BEFORE THE POLLUTION CONTROL BOARD

In the Matter of a Petition for site-specific exception to 35 Illinois Administrative Code Section 304.122(a) concerning effluent standards for the Greater Peoria Sanitary and Sewage and Disposal District.	:	R87-21

REPORT OF PROCEEDINGS in the above entitled cause commencing at the hour of 11:00 a.m., at 2322 S. Darst Street, Peoria, Illinois, Peoria, Illinois, on the 23rd day of November, 1987.

BEFORE:

MICHELLE C. TARALLO,
Hearing Officer,

RONALD FLEMAL, PhD.,
Board Member,

PRESENT:

MARTIN CRAIG, PORTER & SCHOENBECKER,
by Richard J. Kissel, Esq.,
55 West Monroe Street,
Chicago, Illinois 60603,
and
BRAIN, JOHNSON & GARD,
by Frederick A. Johnson, Esq.,
1900 Savings Center Tower,
Peoria, Illinois 61602,
for the Greater Peoria Sanitary District;

PRESENT:

THOMAS DAVIS, ESQ.,
Illinois Environmental Protection Agency,
2200 Churchill Road,
Springfield, Illinois 62706,
for the IEPA;

MS. LINDA VOGT, and
MS. KRISTINA REICHENBACK,
Illinois Department of
Energy and Natural Resources,
325 West Adams Street, Room 300,
Springfield, Illinois 62704-2800.

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HEARING OFFICER TARALLO: I will call the hearing to order at this time.

This will be a hearing on the merits of a petition filed with the Board by the Greater Peoria Sanitary and Sewage Disposal District. The district seeks the site-specific exception to 35 Illinois Administrative Code 304.122(a) concerning effluent standards for ammonium nitrogen for this wastewater treatment plant in Peoria, Illinois.

My name is Michelle Tarallo, and I am the hearing officer here today. To my right is Dr. Flemal who's the attending Board member for the Pollution Control Board.

Just a few things to set out at the beginning of the hearing today. I would like to remind everyone that this is a regulatory proceeding and the regulatory standard of evidence applies. Therefore, all evidence will be admitted and objections will merely go to their weight. All witnesses will be sworn and subject to cross-examination. Anyone can ask a question of the witness, I would just like them to raise their hand and wait for me to acknowledge their question. Anyone can

make a statement on the record so the Board can hear what you have to say on this proposal. You should be aware that anyone who does make a statement is susceptible to questioning by anyone else in the room on that statement.

Also, the two of us up here will very likely be asking questions today. We want to make it clear that ultimately rulemaking proceedings are taken before the Board and Board members who are not present will be going through the record, and if questions are asked by me or Dr. Flemal, no matter how phrased, they are not intended to express any frequency of emotions or bias. It is our responsibility to build the most complete record that we can take back to the Board, and the questions are to simply assist in developing that record.

Are there any members of the public here?

(No response.)

HEARING OFFICER TARALLO: With those comments, Dr. Flemal.

DR. FLEMAL: I think everybody here is familiar with the Board's procedures on a regulatory matter such as we have before us today. But just on the possibility that some of you may not be fully familiar,

there is a single scheduled hearing in this matter, the one that we're holding today. Following this hearing there will be a comment period during which time anybody who wishes may augment the record with public comment. It's very possible during our proceeding today that there will be questions arise which are not answerable at the moment, but would be with some additional time. That sort of material as well could come in the record during the comment period.

The matter then passes to the Department of Energy and Natural Resources for their determination of the matter of an economic impact study on this procedure. Once their decision is made, the matter immediately, either immediately comes back to us directly or will stay in the Department for an actual undertaking of an economic impact study.

If that second course of action is followed, we will reassemble in a second hearing to consider the materials developed and presented in the economic impact study.

When all of those steps are completed, the entire Board, might be just one member of that Board, will

review the record as is developed at that stage and make our determination as to what the appropriate outcome on this matter is.

As Ms. Tarallo indicated, this is a decision which will ultimately be made by the entire Board, so we want to be assured that we develop as complete a record so that those other six Board members who are not with us today will be able to avail themselves to all of the information that they need to make the appropriate decision.

HEARING OFFICER TARALLO: Would counsel for the District please identify yourself and the persons with you.

MR. KISSEL: My name is Dick Kissel, I am an attorney with the firm of Martin, Craig, Chester and Sonnenschein in Chicago representing the District. And to my right is Rick Johnson of the firm of Swain, Johnson and Gard of Peoria. We both represent the Greater Peoria Sanitary District.

HEARING OFFICER TARALLO: For the Agency?

MR. DAVIS: My name is Tom Davis, I am an attorney for the Illinois Environmental Protection Agency.

And with me is Larry Schmitt of the Division of Water Pollution Control, Planning Section, and also James Kammueller who's the Manager of Region III, Division of Water Pollution Control, and one of his environmental specialists, Lyle Ray.

HEARING OFFICER TARALLO: DENR?

MS. VOGT: My name is Linda Vogt from the Department of Energy and Natural Resources, and with me is Christina Reichenbach.

HEARING OFFICER TARALLO: Mr. Kissel?

MR. KISSEL: I'm not really going to make an opening statement here today because I think the petition speaks for itself. Essentially you have stated it correctly, we are on behalf of the District seeking relief from the effluent standard for ammonia nitrogen. This does not, however, mean, so that the Board understands it, that we are seeking absolute relief from all ammonia nitrogen discharge. As the testimony will show, the District's effluent will be water quality limited outside the mixing zone, and so that an ammonia nitrogen still is within the minds of the people at the District.

We aren't going to turn on the pipe if this is granted and just discharge more ammonia nitrogen simply because you've granted an exception.

The the basis of the petition, simply put, is that most recent comprehensive studies done by the Illinois State Water Survey show that there is little, if any, impact as a result of the discharges of ammonia nitrogen on the Illinois River, either in the depletion of dissolved oxygen or in any kind of toxicity to aquatic life. Therefore, the expenditure of funds to continue the operation of that equipment necessary to meet the present effluent limitation is, in our opinion, economically unreasonable and infeasible.

As a part of our testimony today, or our case, if you will, we will be presenting four witnesses, and we will present them in this order. First will be Mr. James Carlisle, who's the Executive Director of the Greater Peoria Sanitary District. Second is Mr. Larry Hughes who's the Director of Waste Treatment Facilities for the Greater Peoria Sanitary District. The third witness is Ralph Evans, who's currently a private consultant but previously was the Head of the Water Quality Section of

the Illinois State Water Survey until he retired just a short time ago. And, finally, we will present Thomas Butts, who's a Research Engineer and Assistant Section Head of the Water Quality Survey -- or Water Quality Section of the Illinois State Water Survey.

Their testimony has been prepared in narrative form and essentially follows that of the petition with some exception and some expansion. They will be each asked to testify and, obviously, will be available for cross-examination.

We have asked that the court reporter mark seven exhibits which were attached to the petition that was filed by the District in this matter.

Petitioner's Exhibit 1 is really a group exhibit and contains a memorandum of February 7th, 1986 from Ralph Evans to James Carlisle, and the subject of that is the origin of Section 304.122(a) of rules and regulations governing water pollution control in Illinois. For the Board's sake, I might point out, that in the memorandum that has been attached I have corrected it, but the first sentence of that memorandum says, "Section 304.121(a)," when it should be "122(a)," a typographical

error. The second part of the second document in Petitioner's group Exhibit No. 1 is the November 11th, 1971 opinion of the Illinois Pollution Control Board in the matter of effluent criteria water quality standards and water quality standards revisions for interstate waters, R70-8, R71-14 and R71-20. The third is a letter -- two letters, actually, a letter of May 5th, 1972 from Mr. Jacob Dumelle, Board Member of the Illinois Pollution Control Board to Ralph Evans, and a letter of May 16th, 1972, a letter from Mr. Evans to Mr. Dumelle responding to the May 5th letter.

The second exhibit, Petitioner's Exhibit No. 2, is a study dated 1970 which is entitled "Dissolved Oxygen Resources and Waste Assimilative Capacity of the LaGrange Pool, Illinois River," by T.A. Butts, D.H. Schnepper and R.L. Evans. It is a study done by the Illinois State Water Survey.

Petitioner's Exhibit No. 3 is also a State Water Survey Study dated 1975 which is entitled "Water Quality Features of the Upper Illinois Waterway," and it is done by, or signatured by Thomas A. Butts, Ralph Evans and Shundar Lin.

Petitioner's Exhibit No. 4 is also a State Water Survey study entitled "Water Quality Assessment and Waste Assimilative Analysis of the LaGrange Pool, Illinois River" dated June 1981 and authored by Thomas Butts, Donald Roseboom, Thomas Hill, Shundar Lin, Davis Beuscher, Richard Twait and Ralph Evans.

Petitioner's Exhibit No. 5 is, again, a State Water Survey study entitled "The Impact of Greater Peoria Sanitary District Ammonia Discharges on Illinois River Water Quality" dated November 1985, by Thomas A. Butts, Dana B. Shackleford, Thomas E. Hill and Ralph Evans.

Exhibit No. 6, Petitioner's Exhibit No. 6, is another State Water Survey study entitled "The Impact of Greater Peoria Sanitary District Ammonia Discharges on Illinois River Water Quality, Part II" dated November 1986, by Thomas A. Butts and Dana B. Shackleford.

Petitioner's Exhibit No. 7 is a letter dated December 5th, 1986 from Toby Frevert, Manager, Planning Section, Division of Water Pollution Control to Mr. James Carlisle concerning the approval of the mixing zone for the Greater Peoria Sanitary District.

