



**URBANA &  
CHAMPAIGN  
SANITARY  
DISTRICT**

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**ORIGINAL**

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**MAR 4 - 2002**

**STATE OF ILLINOIS**  
*Pollution Control Board*

February 26, 2002

Illinois Pollution Control Board  
Docket Clerk  
James R. Thompson Center  
100 West Randolph Street  
Suite 11-500  
Chicago, IL. 60601

Subject: Prefiled Testimony of Mr. Tim Bachman  
Docket No. RO2-19

Attn: Docket Clerk

Enclosed please find the testimony of Mr. Tim Bachman to be presented at the Illinois Pollution Control Board (IPCB) Meeting of March 25, 2002. This IPCB meeting is scheduled for 10:30 a.m. and will take place at the James R. Thompson Center in Chicago. The testimony will be in the matter of the Illinois Association of Wastewater Agencies petition before the IPCB regarding ammonia-nitrogen water quality standards in Docket Number RO2-19.

Please be aware that I have served copies of the enclosed testimony with all persons on the existing service list for RO2-19.

If you have any questions, please call me at 217-367-3409.

Very truly yours,

*Tim Bachman*

Tim Bachman, P.E.  
Director of Waste Treatment Operations

MAR 4 - 2002

STATE OF ILLINOIS  
*Pollution Control Board*

IN THE MATTER OF: )  
)  
PROPOSED AMENDMENTS TO )  
AMMONIA NITROGEN STANDARDS )  
35 ILL. ADM. CODE 302.212, 302.213, )  
AND 304.122 )

R02-19  
(Rulemaking – Water)

TESTIMONY OF TIM BACHMAN

QUALIFICATIONS / INTRODUCTION

My name is Tim Bachman and I am the Director of Waste Treatment Operations for the Urbana & Champaign Sanitary District located in Urbana, Illinois. I have served the District in that position since July of 1979. Prior to that I was employed by the Illinois EPA's Division of Water Pollution Control as a Field Operations Section engineer for nine and one-half years. I have a Bachelor of Science Degree in Chemical Engineering from the University of Illinois and a Master of Science Degree in Environmental Engineering also from the University of Illinois. I am a Registered Professional Engineer in the State of Illinois and a Class I Certified Wastewater Treatment Works Operator. As Director of Waste Treatment Operations for the District, I manage, direct, and supervise the operation of two advanced wastewater treatment facilities (17.3 MGD and 5.9 MGD) to obtain efficient and economical operations and attain compliance with State and Federal Environmental Protection Agency water pollution regulations. My testimony will discuss the impact of the current ammonia nitrogen standards and the proposed amendments on the Urbana & Champaign Sanitary District.

BACKGROUND INFORMATION

The District operates two treatment facilities. The Northeast Plant is a 17.3 MGD (design average flow) facility with a flow treatment scheme consisting of preliminary treatment, primary clarification, secondary treatment with a fixed nozzle trickling filter and the activated sludge process, nitrification

towers, tertiary filters and a year-round disinfection exemption. The Southwest Plant is a 5.9 MGD facility consisting of preliminary treatment, no primary clarification, activated sludge with chemical phosphorous removal, nitrification towers, tertiary filters and a year-round disinfection exemption. Both plants also provide excess flow facilities consisting of primary clarification and disinfection. The last major upgrade at each facility occurred between 1978 and 1982 and included the construction of the nitrification towers. The towers were originally designed to reduce influent ammonia nitrogen from 15 mg/l to 1.5 mg/l during the summer months and 4.0 mg/l during the winter months. Historically, the towers have had essentially no problems meeting the original design intentions.

IMPACT OF CURRENT AMMONIA NITROGEN

WATER QUALITY STANDARDS

The Board’s current water quality standards enacted in 1996 were incorporated into the District’s NPDES permits through the renewal process. The new permits, which became effective November 1, 2000, included a 36 - month compliance schedule in Special Condition No. 16 which acknowledged the possibility of this rulemaking proposal. Attachment 1, page 14 of NPDES Permit No. IL0031500, is for the District’s Northeast Plant and Attachment 2, page 13 of NPDES Permit No. IL0031526, is for the Southwest Plant. Interim and final limits if this proposal is not successful are shown in Table 1.

