Isopod, *Asellus communis*	2,326
13	432	Snail, *Physa heterostropha*	432
12	426	Stonefly, *Pteronarcys dorsata*	426
11	318	Goldfish, *Carassius auratus*	318
10	167	Amphipod, *Gammarus pseudolimnaeus*	167
9	147	Guppy, *Poecilia reticulata*	147
8	125.1	Fathead minnow, *Pimephales promelas*	125.1
7	123.6	Cladoceran, *Daphnia magna* Cladoceran, *Daphnia pulex*	160 95.55
6	102	Largemouth bass, *Micropterus salmoides*	102
5	102	Black crappie. *Pomoxis nigromaculatus*	102
4	99.28	Bluegill, *Lepomis macrochirus*	99.28
3	92.64	Yellow perch, *Perca flavescens*	92.64
2	85.80	Brook trout, *Salvelinus fontinalis*	85.80
1	63.45	Rainbow trout, *Salmo gairdneri* Atlantic salmon, *Salmo salar*	44.73 90.00

The Final Chronic Value (FCV) is usually based on the acute toxicity data, which are used to establish the Final Acute Value (FAV). The studies in which both an acute and a chronic toxicity have been determined are used to establish an acute-chronic ratio. The FCV is determined by dividing the FAV by the acute-chronic ratio. The acute-chronic ratio for cyanide is 8.568.

The FAV is an estimate of the concentration of the material that corresponds to a cumulative probability of 0.05 in the acute toxicity values for the genera with which acceptable acute tests have been conducted on the material. The FAV is computed in the following manner:

a. The GMAVs are ordered from high to low.

b. Ranks, R, are assigned to the GMAVs from "1" for the lowest to "N" for the highest. If two or more GMAVs are identical, they are arbitrarily assigned successive ranks.

c. The cumulative probability, P, for each GMAV is calculated as R/(N+1).

d. The four GMAVs which have cumulative probabilities closest to 0.05 are selected. If there are less than 59 GMAVs, these will always be the four lowest GMAVs.

e. Using the selected GMAVs and Ps, calculate

$$S^2 = \frac{\sum\left((\ln \text{GMAV})^2\right) - \left(\left(\sum(\ln \text{GMAV})\right)^2/4\right)}{\sum(P) - \left(\left(\sum(\sqrt{P})\right)^2/4\right)}$$

$$L = \left(\sum(\ln \text{GMAV}) - S\left(\sum(\sqrt{P})\right)\right)/4$$

$$A = S\left(\sqrt{0.05}\right) + L$$

$$FAV = e^A$$

Using this procedure, I have calculated the FAV to be 62.680 µg/L as shown in the following table. Dividing this value by the acute-chronic ratio of 8.568 gives a FCV of 7.316 µg/L, which represents the National Crition that would be obtained by applying the proceduere described in the Guidelines.

For the development of the Final Acute Value, the Guidelines document states "However, in some cases, if the Species Mean Acute Value of a commercially or recreationally important species is lower than the calculated Final Acute Value, then that Species Mean Acute Value replaces the calculated Final Acute Value in order to provide protection for that important

species." In the case of the U.S. Environmental Protection Agency's development of a National Water Quality Criterion for Cyanide for the Protection of Aquatic Life, the FAV of 44.73 µg/L for rainbow trout has been used in replacement of the 62.68 µg/L that is calculated by the above procedure. This results in the FCV being lowered from 7.32 to 5.22 µg/L. The 5.22 value is for the protection of rainbow trout and other salmonids.

N=total number of Mean Acute Values (MAV) in data set = **15**

	Rank	GMAV	ln GMAV	(ln GMAV)^2	P=R/(N+1)	SQRT (P)
Bluegill, *Lepomis macrochirus*	4	99.28	4.5979	21.14109	0.25000	0.50000
Yellow perch, *Perca flavescens*	3	92.64	4.5287	20.50931	0.18750	0.43301
Brook trout, *Salvelinus fontinalis*	2	85.80	4.4520	19.82047	0.12500	0.35355
Rainbow trout, *Salmo gairdneri*	1	63.45	4.1503	17.22459	0.06250	0.25000
	SUM		**17.7289**	**78.69547**	**0.62500**	**1.53657**

S^2=	3.3584	
S=	1.8326	
L=	3.7283	
A=	4.1380	
	All data for rank 1 thru 4 species	**FAV lowered to protect rainbow trout**
FAV =	62.680	44.730
CMC =	31.340	22.365
acute/chronic ratio =	8.568	8.568
FCV =	7.316	5.221