I've discussed these matters with Mr. Davis of

the Illinois EPA, and I believe that he is in agreement that these can be admitted into the record as evidence without objection -- without foundation, let's put it that way.

MR. DAVIS: That's correct.

HEARING OFFICER TARALLO: Those are admitted.

(Whereupon Petitioner's Exhibit Nos. 1 - 7 were admitted in evidence.)

MR. KISSEL: Thank you. With that, we are prepared to begin, unless the Agency has an opening statement.

MR. DAVIS: I have a few comments.

Once again, my name is Tom Davis and I'll be speaking primarily for the Agency, although I'm sure the other three people in our contingent will have some questions that they may be voicing later. And, also, two of them, Mr. Kammueller and Mr. Ray, will be providing testimony.

Essentially, the Agency is opposing this proposal for site-specific relief. We believe that Section 304.122 is an important part of the Illinois

regulatory scheme, but it does impose relatively stringent limits on the discharge of ammonia nitrogen.

The proposal was given to USEPA Region 5 by the Planning Section back in July of this year for their review. They were recently contacted, and the person that we spoke with indicated that a written comment would be submitted and we would ask leave at this time of the Board to provide that document at some later date. Knowing the USEPA, it may not be within a week or so, it maybe sometime later. But we do have an indication that they are concerned, as we are, with the applicability of the so-called anti-backsliding provisions. As we all know, these were recently, through the 1987 amendments, put into the so-called Clean Water Act, Section 402.0. We believe that this provision would have some application to the request of the District but, of course, we don't have anything to provide in writing at this time so we would simply request leave to file that later.

I believe the primary point that we would make in our opposition to the District's request is to emphasize that the District is doing an excellent job of ammonia reduction. They are doing so with the results of

proceeds, if you will, of a substantial state grant of which there will be testimony presented by the District's witnesses. This was a substantial amount of money provided back in the '70s in response to the newly promulgated regulations. Some $4.7 million, if I'm not mistaken, was allocated simply for the so-called RBC units to provide ammonia reduction and, as the testimony will show, the ammonia reduction provided by this equipment has been substantial. So we believe that as a practical matter that there is a compelling interest to see that this reduction continue.

Now, the testimony I'm sure will also show that the District has an impact on the water quality of the Illinois River. The perspectives of the various parties here, including the District and the Agency, may be somewhat diametrically opposed, but we all agree that the approximately 24 million gallons a day that the District discharges has a substantial affect on the Illinois River.

The evidence that will be presented basically by the Agency will show that the treatment efficiency of the District is quite good, as I mentioned. There will also be other evidence showing the water quality impacts

and I don't believe it's necessary to get into that at this time.

So to summarize, our concern here is very real and direct. We have been pleased with the District's performance and we, by opposing this relief, would essentially want to see that that performance continue as is. Thank you.

HEARING OFFICER TARALLO: Go ahead.

MR. KISSEL: Do you want to swear our four witnesses at the same time?

HEARING OFFICER TARALLO: Sure.

JAMES H. CARLISLE,

a witness called by the Petitioner, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KISSEL:

Q Would you identify yourself for the record, please.

A James H. Carlisle, Executive Director of the Greater Peoria Sanitary District.

Q Mr. Carlisle, did you prepare a statement for today's hearing?

A Yes, I did.

Q Is that what you have in front of you there?

A It is.

Q And is it true and correct to the best of your knowledge and belief?

A It is.

Q Thank you. Proceed.

A My name is Jim Carlisle, Executive Director of the Greater Peoria Sanitary District. I have been employed by the District since April 1965, and for the first year I was the principal assistant to my predecessor, Mr. Lee Kraus. In May 1966 I was privileged to be appointed Executive Director. Prior to that time, my experience included the design and construction of waste treatment and collection systems and water treatment and distribution systems with a Michigan consulting firm; service as the City Engineer and Director of Public Works in Marysville and Pontiac, Michigan; Assistant Director of Technical Services for the American Public Works Association. I am a registered professional engineer in the States of Michigan and Illinois.

The majority of my contribution is already

provided in the petition, and more particularly in Section 36. There are, however, some additional thoughts which I would like to present at this time for the record and your consideration.

The Greater Peoria Sanitary District was organized in June 1927 in accordance with the provisions of the Sanitary District Act of 1917. The original treatment facility together with the Peoria Interceptor were made operational in 1930. The plant was one of the earliest to utilize the activated sludge process. Over the years, the treatment facility was modified and up-graded for comparatively modest costs. This was due in large measure to research by District personnel that was designed to modify the plant to more efficiently treat the specific types of industrial wastes being generated. These wastes were predominantly from distillery sources.

Also, since 1930, there was a substantial growth in the Peoria area which resulted in an increased service area, 58.4 square miles, and population, 135,000, plus or minus, and a collection system of 571 miles. Of the current 571 miles of collection system, the GPSD has operating and maintenance responsibilities for 345 miles,

or 60 percent of the total, with the balance vested with the City of Peoria, 202 miles; the Village of Peoria Heights, 17 miles; and the Village of Bartonville, 7 miles. This increased operation and maintenance responsibility necessitated the implementation of an ongoing preventative sewer maintenance program that is fully staffed and equipped to respond to any problems or emergency that can occur in the District's collection system.

With passage of the Illinois Environmental Protection Act, the formation of the Illinois Pollution Control Board and subsequent hearings on proposed rules and regulations, it was soon apparent to the District that the treatment facility would be incapable of providing the degree of treatment needed for compliance. In 1970, the District's consultants were authorized to study the District's needs, and in 1972 they were authorized to begin the necessary designs, plans and specifications. In March 1975 this readiness to proceed was most instrumental in leading to a State of Illinois grant for a series of projects at a total cost of approximately $48,500,000. Construction was phased over a period of 1975 through

1982. A proposed disinfection improvement was delayed pending resolution of the proposed disinfection regulations. This project is currently under construction. It is noted that one of the projects involved the installation of rotating biological contactors for the reduction of ammonia nitrogen. These units are briefly discussed in Section 36 of the petition.

With completion of major elements of our grant construction program and placing all units on-line, there has been a substantial improvement in the quality of treatment and the effluent discharged to the Illinois River. In many respects, it has exceeded our expectations. For example, BOD and suspended solids concentrations of four to five milligrams per liter are not unusual, and ammonia nitrogen concentrations of less than one milligram per liter are not uncommon. There has been, however, a price to pay for excellent quality effluent. Our operation and maintenance costs have more than doubled since 1977. Also, the District's total annual budget has increased from $1,900,000 to approximately $5,500,000.

As a condition to our grant, the District was

committed to the development and implementation of a user charge for the control of operations, maintenance and replacements. Therefore, the District is currently levying annual charges in the amount of $1,200,000 for replacement of plant facilities. Of this amount, approximately $192,000 per year is for the replacement requirements for the RBC units discussed in Section 36. This amount is in addition to the operation and maintenance cost of $81,960 per year. Therefore, the total cost of the RBCs is nearly $274,000 per year.

We have, therefore, concluded that continued use of the District's nitrification units is unjustified and unnecessary and the overall savings, including the power savings cited in Section 36(d), is approximately $474,000. This amount would offset a considerable portion of the anticipated increase to the District for the envisioned, expanded newer system noted in Section 36(e) of the petition. Thank you.

Q Mr. Carlisle, in your statement you testified that you were familiar, you testified about Section 36 of the petition which had been filed in this matter. Are you familiar with the facts that are contained in Section 36?

A Yes, I am.

Q Are those facts true and correct to the best of your knowledge?

A They are correct to the best of my knowledge.

MR. KISSEL: Thank you, that's all I have.

HEARING OFFICER TARALLO: Do you have any questions?

MR. DAVIS: Yes, I have a few.

CROSS EXAMINATION OF JAMES CARLISLE

BY MR. DAVIS:

Q Mr. Carlisle, in my opening comments I mentioned a figure of approximately $4.7 million grant for the original construction attributable to the RBCs, is that correct, approximately?

A That's the best number I can come up with based on the information I have at hand, yes. That was only for the RBC and the trnkage.

Q And, as you just testified, the total project back in the mid-70s was approximately $4.5 million -- I'm sorry, 46 and a half?

A I said a total amount of the grant eligible cost was 46 and a half million.

Q I'm not used to dealing with such big figures.

A I'm not either.

Q But for purposes of clarity or emphasis, would you agree that the $4.7 million for the RBCs would be not quite 10 percent of the total project cost?

A Yes.

Q Sir, you've also alluded to the user charge system now in effect. Could you describe that a little better for us.

A In what way? What are you particularly interested in?

Q Is there a distinction made between residential and industrial users?

A Yes, there is.

Q What's the typical residential charge?

A Typical residential charge right now would average about $47 a year to $50 a year, right in there.

Q That's for the normal hypothetical family of 2.5, or whatever?

A That's what we consider the average that we have for whatever might be out there. That's about what the average is.

Q What about the industrial part of it?

A Industrial can be almost anything, it certainly, everything we do here is equated on the basis of what they discharge to, and not only volume-wise but actually strength-wise for BOD suspended solids and ammonia nitrogen. We are able to separate those costs in our accounting system and come up with unit cost for each one of those parameters; therefore, each industry is charged accordingly.

Q I think we are all aware of the difficulties Peoria has had recently with its economy, can you give us any of your perspective on the impact that has had on the industrial part of the user charge system?