Table 1		
<u>Northeast Plant</u>	<u>Interim/Final</u> <u>Monthly Average</u>	<u>Interim/Final</u> <u>Daily Max.</u>
April through October	1.5 / 0.9 mg/l	3.0 / 3.0 mg/l
November through March	2.4 / 1.0 mg/l	4.8 / 4.8 mg/l
<u>Southwest Plant</u>		
April through October	1.5 / 0.7* mg/l	3.0 / 2.2 mg/l
November through March	1.9 / 0.7* mg/l	3.8 / 3.2 mg/l

\* Using more recent stream data, these numbers become 0.6 mg/l (See Attachment 3.)

The low limits are created by a combination of two factors – an extremely high pH (approximately 8.8) in the finished water in the local public water supply and zero seven-day-ten-year low flows in the receiving streams. Based on data presented in Attachments 4 and 5 for the Southwest Plant and discussions with the Illinois EPA, these more stringent limits will require the construction of additional ammonia removal facilities to assure compliance both now and as future growth occurs.

### POTENTIAL RELIEF PROVIDED BY IAWA PROPOSAL

If the IAWA proposal is adopted, the final limits will be as shown in Table 2:

<u>Table 2</u>		
<u>Northeast Plant</u>	<u>Monthly Average</u>	<u>Daily Max.</u>
March through October	1.23 mg/l	5.40 mg/l
November through February	3.35 mg/l	6.07 mg/l
<u>Southwest Plant</u>		
March through October	0.96 mg/l	3.02 mg/l
November through February	2.60 mg/l	4.12 mg/l

By following the USEPA 1999 Update of Ambient Water Quality Criteria for Ammonia, significant relief occurs particularly in the winter months. Referring again to Attachments 4 and 5 for the Southwest Plant, these higher limits appear to indicate the existing facilities are adequate both now and into the future to achieve compliance. Therefore no additional facilities for ammonia removal would need to be constructed at this time.

### LONG RANGE PLANNING EFFORTS

Since the last major planning effort at the District took place over 20 years ago, the District in 1999 began working on a new twenty year plan to address the following issues: (1) the immediate need for additional capacity at the Southwest Plant; (2) biosolids handling improvements; (3) equipment that was near the end of its useful life; (4) compliance with ammonia nitrogen water quality standards; and (5)

additional needs through the year 2019. Consoer Townsend Envirodyne Engineers, Inc. (CTE) of Chicago were retained as consultants to assist the District in these efforts. A draft of the Long Range Plan was submitted to IEPA for review early in 2001 and one of the technical issues that has been the subject of ongoing discussions has been how to deal with Special Condition No. 16 of the NPDES permits depending on the outcome of the IAWA proposal.

#### RESOLUTION OF SPECIAL CONDITION NO. 16

In the Long Range Plan that has been tentatively approved by the Agency, the District is proposing three projects identified as the 2005 project, the 2010 project and the 2015 project with the dates reflecting the scheduled completion of each project. The 2005 project includes three phases. Phase I is consolidation of all biosolids handling at the District's Northeast Plant, Phase II is expansion of the Southwest Plant. And, Phase III is construction of a third nitrification tower at the Southwest Plant to assure compliance with the existing standard for ammonia nitrogen if the proposed IAWA amendments are not adopted by the Board. The estimated cost of Phase III as prepared by CTE is \$4,181,000. We believe that an additional tower would also be required possibly in the 2010 project at the Northeast Plant to assure compliance with the existing standard as loading on that plant increases. The estimated cost of the additional tower at the Northeast Plant is \$7,184,000 based on its relative size compared to the one proposed for the Southwest Plant. However, if the IAWA proposal is adopted we do not believe the third tower will be necessary for most if not all of the twenty-year planning period at either plant. The Agency has indicated that they would be receptive to a request to modify the approved Facilities Plan and drop Phase III from the 2005 project upon Board adoption of the IAWA proposal.

UCSD SUPPORTS IAWA PROPOSAL

Since the existing water quality standards do not consider USEPA's 1999 Update of Ambient Water Quality Criteria for Ammonia, the District feels strongly that it should not be required to spend the estimated \$11,365,000 to provide additional ammonia removal facilities to meet a lower limit than required based on the most recent scientific data and Federal guidance available. This unneeded additional cost would result in additional debt retirement that the District would have to pass on to its users in the form of increased user charges. We therefore urge you to adopt the IAWA proposal. This concludes my pre-filed testimony. I will be supplementing this testimony as needed during the hearing. I would be happy to address any questions.

By: Tim Bachman

Tim Bachman, P.E.

February 25, 2002

# Attachment 1

NPDES Permit No. IL0031500

## Special Conditions

	Load Limits lbs/day DAF (DMF)*		Concentration Limits mg/L	
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.
April through Oct.	130 (260)	433 (866)	0.9	3.0
Nov. through March	144 (289)	693 (1,385)	1.0	4.8

\*Load limits based on design maximum flow shall apply only when flow exceeds the design average flow.