Site-specific criteria can be developed by modification of the National Criteria (Guidelines for Deriving Numerical Aquatic Site-Specific Water Quality Criteria by Modifying National Criteria. U.S. Environmental Protection Agency, Environmental Research Laboratory - Duluth. EPA-600/3-84-099. PB85-121101). The same procedure described above for the calculation of National Criterion is followed, but non-resident species are excluded from the calculation. In the present case, the criterion for cyanide was recalculated excluding rainbow

trout from the data base. Black crappie, Pomoxis nigromaculatus, is added as the fourth species used in the calculation. Although neither yellow perch nor bluegill are present in these receiving waters, they were retained in the data base to meet the Guideline's minimum data base requirement that at least eight different families be included. The results of this calculation, which is presented below shows that the concentration of cyanide that would be protective of the fish populations in the receiving waters covered by this Site-specific Rulemaking is 9.799 µg/L, expressed as free cyanide. Because free cyanide is only a portion of WAD cyanide, use of WAD, rather than free cyanide provides a conservative safety factor.

N=total number of Mean Acute Values (MAV) in data set = **14**

	Rank	GMAV	ln GMAV	(ln GMAV)^2	P=R/(N+1)	SQRT (P)
Black crappie, *Pomoxis nigromaculatus*	4	102.00	4.6250	21.39037	0.26667	0.51640
Bluegill, *Lepomis macrochirus*	3	99.28	4.5979	21.14109	0.20000	0.44721
Yellow perch, *Perca flavescens*	2	92.64	4.5287	20.50931	0.13333	0.36515
Brook trout, *Salvelinus fontinalis*	1	85.80	4.4520	19.82047	0.06667	0.25820
	SUM		**18.2037**	**82.86125**	**0.66667**	**1.58696**

S^2=	0.4849
S=	0.6964
L=	4.2746
A=	4.4304

All data for rank 1 thru 4 species

FAV =	83.961
CMC =	41.981
acute/chronic ratio =	8.568
FCV =	9.799

Based on my review and calculations, I believe that a Site-specific Water Quality Criterion, for the protection of aquatic life in the West Branch of the DuPage River, Higgins Creek, Salt Creek, and the Des Plaines River, should be established for cyanide. Using the

calculation presented above, this value should be 9.799 µg/L measured as free cyanide. Because it is likely that cyanide measurements will be WAD cyanide which represents more cyanide species than free cyanide, a criterion of 10.0 µg/L of WAD cyanide will provide an acceptable margin of safety.

Testimony of Dr. Richard G. Luthy
in the Matter of R95-14 (Site-Specific Rulemaking)
A Proposal Before the Illinois Pollution Control Board
June 5, 1995

My name is Richard G. Luthy. I am testifying on behalf of the Metropolitan Water Reclamation District of Greater Chicago, who has retained me as a consultant on this project.

Professional Experience and Qualifications

I am an environmental engineering educator and researcher with more than twenty years experience. Currently I am Professor and Head of the Department of Civil and Environmental Engineering at Carnegie Mellon University, Pittsburgh, PA. In addition to academic responsibilities, I have consulted on a range of waste treatment and remediation issues for both the public and private sectors. My research interests in environmental engineering include physicochemical processes for industrial waste treatment, remediation of contaminated soil using physicochemical and microbial processes, and applied aquatic chemistry. My students and I have received awards for noteworthy research, including that for cyanide measurement and chemistry in wastewaters. I am a past Chair of the Gordon Research Conference on Environmental Sciences and a past President of the Association of Environmental Engineering Professors. I received a B.S. in chemical engineering, and M.S. and Ph.D. in environmental engineering, from the University of California, Berkeley. I am a registered Professional Engineer in Pennsylvania and a Diplomate of the American Academy of Environmental Engineers. I have several on the Cyanide Joint Task Group for *Standard Methods for the Examination and Wastewater* since 1975, and as Chairman of the Cyanide Joint Task Group since 1985, including the preparation of the section on cyanide for the 1992 Eighteenth Edition of *Standard Methods*.

I have been asked to provide testimony on cyanide analytical methods including what species may constitute "free cyanide", and how this relates to measurement of "weak acid dissociable cyanide", and what are analytical detection limits for cyanide measurement and possible interferences resulting from chlorination.

Cyanide Speciation and Measurement

"Cyanide" refers to all the cyanide groups in compounds that can be determined as cyanide (HCN or CN^-) by the methods used. The cyanide compound will complex with various metals, including ferrous and ferric iron, cadmium, copper, lead, zinc, etc. The toxicity to fish to most

complex cyanides is mainly attributable to HCN, not the metallocyanide complexes. Iron cyanide complexes are very stable and not materially toxic unless subject to photolysis.

Thus, there are different degrees of toxicity among cyanide compounds. As stated in *Standard Methods*: "Regulatory distinction between cyanide complexed with iron and that bound in less stable complexes, as well as between the complexed cyanide and free cyanide or HCN, can, therefore be justified" (*Standards Methods*, 1992, pp. 4-19).