A I think, in my opinion, the impact that it's had has been sizable. I think over the years we have lost some of the largest industry and District users and have never replaced them. We lose an organization say like Pabst Brewing Company, we've lost Celotex, Hirum Walker, that loss has not been made up for anything that we may have gained. Even the addition of ADM has not approached anywhere near what we had before.

So there has been a sizable impact, and the

thing is that our costs, even though we've lost the industry, our costs necessarily have not been reduced proportionately. So all we, in effect, have done is to shift, I'll say, costs that we've had essentially to the remaining users.

Q Has there been, for instance, any attempt to give a potential industrial user a bargain to come into the area, a discount on rates and so forth?

A No, no. That would be, I think, a violation of our commitment to the user charge.

Q In the petition, specifically on page 19 --

A May I get my copy of it, I didn't bring it. Page what?

Q 19, sir.

A Okay.

Q There is some discussion of additional projects or responsibilities that the District is undertaking, for instance -- well, just for an example, the Charter Oaks.

A Yes.

Q And there is an indication that the District will be essentially doubling its O and M, operation and maintenance costs?

A Yes.

Q In your testimony this morning you've indicated that the District's total annual budget is now approximately five and a half million dollars?

A Yes.

Q So I would assume that the $1.2 million O and M part of the budget is rather dwarfed by other costs?

A Well, of course, to tell you the truth, that's not in the five and a half million.

Q The 1.2?

A These numbers, what I've tried to show here is that our current, for example, for the sewer system is 652,000 plus. I'm showing that if and when the Sanitary District took over the responsibility for the facilities that are indicated on page 19, the best esti[illegible]e we had is that that would add $560,800 a year.

Q So you have, the District has not yet undertaken these five listed projects?

A No. I'll say they are kind of sitting there on the books waiting for certain things to transpire.

Q As you mentioned, the $5.5 million total annual budget --

A Does not include that.

Q -- would not include that?

A The only thing it includes is that 652,500 current.

Q So the present total budget, only a relatively small amount is devoted to O and M, 652,000?

A You see, that's for District system, that does not include the treatment plant. I'm talking about sewer facilities here, sewer systems, for which we currently have no operating and maintenance responsibility but we are going to have in the comparatively near future.

Q Can you give us a breakdown on the treatment plant budget?

A Treatment plant budget itself is probably over two million eight of that five and a half million. Now that's for O and M.

Q Right, right. That's what I'm trying to narrow down.

A If you add the replacement in there, why it's considerably more.

Q In fact, you've mentioned that the District is currently levying annual charges in the amount of $1.2

million for replacement of plant facilities?

A Yes.

Q So O and M plus replacement --

A Say two and a half -- let me put it this way, if you have two and a half million for the plant, that's our total O and M for the plant, plus the million two, which essentially is plant related, you're talking about three million seven out of five and a half million. The next largest item is our sewer system.

Q So focusing only on the treatment plant O and M and replacement costs, that's $3.7 million?

A Yes.

Q You've testified that the total cost of the RBCs is nearly $274,000 per year?

A That's O and M plus the replacement of the RBCs.

Q Right, okay. So, obviously, I'm not a human calculator, but the percentage of the costs, O and M and replacement attributable to the RBCs is somewhere between 5 to 10 percent of the treatment plant?

A I'll take your word for it, but I look at total dollars. In my opinion, 274,000 a year is pretty good

piece of money whether it's one percent, two percent or three percent.

MR. DAVIS: I don't think I have any other questions.

HEARING OFFICER TARALLO: Do you have any questions?

DR. FLEMAL: No.

MR. DAVIS: But the other Agency personnel may have.

CROSS EXAMINATION OF JAMES CARLISLE

BY MR. LARRY SCHMITT:

Q Sticking with the budget figures, the additional O and M that you expect to be responsible for when you take on these additional sewer systems, essentially, do you expect that that will be compensated for in any way by additional user charges?

A Certainly.

Q So these are people who are currently --

A Certainly.

Q -- possibly paying maintenance costs to other entities for these sewers?

A Certainly, yes.

Q But you have no idea how much of that?

A I could not tell you at this time how much that would be.

Q The total figure that you cite including this 474,000 figure on page three of your testimony, the bottom paragraph.

A Yes.

Q Can you -- as I understand it, that includes the, you reference Section 36(d) of your, of the petition?

A Yes.

Q Can you explain to us a little bit --

A How I got the 474?

Q Yes. And what the relationship is between the 80,000 figure and the $200,000.

A Well, our average costs for, the operation and maintenance costs are something 80,000, I think number 81,960 a year, that's what they've been averaging. If you add to that the replacement we're talking about a total of 274.

What I was talking about in this particular item here, in (d), is that we had a project that we just recently completed that is going to result in an

additional savings to the District of $200,000 a year in electrical power costs. I was merely trying to show that we're not standing still, we are tying to save money wherever we possibly can around here to reduce our costs and thereby hopefully reduce our user charges to the people of the area.

So the difference between the 274 and the 374 is the $200,000 in additional power savings that we're realizing at the present time.

Q Does the operation of the RBCs in any way impact your ability to collect that $200,000 in savings essentially?

A We'll realize some savings there, but the thing is that since 60 percent of our current O and M on our RBCs is electrical power, if you're not using electrical power, why that's a pretty good savings, not only in not having to purchase power but not even having to generate it for that purpose.

Q So there may be some interaction between power usage in your plant, but I'm just trying to keep these two figures separate if, indeed, that is possible. Whatever you don't use to operate the RBCs then you are saying you

would use to operate other facilities?

A We are still going to realize, even with this electrical power savings job that we have, we are still going to realize a substantial savings regardless of how it comes out.

Q So if, for example, the relief were denied you would still be able to save approximately $200,000 in purchased power?

A Well, that all depends on whether or not we are still operating the RBCs. If we weren't doing those, I think the savings probably would be, might be less.

Q So you think if you have to operate the RBCs you would still --

A I'm talking about a savings of 200,000 doing exactly what we're doing now.

Q Okay. So if you turn off the RBCs then you save 200,000 instead of 200,000?

A Right.

Q That's fine.

MR. KAMMUELLER: I did have a couple questions.

CROSS EXAMINATION OF JAMES CARLISLE

BY MR. KAMHUELLER:

Q Mr. Carlisle, the $200,000 figure you just gave us, that's not power consumed by the RBC process, is it?

A It's power consumed plantwide.

Q How much of that is consumed by the RBC process?

A Well, what's 80 percent of 80,000? It's $70,000, 74, $75,000. That's what electrical power costs on those a year.

MR. DAVIS: I don't believe the Agency has any other questions.

HEARING OFFICER TARALLO: Anyone else have any questions? Yes.

MS. VOGT: Linda Vogt, Department of Energy and Natural Resources.

HEARING OFFICER TARALLO: Could you speak up, please.

CROSS EXAMINATION OF JAMES CARLISLE

BY MS. VOGT:

Q You stated earlier that the cost per residential household was $47 a month, is that correct?

A A year.

Q I'm sorry, a year. Is that just for sewage cost or is that for water and sewage combined?

A That's everything. That's sewer system, plant, whatever. It averages about $47 a year.

Q That's for sewage treatment?

A To a single-family residential user.

Q That's for sewage treatment?

A Sewage treatment and sewer collection.

Q Okay. How many households do you serve?

A I'd have to get the numbers out, but it's somewhere in the neighborhood of 40,000.

Q So then would it be correct to say if one just averaged this $81,000 O and M cost over 40,000 --

A You are averaging over more than that.

Q I'm trying to get your cost per user of $81,000. What would that amount to per household?

A I haven't figured that. It takes awhile to do that.

Q How would you figure that?

A Well, you have to build it into the total and figure out exactly how much of that is residential, how

much is applicable to industrial.

Q So you are saying that you can't really come up with a figure?

A Not sitting here today, no, I could not. There would be some savings, some savings. It might be modest, I don't know.

Q I also wanted to ask you, you testified I think it's about $73,000 of the O and M is due to energy costs?

A I said, I think my statement is that about 80 to 85 percent of the RBC operation and maintenance cost is for electrical power. Talking about $75,000 a year, right in there, 70 to $75,000 a year.

Q I don't understand the operations of the biological contactors, could you tell me, is the energy used to rotate them, is that specifically what it's used for?

A That's exactly right.

Q It's not a pumping system?

A You have a media on a shaft, and that shaft is turning into waste. They are continuously turning. Of course, the electrical motors on the end of those that make them turn, they are utilizing electrical power.

Q Have you investigated more efficient motors or other means of generating power on-site or anything?

A Why? We put in, the installation that we had was what was available on the market at the time we did it. Probably to make any kind of a change at this stage of the game would not be economically justified.

Q Are you saying that you haven't really looked into it?

A We've talked about I think bearings, air drives and things like that. But I think the thing is in our situation right now with what we have it would not be cost effective for us to go to another type of drive system.

Q And you've looked into that, you've studied that?

A I think we have looked into this, yes.

Q I also wanted to ask you, are you planning a rate increase? You say you are taking on a number of new responsibilities.

A Not at this time. It all depends on how it shakes out. We haven't done that yet. We're looking down the road here a little bit. Whether or not there is a rate increase is dependent, again, upon the number of

users that we pick up.

MS. VOGT: That's all the questions I have.

HEARING OFFICER TARALLO: Anyone else with any questions?

MR. KISSEL: I have just a clarifying question just to make sure the Board understands.

REDIRECT EXAMINATION OF JAMES CARLISLE

BY MR. KISSEL:

Q Mr. Carlisle, the fact is that, as I understand your statement, that if the rotating biological contactors were not operated you would not have to accrue $190,000 per year, nor would you have operation/maintenance cost of $81,960, is that right?