The Permittee may apply for an Effluent Modified Water (EMW) designation pursuant to 35 Ill. Adm. Code 302.213 and Part 355, Determination of Ammonia Nitrogen Water Quality Based Effluent Limits for Discharges to General Use Waters.

The Permittee shall complete the project described above in accordance with the following schedule:

- |  |  |
|--|--|
| (1) Interim Report on ammonia reductions to date and what measures are necessary to comply with Final Ammonia Nitrogen Limitations | 6 months from the effective date of this Permit  |
| (2) Preliminary Report on construction of ammonia reduction facilities or update on regulatory proposals                           | 12 months from the effective date of this Permit |
| (3) Interim Report   | 18 months from the effective date of this Permit |
| (4) Interim Report   | 24 months from the effective date of this Permit |
| (5) Interim Report   | 30 months from the effective date of this Permit |
| (6) Permittee Achieves Compliance with Final Ammonia Nitrogen Effluent Limitations   | 36 months from the effective date of this Permit |

Should an EMW designation be obtained by the Permittee, this Permit may be modified to remove this Special Condition and to include the requirements necessary to implement the EMW provisions. Such modification shall include Public Notice and the Opportunity for public hearing.

The ammonia nitrogen effluent limits in this Permit are based on the Illinois Pollution Control Board Regulations and the procedures contained in 35 Ill. Adm. Code Part 355. Should these regulations change, the IEPA may re-open and modify this Permit to include revised ammonia nitrogen effluent limitations based on the revised regulations. Prior to the ammonia limits in this Special Condition becoming effective, such revised limits may be either more or less stringent than those contained in this Special Condition. After the ammonia nitrogen limits in this Special Condition become effective, such revised limits shall be subject to the requirements of 40 CFR § 122.44(l).

This Permit may be modified to include revised compliance dates set out in this Permit that are superseded or supplemented by compliance dates in judicial orders, Pollution Control Board orders or financial agreements. Prior to such permit modification, the revised dates in the appropriate orders or financial agreements shall govern the Permittee's compliance. In addition, the IEPA may initiate a modification of the construction schedule set forth in this Permit at any time, to include other dates which are necessary to carry out the provisions of the Illinois Environmental Protection Act, the Federal Clean Water Act or regulations promulgated under those Acts or compliance dates which have been submitted in writing by the Permittee and approved by the IEPA. Public Notice of such modifications and opportunity for public hearing will be provided consistent with the requirements of 40 CFR § 122.63.

## REPORTING

The Permittee shall submit a report no later than fourteen (14) days following the completion dates indicated for each numbered item in the compliance schedule, indicating, a) the date the item was completed, or b) that the item was not completed. All reports shall be submitted to IEPA at the following address:

Illinois Environmental Protection Agency  
Division of Water Pollution Control  
1021 North Grand Avenue East  
Post Office Box 19276  
Springfield, Illinois 62794-9276

Attention: Compliance Assurance Section

## Attachment 2

NPDES Permit No. IL0031526

### Special Conditions

**SPECIAL CONDITION 15.** The Permittee has undergone a Monitoring Reduction review and the influent and effluent sample frequency has been reduced for CBOD<sub>5</sub>, BOD<sub>5</sub>, suspended solids, pH, ammonia nitrogen and phosphorus due to sustained compliance. The IEPA will require that the influent and effluent sampling frequency for these parameters be increased to the monitoring frequency of 5 days/week if effluent deterioration occurs due to increased wasteload, operational, maintenance or other problems. The increased monitoring will be required Without Public Notice when a permit modification is received by the Permittee from the IEPA.

**SPECIAL CONDITION 16.**

Project Description: Compliance with Ammonia Nitrogen Water Quality Standards

Thirty-six (36) months from the effective date of this Permit the following ammonia nitrogen (as N) limits shall become effective:

	Load Limits lbs/day DAF (DMF)*		Concentration Limits mg/L	
	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.
April through Oct.	34 (73)	108 (229)	0.7	2.2
Nov. through March	34 (73)	157 (334)	0.7	3.2

\*Load limits based on design maximum flow shall apply only when flow exceeds the design average flow.

The Permittee may apply for an Effluent Modified Water (EMW) designation pursuant to 35 Ill. Adm. Code 302.213 and Part 355, Determination of Ammonia Nitrogen Water Quality Based Effluent Limits for Discharges to General Use Waters.