At present, there is no reliable technique to measure free cyanide, i.e., HCN plus CN, in wastewater. In principle a cyanide-selective electrode could be used, but the electrode is subject to many interferences. Thus, for example, the cyanide-selective electrode is recommended only for use in analyzing the absorption liquid following sample distillation. Further, the cyanide-selective electrode method is not suitable for samples having less than about 50 µg/L CN. My own personal experience with the cyanide-selective electrode is that it is unreliable in many instances, and may become contaminated easily in routine analytical work with wastewater samples. In theory, ion chromatography may also be used to differentiate between free and complexed cyanide. However, as yet, robust ion chromatographic analytical techniques for cyanide are not available for routine wastewater monitoring.

For these reasons, the weak acid dissociable cyanide procedure is often taken as an alternative to free cyanide measurement. This method reports both free cyanide and potentially dissociable metallocyanide complexes. The weak acid dissociable cyanide methodology employs sample distillation in a slightly acidified medium. The method does not recover cyanide from strong metallocyanide complexes, such as iron-cyanide complexes. Weak, metal-cyanide complexes are reported, e.g., cadmium, lead, and zinc.

In summary, weak acid dissociable cyanide reports both certain labile metal-cyanide complexes, as well as free cyanide. Therefore, the weak acid dissociable method is a conservative measure of free cyanide.

Cyanide Detection Limit and Precision

The common procedure for the determination of "weak acid dissociable cyanide" entails the liberation of HCN from slightly acidified solution with reflux distillation and purging with air, *Standard Methods*, Section 4500-CN^- I. Cyanide in the absorption solution is then analyzed by either a titrimetric, colorimetric, or cyanide-selective electrode procedure. The most sensitive of these analyses is the colorimetric method. "The colorimetric method is suitable for cyanide concentrations to a lower limit of 5 to 20 µg/L" (*Standard Methods*, pg. 4-20).

The overall precision and single-operator precision for the determination of weak acid dissociable cyanide in selected water matricies with colorimetric analysis is discussed in *Standard Methods*, pg. 4-30, wherein the precision is the measure of the degree of agreement among replicate analyses of a sample. The methodology described in *Standard Methods* (pg. 1-9) for the determination of precision is referenced to the American Society for Testing and Materials, "Standard Practice for Determination of Precision and Bias of Methods of Committee D-19 on Water", Designation D2777-77, ASTM, Philadelphia, PA, 1977. According to these procedures, the precision is computed from the standard deviation of replicate tests obtained by several cooperating laboratories. The results of a single operator should agree more closely than those between operators or laboratories.

The Metropolitan Water Reclamation District of Greater Chicago has been required to monitor free cyanide in effluent, for which the discharge limit is 5 µg/L. The method of analysis is weak acid dissociable cyanide, for which *Standards Methods* reports the single operator precision for the determination of weak acid dissociable cyanide to be about 8 µg/L for low-level samples in the range of 5-10 µg/L. Thus, one may expect that the analysis of samples in this range may show considerable variability. It would be improper to ascribe great significance to sample analyses in this range. As a general rule, the lower detection limit of a method is taken at about three times the standard deviation of low-level samples (*Standard Methods*, pg. 1-11), which in this case would be in the range of 20 µg/L or greater.

In summary, it may be expected that the determination of weak acid dissociable cyanide would exhibit considerable variability for measurements in the range of 5 µg/L. It would be inappropriate to use such data for strict assessment for purposes of regulation and compliance.

Cyanide Measurement by the Metropolitan Water Reclamation District of Greater Chicago

This confirms that I have visited the District's laboratory and reviewed the methodology for analysis of total cyanide and weak acid dissociable cyanide. In addition, I have reviewed the District's data for the determination of both total cyanide and weak acid dissociable cyanide. I have concluded that the District is performing the analyses correctly in accordance with accepted methods.

I have received the District's data regarding the effects of chlorination and dechlorination on the determination of weak acid dissociable cyanide. It is demonstrated that some relationship is observed between chlorination and weak acid dissociable cyanide in effluent, but the cause for this effect is unknown at this time.

ATTACHMENT II

ILLINOIS POLLUTION CONTROL BOARD
February 1, 1996

IN THE MATTER OF:	)	
	)	
PETITION OF THE METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO FOR SITE-SPECIFIC WATER QUALITY REGULATION FOR CYANIDE (Amendments to 35 Ill. Adm. Code 303 and 304)	)	R95-14 (Site-Specific Rulemaking - Water)

Adopted Rule. Final Action.