A That's right.

HEARING OFFICER TARALLO: Okay.

LARRY N. HUGHES,

a witness called by the Petitioner, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KISSEL:

Q Would you identify yourself, please.

A Larry N. Hughes, Director of Waste Treatment of

the Greater Peoria Sanitary District.

Q Larry, would you give the Board a brief background of your educational experience, please.

A I have a Bachelor of Science in Civil Engineering Degree from Bradley University. Master of Science in Public Health Engineering from the University of Hawaii. I'm a registered professional engineer in Illinois and in Florida. I am a diplomat of the American Academy of Environmental Engineers, board certified in the specialty of field of Water and Wastewater. I'm a Certified Class I Operator by the Illinois Environmental Protection Agency.

Q And can you give us a brief description of your business and professional experience in this area?

A I've been with the Peoria Sanitary District since July of 1967. I've been Director of Waste Treatment Facilities since May 1st, 1970.

Q Would you give us just an idea of what your job entails with the Sanitary District?

A As Director of Waste Treatment Facilities I am responsible for all treatment plant activities, all laboratory activities and all industrial surveillance

activities.

Q When did you graduate from college and when did you get your master's degree?

A My bachelor's degree was 1964. My master's was 1967.

Q Did you prepare a statement for today?

A Yes, sir, I did.

Q Do you have that with you now?

A Yes, sir, I do.

Q Is the statement true and correct to the best of your knowledge and belief?

A Yes, it is.

Q Thank you. Proceed.

A The District's wastewater treatment plant is a 37 mgd, design average flow, activated sludge plant capable of giving complete treatment to a maximum of 60 mgd and primary treatment followed by chlorination to an additional 94 mgd. It is designed to treat an average daily loading of 120,000 pounds of BOD and 132,000 pounds of suspended solids. The District's NPDES Permit Number IL0021288 sets monthly average BOD limits at 50 milligrams per liter, the suspended solids limit at 25 milligrams per

liter, the April through October ammonia nitrogen, NH3-N, limit at 2.5 milligrams per liter, and the November through March ammonia nitrogen limit at 4.0 milligrams per liter.

For more than 15 years, the District has been actively involved with upgrading its plant to be able to meet these standards. While the plant is currently having no problem meeting any of these limits, the plant is very underloaded at this time because of depressed economic conditions in the Peoria area. However, based upon past experience when the plant has been more fully loaded meeting the ammonia nitrogen limits of 2.5 milligrams per liter and 4.0 milligrams per liter may be a problem as the plant's loadings increase in the future.

The District is capable of removing ammonia nitrogen at essentially two principal areas of the plant. The first area is through secondary treatment. This system is the heart of this treatment plant and is capable, under current conditions, of providing an effluent meeting all current standards without additional treatment. To accomplish this, the 12 original 1930 aeration tanks have been modified such that eight of these

tanks are always functioning as contact aeration tanks. The remaining four tanks can either all be used as contact aeration tanks or reaeration tanks. Under current conditions, two of these tanks are normally used as contact aeration tanks and two are used as reaeration tanks. Into the two, or four, reaeration tanks is pumped a major portion of both the plant's return activated sludge and the plant's anaerobically digested sludge. This latter operation is known as the Kraus process and is used to add nutrients, including high concentrations of ammonia nitrogen, and inert solids to the District's normally light and difficult to settle activated sludge. The process is named after the District's former District Manager, Leon Kraus, who developed the process at the District's plant as a method of effectively dealing with the District's high carbohydrate, low nutrient incoming wastestream.

At one time the plant received wastewater from such industries as Pabst Brewing Company, three plants were located within the District, Hiram Walker and Sons, Incorporated, Commercial Solvents, Incorporate, and other high carbohydrate industries as well. Today they are all

gone, but one giant distillery has moved into the District with the potential to surpass by far the combined carbohydrate loadings of the District's former high carbohydrate industries. This industry is Archer Daniels Midland, ADM. As a result of this industry's high carbohydrate load, it is essential that large amounts of digested sludge, currently at approximately 150,000 gallons per day, containing approximately 500 milligrams per liter of ammonia nitrogen be pumped directly into the plant's aeration system and then, by gravity, directed through the plant's contact aeration system. This is an important point because this sidestream ammonia nitrogen, as it's called, flow can place 500 to 1,000 pounds or more of additional ammonia nitrogen into the plant's aeration system, which must be treated along with the ammonia nitrogen present in the plant's raw sewage. Currently this system is at the absolute optimum point of balanced equilibrium and is doing a fine job as a result. However, as the carbohydrate load from ADM increases, as it is scheduled to do by next spring, more and more digested sludge will be required to maintain this equilibrium. At the same time that the additional ammonia nitrogen is

being introduced from the additional digested sludge, more of the activated sludge's aeration capacity will be utilized for removal of BOD from the incoming high carbohydrate industrial waste. Thus, while doing everything possible to remove BOD, the plant's secondary treatment system will, in all likelihood, lose ground in its effort to remove ammonia nitrogen.

The District's aeration system is one of the most powerful to be found in any activated sludge plant of its size. With 40-horsepower submerged turbine aerators, 40-40/60 horsepower positive displacement blowers, a sparged air system at the head end of each contact aeration tank, three 800-horsepower centrifugal blowers, and six rows of one-foot square fine bubble diffuser plates at the bottom and along the full 189-foot length of each of the eight contact aeration tanks and additional diffuser plates and sparged air lines in the reaeration tanks as well, the plant's aeration system is capable of remarkable feats of wastewater treatment. However, all of this notwithstanding, I believe as our high carbohydrate industrial loads increase we may reach a point where our secondary effluent ammonia nitrogen levels will

deteriorate dramatically. When or if this happens, even the next stage of the District's treatment process may not be enough to reduce the ammonia nitrogen levels to current NPDES permitted levels.

The next and final stage of treatment for ammonia nitrogen is the plant's rotating biological contactor, RBC, system. This system was placed in service during October 1979 and was designed specifically to remove ammonia nitrogen with some BOD and suspended solids polishing. It initially consisted of 84 RBCs, 12 nitrification tanks and two tertiary clarifiers. Within the past two years, two of the RBC shafts have failed, leaving the system with 82 operational RBCs at this time. The system was intended to reduce secondary effluent ammonia nitrogen concentrations from an annual average of six milligrams per liter, which is 1,850 pounds per day at 37 mgd, and a daily maximum of 12 milligrams per liter, which is 3,730 pounds per day at 37 milligrams per liter, to 2.5 milligrams per liter from, and here I'd like you to note that my written testimony says "May," that should be "April," through October, and 4 milligrams per liter from November through, and, again, my written testimony says

"April," that should be "March."

After more than eight years of experience with these units I can testify to the fact that they do remove substantial quantities of ammonia nitrogen and BOD. However, if the incoming ammonia nitrogen is much above six milligrams per liter the units may or may not be able to reduce the level enough to meet NPDES permit conditions. They are not consistent in their ability to remove ammonia nitrogen. Factors such as air temperture, water temperture, BOD loading, abruptness of change of the ammonia loadings, the thickness of the RBC biomass, the character of the RBC biomass, that is nitrifying versus carbonaceous growth, the RBC influent flowrate, and even the abundance of pouch snails all affect the ability of the RBCs to remove ammonia nitrogen. Unfortunately, about the only one of these factors the District can regulate is the flowrate. In other words, once the flow enters the RBCs, there is not much to be done from an operational standpoint. The ammonia nitrogen is either adequately removed or it isn't. Sometimes it isn't. Mother nature is essentially responsible for the effectiveness of the RBCs, not the treatment plant operator. This is fine when

conditions are favorable, but when they are not, an NPDES permit ammonia nitrogen violation is very possible through no fault of the operator. This can be a very frustrating situation for the District when it happens, and it has happened and it will happen more frequently as the plant's influent loading increases. Writing letters of noncompliance to USEPA and IEPA because of unavoidable ammonia nitrogen standards violations is both time consuming and frustrating. It is also hazardous to one's professional career, and by that statement I'm referring specifically to the provisions of public law 92.500, the various penalties including imprisonment provided therein.

An RBC is essentially a large horizontal cylinder slowly rotating approximately 1/3 to 1/2 submerged in a tank of wastewater. The cylinder is comprised of a series of hollow plates, or discs, positioned next to one another along the full length of the shaft and perpendicular to the axis of the shaft. The District's units are each approximately 25 feet long and 11 feet in diameter. We have seven of these units arranged in series in each of the 12 nitrification tanks which are then arranged in parallel. The shafts rotate

countercurrent to the incoming flow, alternately exposing the surface area of the hollow discs to wastewater and to air above the tanks. In so doing, a culture of micro and macro-organisms develops on the discs which corresponds to the type of waste passing through the tanks. In other words, if a high BOD waste is being treated, a thick, almost hairy appearing growth, will be established to remove BOD. If a low BOD waste containing ammonia nitrogen is passing through the tanks, a very thin, tight, golden brown growth will develop, which will nitrify the ammonia nitrogen converting a portion of the ammonia nitrogen, NH3-N, to nitrate nitrogen, NO3-N. When the BOD is fairly high, there will be little or no nitrification taking place in the nitrification tanks. Likewise, when a good nitrifying culture, or biomass, has been established, very little BOD will be removed. When conditions change during the course of a day or two from a low ammonia to a high ammonia waste, or from a low BOD to a high BOD waste, the RBCs will struggle with the waste until the appropriate amount of the correct kind of biomass has been developed to adequately treat the new concentrations of BOD or ammonia nitrogen. During the interim period, the

RBCs will discharge higher levels of BOD and/or NH3-N than are usually discharged. Again, the RBCs create short term compliance problems because the operator does not have the ability to rapidly change the character or volume of the biomass. I'd like to say that in comparison to our "hot rod" activated sludge system over which we have a tremendous amount of control, our RBC system doesn't even have an "accelerator." That is not to say that our RBCs don't do a good job removing BOD and ammonia nitrogen, they normally do a very acceptable job. They just don't have the ability to produce more when more is immediately needed from them. To meet NPDES permit conditions at all times these units need the accelerator they do not have nor will they ever have. Stated differently, they are reasonably effective units but are not totally dependable for meeting NPDES permit requirements under rapidly changing conditions.