The Permittee shall complete the project described above in accordance with the following schedule:

- |  |  |
|--|--|
| (1) Interim Report on ammonia reductions to date and what measures are necessary to comply with Final Ammonia Nitrogen Limitations | 6 months from the effective date of this Permit  |
| (2) Preliminary Report on construction of ammonia reduction facilities or update on regulatory proposals                           | 12 months from the effective date of this Permit |
| (3) Interim Report   | 18 months from the effective date of this Permit |
| (4) Interim Report   | 24 months from the effective date of this Permit |
| (5) Interim Report   | 30 months from the effective date of this Permit |
| (6) Permittee Achieves Compliance with Final Ammonia Nitrogen Effluent Limitations   | 36 months from the effective date of this Permit |

Should an EMW designation be obtained by the Permittee, this Permit may be modified to remove this Special Condition and to include the requirements necessary to implement the EMW provisions. Such modification shall include Public Notice and the Opportunity for public hearing.

The ammonia nitrogen effluent limits in this Permit are based on the Illinois Pollution Control Board Regulations and the procedures contained in 35 Ill. Adm. Code Part 355. Should these regulations change, the IEPA may re-open and modify this Permit to include revised ammonia nitrogen effluent limitations based on the revised regulations. Prior to the ammonia limits in this Special Condition becoming effective, such revised limits may be either more or less stringent than those contained in this Special Condition. After the ammonia nitrogen limits in this Special Condition become effective, such revised limits shall be subject to the requirements of 40 CFR § 122.44(l).

This Permit may be modified to include revised compliance dates set out in this Permit that are superseded or supplemented by compliance dates in judicial orders, Pollution Control Board orders or financial agreements. Prior to such permit modification, the revised dates in the appropriate orders or financial agreements shall govern the Permittee's compliance. In addition, the IEPA may initiate a modification of the construction schedule set forth in this Permit at any time, to include other dates which are necessary to carry out the provisions of the Illinois Environmental Protection Act, the Federal Clean Water Act or regulations promulgated under those Acts or compliance dates which have been submitted in writing by the Permittee and approved by the IEPA. Public Notice of such modifications and opportunity for public hearing will be provided consistent with the requirements of 40 CFR § 122.63.



# Attachment 3

## Ammonia Worksheet

Discharger: Urbana-Champaign (Southwest) NPDES: IL0031526 Date: 01/15/02  
 Receiving Stream (BSC rating): Copper Slough ("C")

### Conversion of un-ionized standards

un-ionized standards (mg/L Acute: 0.33 (summer) 0.14 (winter)  
 Chronic: 0.057 (summer) 0.025 (winter)

	pH and temperature values used in conversion			Equivalent total ammonia concentrations		
	pH		temp			
	50th %ile	75th %ile	75th %ile	Chronic (50th %ile)	(75th %ile)	Acute (75th %ile)
Summer	8.37	8.53	22.0	Summer 0.6	0.4	2.3
Winter	8.33	8.48	10.6	Winter 0.6	0.4	2.4

Data Source: Site-specific sampling site downstream of outfall  
 on Copper Slough from Nov. 1998 through Nov. 2001

Note: Conversion of un-ionized ammonia standards to total ammonia concentrations are based on the algorithm found at 35 IAC 302.212(c)  
 and pursuant to methodologies given in the proposed rules filed with the Secretary of State and published in the Illinois Register.

### Chronic Wasteload Allocation

$$C_e = [C_{ds}(Q_{us} + Q_e) - C_{us}Q_{us}] / Q_e$$

Effluent Flow (Q<sub>e</sub>): 7.98 MGD (DAF)  
 Upstream 7Q10: 0 cfs Source: ISWS map of the Kaskaskia Region  
 7Q10 for dilution (Q<sub>us</sub>): 0 cfs

**NO MIXING AVAILABLE DURING 7Q10 LOW-FLOW CONDITIONS**

wasteload allocation: summer 0.6 mg/L\*  
 winter 0.6 mg/L\*

\* based on median pH value, see 35 IAC 355.203

### Acute Wasteload Allocation

$$C_e = S(C_{ds} - C_{us}) + C_{us}$$

**NO MIXING AVAILABLE DURING 7Q10 LOW-FLOW CONDITIONS**

wasteload allocation: summer 2.3 mg/L  
 winter 2.4 mg/L

**WQBELs Recommended:**

<b>Daily Maximum:</b>	summer	2.3 mg/L
	winter	2.4 mg/L
<b>30-day Average:</b>		
	summer	0.6 mg/L
	winter	0.6 mg/L