OPINION AND ORDER OF THE BOARD (by R.C. Flemal):

This matter comes before the Board upon a proposal to amend the Board's water quality regulations for cyanide filed by the Metropolitan Water Reclamation District of Greater Chicago (District). The District requests that the existing General Use chronic standard (CS) for weak acid dissociable (WAD) cyanide be changed from 5.2 µg/L to 10 µg/L as applied to the West Branch of the DuPage River, Higgins Creek, Salt Creek, and the Des Plaines River within Cook County.

The Board's responsibility in this matter arises from the Environmental Protection Act (Act) (415 ILCS 5/1 et seq. (1994)). 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)). More generally, the Board's rulemaking charge is based on the system of checks and balances integral to Illinois environmental governance: the Board bears responsibility for the rulemaking and principal adjudicatory functions; the Illinois Environmental Protection Agency (Agency) has primary responsibility for administration of the Act and the Board's regulations, including today's proposed regulation.

Today the Board adopts the amendment as final and sends the amendment to the Administrative Code Division of the office of Secretary of State for publication and assignment of an effective date pursuant to Section 5 of the Illinois Administrative Procedure Act (5 ILCS 100/5-40(d) (1994)).

PROCEDURAL HISTORY

The District filed its proposal on April 28, 1995. By order of May 4, 1995 the Board accepted the proposal for hearing.

A public hearing was held before hearing officer Audrey Lozuk-Lawless in Chicago on June 30, 1995. The District presented the testimony of Dr. Cecil Lue-Hing, Director of Research and Development at the District; Dr. Richard G. Luthy, Professor and Head of the Department of Civil and Environmental Engineering at Carnegie Mellon University; and Dr. Herbert Allen, Professor of Environmental Engineering at the University of Delaware.

Dr. Lue-Hing presented an overview of the District's petition, including discussion of the existing WAD cyanide standard and studies the District has undertaken of that standard. Dr. Lue-Hing additionally addressed the economic impact to the District and the water quality of the rivers impacted by the proposed new standard.

Dr. Luthy addressed the methodology for WAD cyanide analysis, including the precision and accuracy of the WAD cyanide test. Dr. Allen addressed the methodologies for determining a WAD cyanide CS.

In addition to the hearing testimony, seven public comments (PC) were filed by Chicago Metal Finishers Institute (PC #1), Illinois Association of Wastewater Agencies (PC #2), the District (PC #3, #5, and #7), and the Agency (PC #4 and #6). All comments support adoption of the District's proposal.

By order of August 24, 1995 the Board adopted the District's proposal[1] for first notice. First notice publication occurred at 19 *Illinois Register* 12583 (September 8, 1995).

By order of December 7, 1995 the Board adopted the District's proposal for second notice[2] . The matter was

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[1] The proposal as adopted for first notice contained several modifications relative to the proposal as originally filed with the Board. The basis for making these modifications is discussed in the Board's first notice opinion of August 24 at p. 7-8.

[2] The second notice proposal contained several modifications relative to the proposal as presented at first notice. These modifications and their justification are discussed in the Board's second notice opinion of December 7, 1995 at p. 8-9. The principal modification was striking of

accordingly filed with the Joint Committee on Administrative Rules (JCAR). On January 23, 1996 JCAR voted no objection to adoption of the proposal.

BACKGROUND

The District is a unit of government with jurisdiction within part of Cook County, Illinois. Among the duties of the District is operation of water reclamation plants (WRPs), which, as part of their normal activities, produce discharges to local waterways.

The Board has established water quality standards for the streams of the State, including streams within the area served by the District. Among these standards are two standards for cyanide[3] that apply to the General Use Waterways to which the District discharges. These are a chronic standard (CS) with a value of 5.2 µg/L and an acute standard (AS) of 22 µg\L. The parameter to be measured in both cases is WAD cyanide, identified by the STORET number 00718.

At issue in the instant proceedings are three of the District's seven WRPs and the General Use Water Quality streams to which they discharge. These are:

WRP	Receiving Stream	ADF*
Hanover Park	West Branch DuPage River	8.87
John E. Egan	Salt Creek	24.5
James C. Kirie	Higgins Creek	31.8

*(ADF = Average 1994 daily flow in million gallons per day)

Each of the three receiving streams has a 7-day, 10-year low flow of zero at the point of discharge. The three receiving streams are tributary to a fourth stream of interest, the Des Plaines River.

In 1993 the Agency issued renewed National Pollutant Discharge Elimination System (NPDES) permits for the Hanover Park

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304.201(c), a subsection observed by the Agency to be obsolete (PC #6).