After eight years of operating experience with these units, we are pleased that we still have 62 out of the 64 units in service. Other RBC installations around the country have not been so fortunate. Numerous horror stories about shaft, bearing and media failures at other

plants make us sometimes wonder if we are next on the trouble list. Having had two shaft failures and several shaft bearing failures within the past two years does not ease this apprehension. The units supposedly have a useful life of 20 years. At this point we have thus used 8/20 of their lives. While we have had very few maintenance problems with these units during the past eight years, the problems we have had seems to be increasing in both frequency and severity. As the units come closer to their anticipated life of 20 years, I believe we can correctly assume we will have more and more shaft bearing and media failures.

If we continue to have to meet NPDES effluent ammonia nitrogen limits, at some point we will have to start replacing the units which fail or else not meet our permit conditions. While it might seem reasonable to maintain the system such that we always have 84 units in top operating condition, from a practical point of view this is not necessarily prudent. To replace all units that fail with new units would very likely mean that we would forever be operating an RBC system at our plant. For example, each new unit which is purchased

theoretically adds another 20 years of life to that portion of the system. To continue to replace the units which fail with new ones virtually forces the District to operate the RBC system in perpetuity. The cost of replacing 84 units is also overwhelming. I am not yet convinced that such an expenditure is justified. In the first place, from a purely technical point of view, data exists which irrefutably establishes that the District does not need to nitrify its effluent to its current level of treatment to maintain Illinois River water quality standards anyway. In the second place, even if we were required to nitrify from now until forever, I'm not at all certain that the District will want to be using and relying upon RBCs 12 years or more from now. I believe that point is easily overlooked. With an activated sludge system, if the technology changes, a different style blower can be added or the entire system can be readily modified and reduced in some manner. Keeping an RBC system fully operational at all times means ultimately replacing every RBC in the system at a cost, in our case, of 50 to $100,000, which that $100,000 is undoubtedly a future cost, for each of the 84 shafts and then being

essentially locked-in to using that system forever. One does not simply junk 5 to $10 million worth of fully operational equipment, even though a better method may be available.

I honestly believe that the answer is for the Pollution Control Board to either eliminate the requirement that the District meet any effluent ammonia nitrogen standard or else agree to the proposed regulation changes. Let us use the RBC system as we see fit and then let the system die a natural death. During the period between today and when the system is no longer effective in removing BOD or ammonia nitrogen, the system could be used as we deem appropriate. We might go for one year and not use it and then use it for six months or more to help polish our BOD and suspended solids. This cycle could be repeated year after year. In this manner, we might still be productively using the system 20 or more years from now. But to hold the District to a standard that has been scientifically proven to be unwarranted for the District and to lock the District into using equipment which will have to be maintained and ultimately replaced at great expense to meet this standard, I believe is very wrong. I

also believe that it is significant that as a result of the many negative experiences RBC owners and operators have had throughout our country, our own Illinois Environmental Protection Agency is currently refusing to approve any new RBC installations in Illinois.

I recently asked the chairman of IEPA's Division of Water Pollution Control Design Standards Committee the following question, "If the plans for our RBC facility were to be submitted to the IEPA for review and approval today, would they be approved?" The answer was an emphatic, "No, they would not." He went on to say that the poor experience record of such installations has been responsible for IEPA's negative position. That statement probably says more than anything else I might say in today's testimony regarding the future of RBC installations in Illinois.

Before leaving this subject I'll mention one other portion of our plant which affects our effluent ammonia nitrogen concentration. That is what we call "the pond." The pond is actually two large BOD and suspended solids polishing basins located immediately downstream of the plant's two tertiary clarifiers. These two ponds,

combined, hold a total volume of more than 27 million gallons of tertiary effluent and have a combined detention time of more than 13 hours at 37 million gallons per day. Through a very basic unenhanced solids settling they consistently remove sizable quantities of the BOD and suspended solids remaining after passing through the nitrification system just described. Thus far this year, and these statistics are at the time I wrote this which was about a week and a half ago, these ponds have removed 49.3 percent of the incoming BOD, and 29.5 percent of the suspended solids. Last year 41.8 percent and 47.4 percent of the incoming BOD and suspended solids, respectively, were removed. These ponds are extremely effective, easy to operate and have virtually no operation and maintenance costs associated with them. They do have a price though, and that price is that they add ammonia nitrogen to the plant's effluent. The same solids that are removed by the ponds remain in the ponds to slowly decompose or digest at the bottom of the basins. This reduces the volume of the sludge in the ponds but also, as the organic nitrogen and the sludge breaks down, ammonia nitrogen is released into the ponds effluent. During the summer the generation of

ammonia nitrogen normally becomes such a problem that the ponds frequently have to be taken out of service until the water cools and the rate of sludge decomposition slows. Thus, because of the need to meet the current summer ammonia nitrogen standards, we are forced to remove one of our plant's most basic economical and effective BOD and suspended solids treatment systems from service. Stated bluntly, we deliberately discharge higher levels of BOD and suspended solids to the river than we normally would just to be able to not violate our NPDES permit effluent ammonia standard. I have to ask the Board which makes more sense, keeping our BOD and suspended solids levels as low as they possibly can be, or essentially treating to meet an ammonia nitrogen standard that has been shown to be unwarranted at the expense of BOD and suspended solids removals?

In concluding this section on our current wastewater treatment facilities, I'll make one final statement. It is the District's intent if the Board accepts our requested ammonia nitrogen regulation change, to operate as much of our existing equipment as is needed to maximize the effectiveness of our plant's operation.

The only major change is that we would not be operating our plant specifically for the meeting of the current ammonia nitrogen effluent standards, which is certainly the current situation. If we need the RBCs to achieve BOD and suspended solids compliance, they will be used. Likewise, we will continue to use the two tertiary clarifiers and the ponds without interruption, except for maintenance purposes, of course. Our job is to produce the best effluent from our plant we possibly can. All we ask the Board is to let us do this as we see fit and do not impose any unnecessary standards or limits on our activities. Let us expend our talents and efforts on that which we know and the Board knows to be needed and important. Please do not burden us with meeting ammonia nitrogen standards which are unnecessary and unwarranted or with writing letters of noncompliance to the USEPA and IEPA and putting our necks in the noose for violations of standards which have no basis in fact.

Part two of my testimony is a description of the operational plan to insure compliance with water quality standards.

To insure that the District's effluent never

raises the ammonia nitrogen level of the Illinois River above 1.5 milligrams per liter outside of our IEPA approved mixing zone, a comprehensive operational plan has been developed by the District. This operational plan incorporates five major elements which are as follows:

1) The District's mixing zone;

2) The production equations of table eight on page 23 of the Illinois State Water Survey's November 1986 report entitled "The Impact of Greater Peoria Sanitary District Ammonia Discharges on Illinois River Water Quality, Part 2."

Q For the record, I might state that that has been introduced into this record as Petitioner's Exhibit No. 6.

A 3) An equation developed by the Illinois State Water Survey relating plant effluent temperture to Illinois River water temperture;

4) United States Corp of Engineers river state readings at the Illinois River gauging stations located at Kingston Mines and Copras Creek;

5) United States Geological Survey tables and equations for determining the river flow at Kingston

Mines.

The District has essentially married these five elements into one predictive equation. This equation accurately determines the maximum effluent flowrate which we term "q", as I'll refer to it, which the District can discharge at 10 milligrams per liter ammonia nitrogen without raising the ammonia nitrogen level concentration of the river above 1.5 milligrams per liter immediately outside of the District's mixing zone.

The equation developed is as follows --

Q I wonder if we might just include that in the record as though read instead of having him read it. I assume we'll introduce these statements as exhibits at a later time?

HEARING OFFICER TARALLO: Okay.

Q Thank you.

$$q = 0.349t + 0.00302\left[(KM-CC)\left(\frac{1/2}{-----}\right)(SDC)\right] + 22.605$$

(NFC)

A I'll mention that in this equation "q" is the maximum plant effluent flowrate at 10 milligrams per liter of ammonia nitrogen in the plant effluent in terms of mgd. "t" is the plant effluent temperture in degree centigrade.

"KM" is the Illinois River stage reading at Kingston Mines in feet above mean sea level. "CC" is the Illinois River stage reading at Coppras Creek in feet above mean sea level. "NFC" refers to normal fall curve reading at Kingston Mines in feet. "SDC" equals the stage discharge curve reading at Kingston Mines in cubic feet per second.

There is one other factor that does not show up in the equation but it must be calculated before the equation will work, and that's "GH" which is the gauge height at Kingston Mines, and that is equal to "KM" minus 428.0 feet above mean sea level.

I'll point out in the testimony this equation is a secondary equation used for determining "NFC" and "SDC."