**Figure 11**  
**Monthly Average (Summer) Effluent Ammonia-Nitrogen Concentrations (January 1997 - December 2001)**  
**Nitrification Towers at the Southwest Plant**  
**Urbana/Champaign Sanitary District**

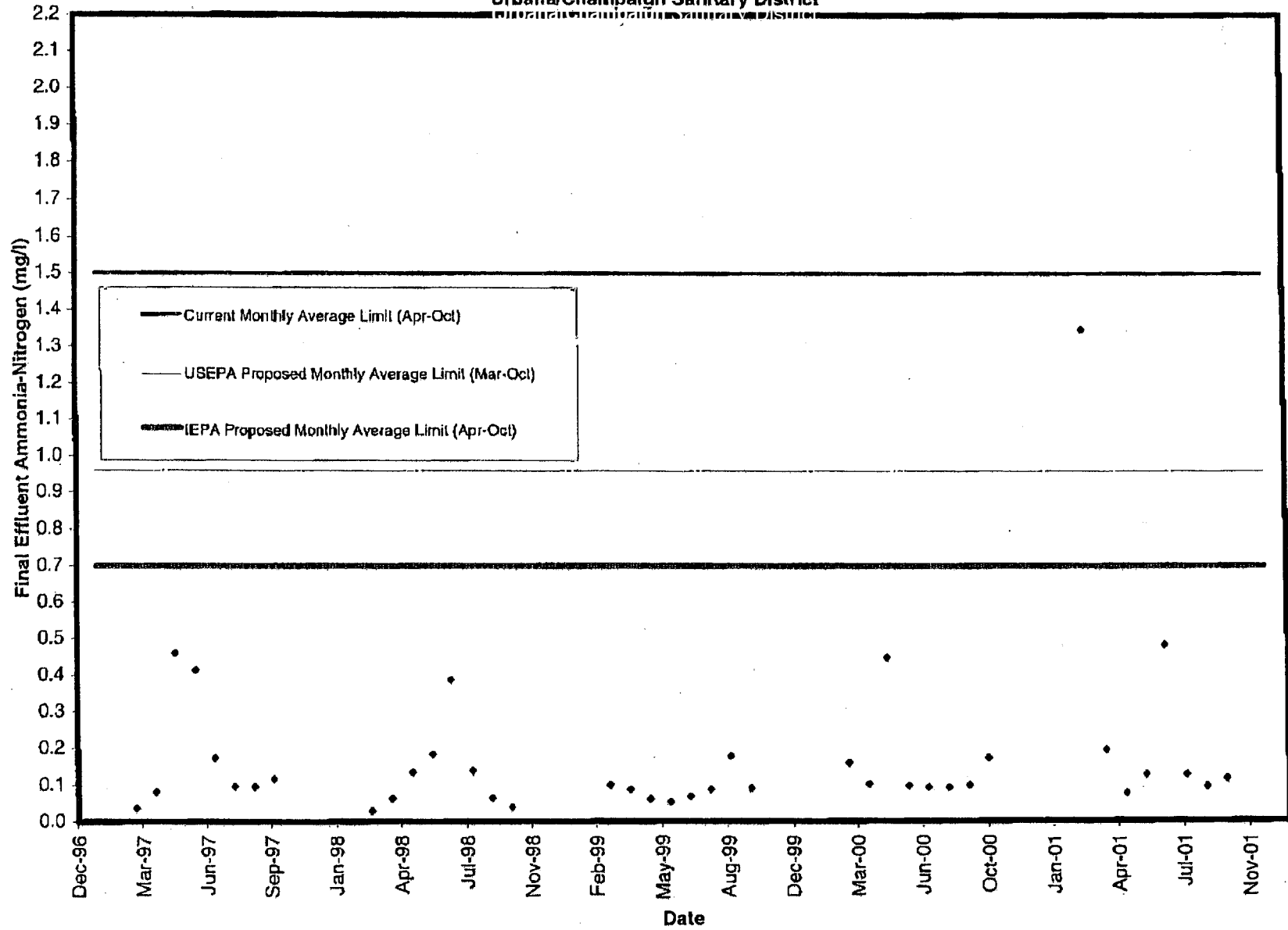


Figure 12

Monthly Average (Winter) Effluent Ammonia-Nitrogen Concentrations (January 1997 - December 2001)  
Nitrification Towers at the Southwest Plant  
Urbana/Champaign Sanitary District