[3] These standards are found at 35 Ill. Adm. Code 302.208(d). They were adopted in Board proceeding R88-21(A). (In the matter of: Amendments to Title 35, Subtitle C (Toxics Control)), effective February 13, 1990.

and James C. Kirie WRPs. In these permits the Agency for the first time included numerical effluent limits based on the cyanide water quality standards[4] . These effluent limits for the two plants are 5.2 and 5.0 µg/L, respectively, measured as monthly average WAD cyanide, and 22 µg/L measured as daily maximum WAD cyanide.

The NPDES cyanide limits were set equal to the cyanide CS, in keeping with the permit-writing practice applicable to streams that have 7-day, 10-year low flows of zero.

Prior to the 1993 issuance of the NPDES permits at issue, the District had not conducted routine analysis of effluent cyanide. However, analyses conducted subsequently at both the Hanover Park and James C. Kirie WRPs have suggested to the District that a 5 µg\L monthly average[5] of WAD cyanide would often be equaled or exceeded. In this circumstance the District believes that compliance with the monthly averages currently expressed in the permits is problematic. The District believes that the solution lies in examination of the rationale for the cyanide General Use CS, and bases the instant petition on that examination.

JUSTIFICATION FOR PROPOSED AMENDMENTS

The District has identified four factors that it believes give technical justification for a CS standard of 10 µg/L[6] . These are:

1. The indigenous species used in calculating fish toxicities are not applicable to the waterways named in the District's proposal.

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[4] Upon petition from the District the Agency has set the effective date for the cyanide limits to October 1, 1996.

[5] The District believes that it would have no difficulty complying with the 22 µg/L daily limits.

[6] This value is expressed in the record both as 10 µg/L and 10.0 µg/L. The Agency recommends (PC #4 at ¶6), and the Board agrees, that in view of concerns regarding precision of WAD cyanide analyses, 10 µg/L is the preferred form.

2. Use of WAD cyanide for determining water quality standards is not directly related to toxicity as compared to use of free cyanide.

3. Chlorine interferes with the WAD cyanide test.

4. The regulatory limits are at or below the limit of detection.

The Board will address each of these in turn.

Use of Indigenous Species

Determination of AS and CS water quality standards is accomplished by a well-established procedure[7] that involves consideration of the toxicity of the substance in question to a range of aquatic organisms. In fresh-water environments such as those of concern here, the procedures and cyanide data base are such that the four fish species most sensitive to cyanide determine the calculated standards[8] .

The current cyanide CS standard of 5.2 µg/L was established based upon a calculation that included toxicities to rainbow trout, brook trout, yellow perch, and bluegill as the four species in question. However, the District observes that rainbow trout, which is the most sensitive of the four species to cyanide, are not indigenous to the District's waterways.

The District notes that rainbow trout have never been observed in any of the extensive fish collections made by the District. (Proposal at p. 45-51: Tr. at 25.) Moreover, the District observes that rainbow trout, which are a coldwater fish

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[7] The procedures are given in Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses, NTIS PB85-227049. Similar procedures are present in the Board's regulations at 35 Ill. Adm. Code 302.Subpart F: Procedures for Determining Water Quality Criteria.

[8] Application of the procedures, including selection of data and calculations using the data to produce the CS values discussed herein, is detailed in the testimony of Dr. Allen at Tr. 35-42 and Exh. 2. The Agency has independently undertaken the analysis, and confirms the results obtained by Dr. Allen. (Tr. at 54.)

species, are intolerant of the warmwater environments at issue here. (Proposal at p. 50-54.)

If rainbow trout are not included in the cyanide CS calculation, the four most sensitive species become the four fishes: brook trout[9], yellow perch, bluegill, and black crappie. When these four species are used, the calculated CS value for cyanide becomes 9.799 µg/L. (Tr. at 41-42; Exh. 2 at 6.) The District recommends that this value, rounded to 10 µg/L, be the CS applicable in the District's waterways.

The Agency agrees that rainbow trout are not a species indigenous to the District's waterways. (Tr. at 62-63.) The Agency further observes that excluding rainbow trout from the CS calculation for the streams at issue is consistent with federal guidance and that the resultant cyanide CS of 10 µg/L is protective of existing and expected aquatic life. (PC #4 at ¶2.)

WAD Cyanide Toxicity

Cyanide occurs in natural aquatic environments in a number of forms. Among these are HCN, CN^-, and complexes of cyanide with metals (e.g., ferrocyanide). The WAD cyanide measurement procedure measures all three of these forms. However, it is generally recognized that only the first two forms, HCN and CN^- (collectively called free cyanide), significantly contribute to the toxicity of cyanide. (Tr. at 44.) Thus, analyses of WAD cyanide overestimates the toxicity of the cyanide in direct proportion to the amount of metallocyanide complexes present in any sample.

This problem would be eliminated if free cyanide could be measured directly. However, there currently is no approved method for analysis of free cyanide in natural samples. (Tr. at 29, 45; Exh. 3 at 2.) Thus, analysis of WAD cyanide must be used in default.