This equation, together with all known stage discharge curve and normal fall curve data for Kingston Mines are currently entered into the District's computer system. To determine "q" which is the maximum allowable plant effluent flow in mgd, all that is necessary is to enter the temperture of the plant's effluent, "t", in degrees centigrade and the river stage readings in feet above mean sea level at Kingston Mines and Coppras Creek.

Within seconds after entering this data into the computer, the District's operating staff will know how much flow can be discharged that day without exceeding the ammonia nitrogen stream standard of 1.5 milligrams per liter. Again, this is based upon a fixed effluent ammonia nitrogen concentration of 10 milligrams per liter. Other equations are available for other concentrations of effluent ammonia nitrogen as well. For example, the basic equation used to determine "q" at 10 milligrams per liter ammonia nitrogen in the District's effluent came from Table 8 of the Illinois State Water Survey Report No. 406 of November 1986.

Q What is Petitioner's Exhibit No. 6.

A The specific equation used was that which was developed by the Illinois State Water Survey for the 15 percent residual contour. That is, with a stream standard of 1.5 milligrams per liter ammonia nitrogen, dividing that number by the residual contour percent, which in this case is 15 percent or 0.15, yields the maximum allowable effluent ammonia nitrogen concentration at that contour. Thus, 1.5 milligrams per liter divided by 0.15 equals 10 milligrams per liter effluent ammonia nitrogen. The same

procedure can be used for each of the remain[illegible]ations shown in Table 8. Thus, the 20 percent cor[illegible]lation is based upon an effluent ammonia nitrogen c[illegible]ation of 7.5 milligrams per liter, which is 1.5 mi[illegible] per liter divided by 0.20 equ[illegible] 7.5 milligram[illegible]iter. The 10 percent contour equ[illegible] based upon an effluent ammonia nitrogen concentra[illegible]grams per liter, which is 1.5 milligrams per [illegible], 0.10 equals 15 milligrams per liter, and so [illegible]. Furthermore, by interpolation between the various residual contour equations the maximum allowable effluent ammonia nitrogen can be calculated for varying effluent flows, river flows, effluent temperatures and river temperatures. In other words, by simply entering "t", "KK" and "CC" into the various Table 8 equations or their mathematical equivalents, the District can not only determine how much flow it can legally discharge each day but, in addition, they can determine the maximum allowable ammonia nitrogen level it could have discharged once the actual flowrate for that day is known. The only other factors involved with these calculations are "D", which is a residual contour projection from the shore, in feet, and the

relationship between effluent temperture, which is "t", and river temperture, which is "T", which was developed by the Illinois State Water Survey. When determining the allowable effluent flow, the Table 8 equations are always set to equal "D" equals 250 feet. That is because the District's mixing zone has the outer projection limit set at 25 percent of the river's width, which is approximately 1,000 feet at the plant's outfall. Thus, "D" equals 250 feet. Also, the Illinois State Water Survey subsequent to its development of equation two in Contract Report No. 406 developed the equation, "t" is equal to 0.5T plus 12.0. This equation is based upon 663 data pairs and is essentially the same as Equation two on page 24 of Contract Report No. 406, which is "t" is equal to 0.464T plus 12.02. However, since equation two was based upon 20 data pairs versus 663 data pairs for the latter equation -- excuse me, the later equation, the later equation is believed to be more statistically correct and is the equation of choice in these calculations. Solving this equation for "T" and substituting in the Table 8 equations eliminates the need to actually measure the river's temperture. Since the temperture of the treatment plant's

effluent, "t", is measured several times each day and since the river stage reading is available continuously at Copprus Creek, which is "CC", and several times each day at Kingston Mines, which is "KM", and the U.S. Corp of Engineers, all of the needed information is readily available to solve all of the pertinent equations.

We believe the system is very workable and are currently prepared to immediately start determining "q" on a daily basis based upon a 10 milligram per liter effluent ammonia nitrogen limit. We can also be ready to solve for "q" at any of the other contours and to solve for the maximum allowable ammonia nitrogen concentrations at any time should the Board believe it appropriate to do so.

Thank you for the opportunity to present my comments on this issue which is of such great importance to the District.

MR. KIESEL: Nothing further at this time.

HEARING OFFICER TARALLO: Pardon me?

MR. KIESEL: Nothing further at this time of this witness.

HEARING OFFICER TARALLO: I think I'd like to take a ten minute break.

HEARING OFFICER TAKALLO: We'll call this hearing back to order. I believe the Agency had some questions.

MR. DAVIS: Thank you.

CROSS EXAMINATION OF LARRY HUGHES

BY MR. DAVIS:

Q Mr. Hughes, I have a series of questions and I'll try to follow the written testimony that you provided us.

For instance, on the first page of your testimony you make the statement that the plant is very underloaded at this point in time?

A Yes.

Q What is the approximate mgd?

A In terms of mgd, for example, last month we averaged less than 20 million gallons per day.

Q Is that atypical, is that unusual?

A That was atypical, yes.

Q I think in my opening comments I mention a figure of approximately 24 mgd, is that --

A That's more in line with the normal dry weather flow, yes.

Q For purposes of emphasis, the design average flow is 37 mgd?

A That's correct.

Q What is the status on the ADM situation, are they fully operational?

A Yes, they're fully operational now and they are currently in the process of upgrading or increasing their capacity of their production. And, as I mentioned in my testimony, by spring of 1988 they are planning on having that new system completely in service which will increase our loading substantially.

Q For the purposes of the record, could you describe your understanding of what ADM does and what they contribute to you?

A ADM, for the most part, produces ethyl alcohol which is used as a supplement to gasoline and in the production of ethanol -- or gasahol, excuse me. And in terms of their loading to us, as I'm sure you are aware, distillery wastes are quite potent, so BOD is extremely strong, amounting many times to 50 percent or more of our incoming BOD. Likewise, ethyl alcohol has an extremely high BOD and as with all distilleries there is a certain

amount of alcohol that does accidentally get into the sewer system which can raise our BOD substantially. So we can and do have significant spikes of BOD from time to time.

Q So it's a high strength waste?

A Extremely high strength.

Q What is the quantity of the influent?

A From ADM?

Q Yes.

A I don't have that number right with me here, but I would estimate at least 25,000 pounds of BOD per day.

Q And is this industry a three shift, seven day a week operation, or something less than that?

A All the time. The only time they're down is for clean-up.

Q So there are no real slug load type situations, it's a constant inflow?

A It's a constant inflow, but there certainly are slug loads with clean-up, with spills.

Q Can you go into that a little more. Has it caused you any definite problems that you can describe?

A As the plant is at a balanced state we get everything set just for certain type of condition and then all of the sudden, if we don't know what's going to happen, all of the sudden the BO levels are dramatically depressed all at once. The system immediately becomes out of balance and certain changes have to be made to bring the system back in balance, and this can take a period of time. And usually when this happens the depressed BO levels will cause a problem with our operational facilities.

Q Is there any pretreatment at ADM?

A Pretreatment to the extent that they do collect the majority of their solids and I believe they sell them as cattle feed.

Q Has there been any attempt to have some sort of channel of communication between the District here at the plant and folks at ADM?

A Absolutely. Even to the point where, while we don't believe it's necessary at this point to do this, but they have even volunteered, as I recall, to supply walkie-talkies so that our people can be in touch with their people at all times. But I don't believe that's

necessary at this point.

The main thing, in answer to your question, is we are in daily contact with ADM. ADM realizes our situation here. For the most part, if there is a problem and ADM is aware of the problem, we'll be notified. I have to say that they aren't always aware of the problem. We are aware of it before they are sometimes.

Q On the second page of your testimony you make a statement towards the bottom that currently the system is at the absolutely optimum point of balanced equilibrium and is doing a fine job as a result.

A Yes.

Q This takes into consideration the ADM plant?

A Yes. Yes, it does.

Q So you feel that you've developed enough experience, I guess you would say, to cope with what you are getting from ADM?

A If conditions are fairly stable at ADM, yes. If we encounter these tremendous swings, like we can encounter, no, our plant obviously not be operating at optimum efficiency. Will not be balanced. I'm talking about normal conditions. Last month we had a fairly

normal loading coming into the plant, fairly steady loading coming in. As a result, we had essentially the most efficient month we've ever had in terms of the BOD removal and ammonia removals.

Q To qualify the statement you would add the phrase "under normal conditions" or something like that?

A Yes.

Q What system are you talking about? I know that in this paragraph of your testimony you seem to be focusing on the secondary treatment part and making a distinction between that and the additional treatment processes such as the RBCs?

A Yes.

Q So is the system that you're talking about in that statement that I quoted the secondary treatment system?

A In that statement, let's see, yes, in that area I am specifically referring to the secondary system. However, they are concessus, it is also very well balanced right now. We have the right type of growth for the kind of loading we're getting right now. It can apply to both.

Q Last month was a very good month as far as

overall treatment efficiency?

A Absolutely.

HEARING OFFICER TARALLO: Could you speak up, please.

A Yes, I'm sorry.

Q And to focus in now a little bit on the treatment efficiency as far as ammonia is concerned, at the bottom of page three of your testimony you discussed the treatment efficiency before the RBC units were put in service, do you not, the very last sentence there which continues on page four?

A Yes. I'm just basically restating the basis of design for the RBC system.

Q So prior to the RBCs being placed in service some 1,850 pounds of ammonia per day would be discharged at design levels?

A Well, I'm not --

Q Was this a theoretical --

A I'm not saying that. I'm saying the RBC system was designed to removed, was designed to have an incoming load of six milligrams per liter at 1,850 pounds per day at 37 mgd. That's all I'm saying. This is directly out

of the basis of design from Greeley and Hansen, our engineers.

Q So one could not look at that statement and come to the conclusion that without the RBCs this much ammonia would be discharged?

A No. Again, that's not what I'm saying there.

Q All right. What are the -- strike that.

What were the loadings of ammonia per day prior to the RBC units being put into service?

A Here I will quote secondary effluent data, ammonia nitrogen, for the period 1970, these are annual averages, 1970 through, I go through 1978. Now, during that period we also had our tertiary ponds, so this was not necessarily what was discharged to the river, this would have been, had we had RBCs, this would have been what we would have been discharging to the RBCs. 1970 secondary treatment effluent ammonia was 5.1 milligrams per liter; 1971 was 5.4; 1972, 6.64; '73, 5.36; 1974, 6.13; 1975, 5.91; 1976, 7.31; 1977, 7.35; 1978, 6.40.

In terms of the data I have available here as far as what we were discharging to the, actually discharging to the river after passing through the pond, I

don't have a great deal of data. Let's see. As you will recall, in my testimony I mentioned that the pond is an ammonia generator.

Q Yes.

A 1975 we discharged 7.51 milligrams per liter of ammonia; 1976 it was 8.18 milligrams per liter. Now prior to that there was a great deal of construction under way and the pond was not in service much at that time, likewise in '77, '78. I believe -- it was a long time ago, I believe that was the situation.

Q Is there any data available on pounds per day loading?

A Of what?

Q Of ammonia.

A To where?

Q In the effluent.

A To the RBC if we had the RBC?

Q No. What I'm trying to ascertain is what pounds per day loading of an ammonia nitrogen were discharged in the effluent before the RBCs were put into service and then contrast that with the pounds per day after.

A Okay. Pounds per day -- this would be 1970, again, through 1978 -- secondary effluent is 1,252 pounds, 1970 -- I'll just read these off -- 1,287, 1,707, 1,386; 1974 was 1,540 and 1,448, 1,712, 1,729, 1,580. And I'll give you 1979, remember the RBCs weren't in service in October of '79, this number would have reflected a portion of the time that the RBCs were in service. 1,794 pounds.

You would like to know what it is, am I correct?

Q Yes, please.

A Okay, I'll gave you the data most recently that I have. Keep in mind a number of things have changed since the '70s, one of the major things that has changed is we have an aeration system now that is second to none. I have the greatest respect for that aeration system, it is tremendous, believe me. In the 1970s all of the equipment modifications had not been completed. We were under construction. So there have been a lot of different changes since then. This is October of '87, and this is pounds per day of RBC influent. Now this would be a mixture of secondary effluent and primary effluent. We can bypass primary effluent around our secondly system.

So this is actually what the RBCs are seeing.

Q Okay.

A I'll just summarize. Through October it's 279 pounds. And we've got there -- I don't want to read all these numbers -- but to give you an example here, 420, 376, 303, 282, 275, 325. Going on down, there is on the 21st of October it was 177 pounds per day; on the 25th, which was a Sunday, it was 92 pounds per day. Here is the lowest, the 27th, Tuesday, it was 48 pounds per day.

Q So just as a general statement would you agree that prior to the RBCs being put into service during the time period that you testified to, the '70s, essentially, that there was anywhere from 1,200 to 1,800 pounds per day of ammonia, just as a rough --

A Yes, yes.

Q -- characterization?

HEARING OFFICER TARALLO: Excuse me, the records that you were reading from, we don't know for the record what they were. And also is it possible to have copies of that to put in the record?

A Surely. Absolutely. The first records I was referring to, these are what we call our decade sheets.

every 10 years. We generate an annual report every year. We have a monthly report, which I was just reading from, that was the last data was from the October 1987 monthly report, complete monthly summary. In addition, we take all of the 12 monthly repoets and summarize into an annual report on a month-by-month average basis. In addition, we take each 10 years of yearly sheets and summarize and put these on what we call our decade sheet, our decade report.

So the first information I was giving you, the 1970 through '79, was from our decade report which we generate only once every 10 years. And the last I was giving you was directly from our October monthly report.

Q I'll leave that up to your counsel to determine which documents you'll be admitting. But I think your testimony has helped us gain a better understanding upon simply the issue of how much better the District is doing in ammonia reduction with the RBCs. That was the point I was trying to make.

A Excuse me, but what I've been referring to here how much better the plant has been doing with secondary treatment improved. That's the deal I was giving you, is secondary influent, not RBC effluent.

DR. FLEMAL: If I might jump in here. The figure you just gave us that showed loads in the order of a few hundred pounds per day, was that to the RBCs or from the RBCs?

A That's to the RBCs. That's secondary effluent to the RBCs prior to all of the plant improvements in the secondary system, and then loadings to the RBCs after those secondary improvements had been completed. I did give a little bit of information about what the loadings were or the discharge loadings were to the river back in the '70s. I haven't given the data after the RBCs were put into service. I have that as well, if you'd like.

Q I think personally I understand that the '70s data represents the extent of treatment then which was essentially just secondary, correct?

A Secondary with the ponds, yes.

Q The 279 pounds per day from October of 1987, is that an influent figure to the RBCs or an effluent from the RBCs?

A That was influent to the RBCs. That was the impact of our modified secondary treatment system.

Q So, as you stated, all of the numbers you just

gave us reflected simply the secondary treatment efficiency?

A Absolutely.

Q Can we get into now a little bit -- well, let's just focus on October of 1987.

A Okay.

Q The influent to the RBCs, as we mentioned, was 279 pounds per day. What was the resulting effluent from the RBCs to the tertiary ponds?

A In terms of pounds?

Q Yes, sir.

HEARING OFFICER TARALLO: Let us know what report you are reading from.

A This is the October monthly report, this is last month's report. I'll give you tertiary clarifying influent, this is after the RBCs but prior to going into the tertiary clarifiers.

Q Okay.

A The ammonia level in terms of pounds per day averaged 95.

Q And what was the resulting final effluent from the ponds to the river?

A From the tertiary clarifier effluent -- let me give you that also -- that was 91. So we did remove 4 pounds average through the tertiary clarifiers. And overall treatment to the river, yes, as I recall this particular month, again, the weather was cooler and the ponds did not produce a negative removal this month for ammonia. We actually did remove some ammonia through the ponds. 79 pounds per day actually was discharged to the river.

Q And since we're really dealing, the focus of the proposal is an effluent concentration, 304.122 is phrased in terms of milligrams per liter, can you give us that final effluent?

A Sure. I'll back up and go from the river back. We discharged 0.5 milligrams per liter of ammonia to the river. From our tertiary clarifiers it was also 0.5. And what was going into the tertiary clarifiers was 0.5. And what was going into the RBCs was 1.5.

Q And, as you stated earlier in my line of questioning, last month was a good month for treatment efficiency?

A Outstanding month.

Q And it had no unusual occurrences?

A No, it was a very stable, very steady month.

Q The next topic I'd like to address, sir, is the maintenance problems that you are encountering with the RBC units. And you discuss, you start your discussion of this in your testimony on page six, I believe. Mr. Carlisle has earlier testified that in the District's budget there is an annual amount at the present of $192,000 for replacement costs just for the RBC units. How much of this money is being used at the present? That is you've testified about a few of the operational and maintenance problems that you've encountered, my question pertains more to how much money are you spending to fix these problems?

A What you would be referring to would be our replacement and improvements costs, I believe, and the money that Mr. Carlisle was referring to would be used if, for example, we were to replace the two RBC shafts which failed.

Q And you have not done so?

A We have not done so, no.

Q So the $192,000, or whatever amount is set

aside for replacement costs, is only used when you actually replace some item?

A I would say that's correct, yes.

Q And that's a separate amount from just typical O and M? That is you have replacement on the one hand and O and M on the other hand?

A Yes, sir.

Q And we've heard testimony that the average O and M costs for the RBC units is approximately $91,000 -- I'm sorry, $81,000?

A That was Mr. Carlisle's testimony, yes, sir.

Q When did the two shafts malfunction?

A I don't have the exact dates, but I believe both shafts failed in the last two years.

Q Do you know whether or not any moneys were budgeted for replacement costs at that time?

A Money has been budgeted every year for replacements, yes.

Q But no money has been spent for that purpose?

A No, not for the replacement of those two shafts.

Q What about any other items directly relating to

the RBCs, such as the bearings, the media, anything else that is part of the RBC units?

A We have had a number of bearing failures, a number I think less than 10, considering we have 168 bearings, but I believe that was funded out of just regular O and M replacement and improvements, that came out of replacements and improvements.

Q Do you have any feel for an approximate amount that has been spent for replacement?

A Those bearings, I believe, are around $1,000 a piece, and estimating we replaced, I'm not certain how many we replaced, but say six would be $6,000.

HEARING OFFICER TARALLO: I didn't catch that.

A I'm estimating it would be in the neighborhood of $6,000, I really am not certain. I don't have those figures right with me.

Q Would it be fair to say, sir, you have plenty of money budgeted that you'd rather not spend for replacement?

A I can't say that, I can't answer that. That's not --

Q That's not your --

A That's not my responsibility.

Q On the next page you indicate that -- well, again, I'll quote you towards the middle of the page, "With an activated sludge system, if the technology changes a different style blower can be added or the entire system can be readily modified and reused in some other manner."

A That's true.

Q My question to you is how could the entire system be modified?