The District observes that for these reasons, WAD cyanide is a conservative measure of cyanide toxicity. (Tr. at 29.) Nevertheless, at the low levels of metals and cyanide in the District's effluent, there should be little difference between

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[9] At hearing it was noted that brook trout do not occur in the waterways at issue, and that yellow perch are rare (Tr. at 51-54). Nevertheless, no suggestion has been made that these species also be excluded from the CS calculation; if brook trout are excluded, the calculated CS would be 10.9 µg/L (Tr. at 54).

the expected free cyanide concentrations and measured WAD cyanide concentrations. (Tr. at 59.)

Chlorine Interference

The District has completed 16½ months of detailed WAD cyanide sampling and analysis in effluents from the Hanover Park and James C. Kirie WRPs. In both data sets the District observes that measured WAD cyanide concentrations were higher during the months of May through October than in November through April[10]. The only consistent difference in inflow or operational parameters between these two time periods is that during May through October both WRPs employ chlorination/dechlorination procedures.

The District observes that during the summer of 1994, when the correlation between chlorination/dechlorination was becoming evident, it undertook a study of the fate of WAD cyanide concentrations during the treatment process, including sampling prior to and after chlorination. (Tr. at 31-32; Exh. 1 at 11.) The results verified that chlorination causes an increase in the reported WAD cyanide concentrations (Id.), although it remains uncertain whether the increase is caused by an analytical interference or by a chemical reaction that produces new cyanide (Tr. at 55-57).

Detection Limit

The District observes that Standard Methods for the Examination of Water and Wastewater, 18th edition, lists the limit of detection for WAD cyanide as 5 to 20 µg/L, depending upon the sample matrix. (Proposal at 57.) The District observes, accordingly, that a standard at 5.2 µg/L lies at the threshold of and "perhaps beyond the limits of existing laboratory analytical methodology" (Id.).

In addition, Dr. Luthy, who chairs the task group that prepared the section on cyanide for the current edition of Standard Methods, notes that the single operator precision for

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[10] At the Hanover Park WRP, the WAD cyanide concentrations on the final effluent were 1.0 to 2.0 µg/L during November through April, versus 4.0 to 6.0 µg/L during May through October. (Exh. 1 at Table 1.) At the James C. Kirie WRP WAD cyanide concentrations were 1.0 to 2.0 µg/L during November through April, versus 3.0 to 4.0 µg/L during May through October. (Exh. 1 at Table 2.)

the determination of WAD cyanide is about 8 µg/L for samples in the range 5-10 µg/L. (Tr. at 47; Exh. 3 at 3.) He concludes that considerable variation should be expected in such low-level samples, and that "it would be improper to ascribe great significance to sample analyses in this range" (Id.).

ECONOMICS

The District has calculated the cost of replacing the chlorination/dechlorination system at the Hanover Park and James C. Kirie WRPs. (Proposal at 24, Attachment 7.) The District calculated estimates of replacing the existing system with ultraviolet radiation (UV) and ozone disinfection. The calculations indicate that ozonation would be the least costly replacement alternative. The District's total cost to replace the current chlorination/dechlorination system with an ozonation system would be $5,699,728 in construction costs, with an annual operating cost of $164,200. (Id.) The total annualized capital plus operating cost for both WRPs would be $830,097. (Id.) These expenses do not include any costs for replacing the existing chlorination/dechlorination system at the John E. Egan WRP.

The District notes that even with this expenditure, there is no guarantee that an ozonation system would not produce increases in WAD cyanide as observed during chlorination/dechlorination.

CONCLUSION

The Board finds that the record before us justifies adoption of the District's proposed site-specific cyanide rule. Accordingly, we today adopt that rule.

ORDER

The Board directs that the following amendments be submitted to the Secretary of State for final notice pursuant to Section 5-40 of the Illinois Administrative Procedure Act.

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

PART 303
WATER USE DESIGNATIONS AND SITE SPECIFIC

WATER QUALITY STANDARDS

SUBPART A: GENERAL PROVISIONS

Section
303.100 Scope and Applicability
303.101 Multiple Designations
303.102 Rulemaking Required

SUBPART B: NONSPECIFIC WATER USE DESIGNATIONS

Section
303.200 Scope and Applicability
303.201 General Use Waters
303.202 Public and Food Processing Water Supplies
303.203 Underground Waters
303.204 Secondary Contact and Indigenous Aquatic Life Waters

SUBPART C: SPECIFIC USE DESIGNATIONS AND SITE SPECIFIC WATER QUALITY STANDARDS

Section
303.300 Scope and Applicability
303.301 Organization
303.311 Ohio River Temperature
303.312 Waters Receiving Fluorspar Mine Drainage
303.321 Wabash River Temperature
303.322 Unnamed Tributary of the Vermilion River
303.323 Sugar Creek and Its Unnamed Tributary
303.331 Mississippi River North Temperature
303.341 Mississippi River North Central Temperature
303.351 Mississippi River South Central Temperature
303.352 Unnamed Tributary of Wood River Creek
303.353 Schoenberger Creek; Unnamed Tributary of Cahokia Canal
303.361 Mississippi River South Temperature
303.400 Bankline Disposal Along the Illinois Waterway Rivers
303.430 Unnamed Tributary to Dutch Creek
303.431 Long Point Slough and Its Unnamed Tributary
303.441 Secondary Contact Waters
303.442 Waters Not Designated for Public Water Supply
303.443 Lake Michigan
303.444 Salt Creek, Higgins Creek, West Branch of the DuPage River, Des Plaines River

SUBPART D: THERMAL DISCHARGES

Section

303.500 Scope and Applicability
303.502 Lake Sangchris Thermal Discharges

303.Appendix A References to Previous Rules
303.Appendix B Sources of Codified Sections

AUTHORITY: Implementing Section 13 and authorized by Section 27 of the Environmental Protection Act (415 ILCS 5/13 and 27).

SOURCE: Filed with the Secretary of State January 1, 1978; amended at 2 Ill. Reg. 27, p. 221, effective July 5, 1978; amended at 3 Ill. Reg. 20, p. 95, effective May 17, 1979; amended at 5 Ill. Reg. 11592, effective October 19, 1981; codified at 6 Ill. Reg. 7818; amended at 6 Ill. Reg. 11161, effective September 7, 1982; amended at 7 Ill. Reg. 8111, effective June 23, 1983; amended in R87-27 at 12 Ill. Reg. 9917, effective May 27, 1988; amended in R87-2 at 13 Ill. Reg. 15649, effective September 22, 1989; amended in R87-36 at 14 Ill. Reg. 9460, effective May 31, 1990; amended in R86-14 at 14 Ill. Reg. 20724, effective December 18, 1990; amended in R89-14(C) at 16 Ill. Reg. 14684, effective September 10, 1992; amended in R92-17 at 18 Ill. Reg. at 2981 effective February 14, 1994; amended in R91-23 at 18 Ill. Reg. 13457, effective August 19, 1994; amended in R93-13 at 19 Ill. Reg. 1310 effective January 30, 1995; amended in R95-14 at 19 Ill. Reg. _____ effective _____.

SUBPART C: SPECIFIC USE DESIGNATIONS AND SITE SPECIFIC WATER QUALITY STANDARDS

Section 303.444 Salt Creek, Higgins Creek, West Branch of the DuPage River, Des Plaines River

The General Use chronic water quality standard for cyanide (STORET number 00718) contained in Section 302.208 does not apply to Salt Creek, Higgins Creek, the West Branch of the DuPage River, and the Des Plaines River in Cook County, Illinois. Instead, for these waters the chronic cyanide standard is 10 µg/L.

(Source: Amended at 19 Ill. Reg. _____, effective _____)

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

PART 304
EFFLUENT STANDARDS

SUBPART A: GENERAL EFFLUENT STANDARDS

SUBPART B: SITE SPECIFIC RULES AND EXCEPTIONS NOT OF GENERAL APPLICABILITY

SUBPART C: TEMPORARY EFFLUENT STANDARDS

AUTHORITY: Implementing Section 13 and authorized by Section 27 of the Environmental Protection Act (415 ILCS 5/13 and 27).

SOURCE: Filed with the Secretary of State January 1, 1978; amended at 2 Ill. Reg. 30, p. 343, effective July 27, 1978; amended at 2 Ill. Reg. 44, p. 151, effective November 2, 1978; amended at 3 Ill. Reg. 20, p. 95, effective May 17, 1979; amended at 3 Ill. Reg. 25, p. 190, effective June 21, 1979; amended at 4 Ill. Reg. 20, p. 53 effective May 7, 1980; amended at 6 Ill. Reg. 563, effective December 24, 1981; codified at 6 Ill. Reg. 7818: amended at 6 Ill. Reg. 11161, effective September 7, 1982; amended at 6 Ill. Reg. 13750, effective October 26, 1982; amended at 7 Ill. Reg. 3020, effective March 4, 1983; amended at 7 Ill. Reg. 8111, effective June 23, 1983; amended at 7 Ill. Reg. 14515, effective October 14, 1983; amended at 7 Ill. Reg. 14910, effective November 14, 1983; amended at 7 Ill. Reg. 14910, effective November 14, 1983; amended at 8 Ill. Reg. 1600, effective January 18, 1984; amended at 8 Ill. Reg. 3687, effective March 14, 1984; amended at 8 Ill. Reg. 8237, effective June 8, 1984; amended at 9 Ill. Reg. 1379, effective January 21, 1985; amended at 9 Ill. Reg. 4510, effective March 22, 1985; peremptory amendment at 10 Ill. Reg. 456, effective December 23, 1985; amended at 11 Ill. Reg. 3117, effective January 28, 1987; amended in R84-13 at 11 Ill. Reg. 7291 effective April 3, 1987; amended in R86-17(A) at 11 Ill. Reg. 14748, effective August 24, 1987; amended in R84-16 at 12 Ill. Reg. 2445, effective January 15, 1988; amended in R83-23 at 12 Ill. Reg. 8658, effective May 10, 1988; amended in R87-27 at 12 Ill. Reg. 9905, effective May 27, 1988; amended in R82-7 at 12 Ill. Reg. 10712, effective June 9, 1988; amended in R85-29 at 12 Ill. Reg. 12064, effective July 12, 1988; amended in R87-22 at 12 Ill. Reg. 13966, effective August 23, 1988; amended in R86-3 at 12 Ill. Reg. 20126, effective November 16, 1988; amended in R84-20 at 13 Ill. Reg.

851, effective January 9, 1989; amended in R85-11 at 13 Ill. Reg. 2060, effective February 6, 1989; amended in R88-1 at 13 Ill. Reg. 5976, effective April 18, 1989; amended in R86-17B at 13 Ill. Reg. 7754, effective May 4, 1989; amended in R88-22 at 13 Ill. Reg. 8880, effective May 26, 1989; amended in R87-6 at 14 Ill. Reg. 6777, effective April 24, 1990; amended in R87-36 at 14 Ill. Reg. 9437, effective May 31, 1990; amended in R88-21(B) at 14 Ill. Reg. 12538, effective July 18, 1990; amended in R84-44 at 14 Ill. Reg. 20719, effective December 11, 1990; amended in R86-14 at 15 Ill. Reg. 241, effective December 18, 1990; amended in R87-33 at 18 Ill. Reg. 11574, effective July 7, 1994; amended in R94-1 at 19 Ill. Reg. _____, effective _____; amended in R95-14 at 19 Ill. Reg. _____, effective _____.

BOARD NOTE: This Part implements the Illinois Environmental Protection Act as of July 1, 1994.

SUBPART B: SITE SPECIFIC RULES AND EXCEPTIONS NOT OF GENERAL APPLICABILITY

Section 304.201 Wastewater Treatment Plant Discharges of The Metropolitan ~~Sanitary~~ Water Reclamation District of Greater Chicago

a) Calumet Treatment Plant Cyanide Discharges:

The effluent standards of Section 304.124 as applied to cyanide discharges, Sections 304.120(b) and (c) and Section 304.122 do not apply to BOD_5, total suspended solids, cyanide, and ammonia-nitrogen discharged from the Calumet Sewage Treatment Works of The Metropolitan ~~Sanitary~~ Water Reclamation District of Greater Chicago. Instead, it must meet the following effluent standard, subject to the averaging rule of Section 304.104(a), effective July 1, 1988:

CONSTITUENT	STORET NUMBER	CONCENTRATION (mg/l)
CBOD5	80082	24
SS	00530	28
Ammonia Nitrogen (as N)	00610	13
Cyanide	00720	0.15

b) North Side Sewage Treatment Works

The effluent standards of Sections 304.120(b) and (c) and 304.122 do not apply to BOD_5, total suspended solids, and ammonia-nitrogen discharged from the North Side Sewage Treatment Works of The Metropolitan ~~Sanitary~~ Water Reclamation District of Greater Chicago. Instead, it must meet the following standard, subject to the averaging rule of Section 304.104(a) effective July 1, 1988:

CONSTITUENT	STORET NUMBER	CONCENTRATION (mg/l)
CBOD5	80082	12
SS	00530	20
Ammonia Nitrogen (as N)		
April-October	00610	2.5
November-March	00610	4.0

~~c) Chicago Waterway Evaluation~~

~~The Metropolitan Sanitary District of Greater Chicago shall complete and submit to the Board a comprehensive water quality evaluation of the Chicago Waterway System and its influence on the lower Des Plaines and Upper Illinois Rivers by January 15, 1992. Such evaluation shall include assessment of performance levels for North Side, Calumet and Stickney wastewater reclamation plants and the extent of sewer overflow reduction through The Metropolitan Sanitary District of Greater Chicago's Tunnel and Reservoir Plan.~~

(Source: Amended at 19 Ill. Reg. _____, effective _____)

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 1st day of February, 1996, by a vote of 7-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board