A A classic example of that would be in our own case was the retrofitting of submerged turbine air raiders. In 1969 we added, on a trial basis, experimental basis, four mixing equipment company submerged turbine air raiders and found they did a beautiful job of improving the quality of our secondary effluent and as a result during the plant improvement program we added 36 more, each with its own individual blower. So we now have 40 of these units.

Another example would be the Union Carbide UNOX system, while it would be a sizable expense, I'm sure, but

by covering the tanks and introducing a cryogenic operation that is producing oxygen on-site, that type of system could be introduced into an existing aeration system. On the other hand, it could be with the RBCs. I think you see my point, it would be much more difficult to do that.

Q Further on in this paragraph you begin discussing what operations might consist of if the Pollution Control Board were to grant the requested relief. You indicate you might go for --

HEARING OFFICER TARALLO: What page is that?

Q Page seven. To quote you again, "We might go for one year and not use it and then use it for six months or more," etc.

A Okay.

Q What would happen if you were to not use the RBC units for several months, would the bearings freeze up?

A No, I don't believe so. We probably, to avoid any problems like that, would exercise the units periodically.

Q What about the media, would that sort of degrade?

A I don't know. I don't know what would happen, in all honesty, to the media just sitting there. The normal life expectancy for the RBCs is 20 years. The media sitting unexposed inside of these tanks, these fiberglass tanks, with no biomass on the RBCs, I don't, I really don't know if we could expect more than 20 years of life from the media or not, I honestly can't answer that.

Q Let's say you were to stop one of the RBC units today, wouldn't tomorrow you have some biomass still remain on the media?

A Absolutely.

Q Have you given any thought about whether or not you could clean the units off to sort of mothball them for a few months, would that be an option?

A It's not necessary to clean them off. The media, the biomass will die, it will die.

Q And it will just sloth off of the artificial unit?

A Yes, yes.

Q Can you foresee any operational and maintenance

problems with idling the RBC units for an extended time?

A Not really. As long as the tanks are drained and, therefore, there would be no growth growing on the bottom parts of the shafts that are exposed to the wastewater, and as long as we would exercise them periodically, I really don't see any problem. The one thing I can't answer though is whether the media would deteriorate just sitting there, I don't know, or deteriorate more rapidly.

Q Once again, for purposes of emphasis, you calculate, if design life is 20 years you've got about 12 years left?

A Right, that's correct.

Q So this would be a very real operational question for the next 12 years?

A Yes, sir. The main point I was making there, the units would be there, they would be in a state of readiness, they could be used for anything that we chose to use them for during that period.

Q One of the Agency's concerns, and I think you've touched a little bit on this in your testimony, is the extent to which the RBCs are efficient in reducing

BOD, can you go into this a little bit more?

A Okay. The RBCs, I'm looking now at another report, this is our monthly board meeting report, and I'm looking, again, at just the month of October percent removal of BOD, RBC influent through plant effluent. Here, let me look at this one, RBC influent through tertiary clarifier effluent, that is just the RBCs and the tertiary clarifiers. In the month of October 1987 69.3 percent of the BOD was removed.

Just for the record, likewise 64.2 percent of the suspended solids was removed and 67.5 percent of the ammonia nitrogen was removed. Along with that, the 10-month average for the year RBC influent through tertiary clarifier effluent, so far this year we've removed 76 percent of the BOD entering the RBCs.

Q Now, the bottom of page eight of your testimony you make a statement, "Thus far this year these ponds," and I realize we're talking about the tertiary ponds, "have removed 49.3 percent of the incoming BOD and 29.5 percent of the suspended solids."

A Yes.

Q By "incoming" do you mean the flow from the RBC

and tertiary clarifiers?

A Yes, I do.

Q And that part of it you were just testifying about from those notes?

A That's correct. Yes, sir, I believe those numbers, as I stated during my testimony, those are about a week and a half old. Let me see here, the numbers -- now, again, this would be from the October report which has now been completed, removal through the pond, this would be tertiary clarifier effluent through pond effluent, and I'll just read this, thus far this year, that would be what we would call our 10-month average, 50.4 percent of the BOD has been removed through the ponds, 31.9 percent of the suspended solids and negative 6.3 percent ammonia. In other words, we added that much additional ammonia through the ponds through the 10-month period.

Q The addition of ammonia through the ponds would be from the decomposition of solids at the bottom?

A That's correct.

Q How often are the ponds cleaned or the solids removed?

A Extremely infrequently. We have two ponds, one is a lined pond and one is an unlined pond. The lined pond has a hypolon liner and we do periodically, I'd say at least once a year, reduce the level of the sludge that accumulates in that pond. That is the first stage of the two stage pond system. So we do remove a portion of the solids in that cell. The unlined portion, years, we're talking about very infrequently removing the solids from the unlined pond.

Q What would be the potential or speculative effect on the accumulation of solids in the ponds if the RBC units were not operating?

A I don't believe that would have any major impact whatsoever. As I stated in my testimony, it would be our intent to keep the tertiary clarifiers in operation regardless of the Board's decision, and the vast majority of the solids that would be going into the pond would be removed through the tertiary clarifiers. In fact, there would probably be fewer solids because the RBCs do generate solids themselves.

Q Just from the biomass?

A The biomass leveling off does generate solids,

In fact, as I think about it, there would probably be less solids actually going in through the tertiary clarifiers.

Q Now, the point I was attempting to get to is under what circumstances would you reactivate the RBC units?

A Let's take this scenario, ADM increases its loading dramatically and we see the plant is having difficulty meeting the 20/25 BOD suspended solids standard. Under those conditions, the RBCs would be put back in service and used to remove additional BOD so that we would be in compliance with the 20/25 BOD solids standard.

Q What would be the start-up time to generate a biomass and so forth?

A It depends on how long the units have been out of service. It's been our experience that if the units have been out of service for even like two weeks, three weeks, it's amazing how rapidly the biomass will re-establish itself. To have the units out of service for a year, for example, I would imagine that we would be starting from scratch in that case and probably looking at oh, at least three weeks, I'm estimating three weeks to a

month to get them going fully.

HEARING OFFICER TARALLO: Did you say three weeks to a month?

A I'm just estimating. If the RBCs have been out of service for a full year, for example, probably three weeks to a month. But during that period they would be coming up slowly, so you can't really say that there would be no treatment. I would anticipate we would be removing BOD, especially since we'd be treating for BOD, that biomass would come back faster than the nitrifying biomass. It's hard for me to answer that one when I'm just estimating. I would say for BOD removal we would probably be pretty much back in service in two weeks. If we were going for ammonia, that's another thing, it's more difficult to develop that biomass. But probably BOD we would be back in business in two weeks.

Q Now, you've got a formula or really a method of formulation to determine the discharge flowrate, so forth, to hit an effluent -- or, I'm sorry, to hit a safe water quality number, so to speak?

A Yes.

Q Have you given any thought to a formulation

under the circumstances that we've been discussing, when you would use the RBCs to remove BOD after having had them reactivated? That is -- well, do you have an answer to that?

A Restate the question, please.

Q Okay, it's rather an awkward question. Simply, what I'm getting at is have you thought about having a computer program for the reactivation of the RBCs?

A No, we have not. This would just be a matter of judgment. We would know when we would be having trouble or we would see the trouble was eminent as far as us meeting the standards and at that point we would put the RBCs back in service. I don't think a computer would help us reach that decision.

Q You would presumably test the discharge from the tertiary clarifiers to make that determination?

A Oh, yes, we do that daily here, yes.

Q I realize it was a speculative question, but my emphasis is to try to explore how much you've thought ahead about the operational problems if the RBC units were not in service. Do you have any other statements along that topic?

A I personally have given that quite a good deal of thought. I've thought about the various ramifications of putting the RBCs back in service as far an removing BOD. We know that the excess, we can generate extra biomass, for example, when the RBC is removing BOD. The long term impact of that extra weight of the carbonaceous type growth, I've thought about the impact of that. I've also thought that it wouldn't have any long term problem if this was only done periodically and that the loading going to the RBCs was not the same type of loading that we would have going into the secondary system. For example, we're talking about secondary effluent going to the RBCs as opposed to primary effluent. The plants that have had trouble with shaft failures, for the most part, major shaft failures, have had primary effluent going to their RBCs. We've had shaft failures, but not like some of those who are or stories that we've heard.

Q I take it that's more stress on the shafts?

A Yes, it is. I can say, you ask what we thought about this, having given this a great deal of thought and the conclusion I came to was that, yes, I believe we can operate the RBCs to remove BOD from secondary effluent.

I'd be very hesitant to use the RBCs on a long term basis to remove BOD from primary effluent, but I think we can do this on an extended period with the secondary effluent we're talking about. We'd have to be very careful to not overload our shafts to the point where we start having shaft failures because of stress induced problems.

Q Can you give us any feel for the mixture of primary and second effluents going into the RBCs, is it most --

A It can be. It can be, yes. For the most part under normal conditions it would be secondary effluent alone going into the RBCs. If we have problems with sludge rising, for example, in secondary clarifiers and we suspect that it's a hydraulic problem, that we are putting possibly too much flow through the secondary system we can divert primary effluent around the secondary system and direct that to the RBCs. Under normal circumstances we don't have to do that. For example, I don't think this last month that we did that at all. No, we did not do that at all in October of '87.

It's just another, this plant is tremendously flexible, and it's just one of the other tools that we

have available to us to maximize our efficiency.

Q But part of that overall flexibility is that you have RBC units, is it not?

A That's correct, yes. And we would still have that flexibility were those units not kept in service for the ammonia nitrogen standard.

Q You would increase your flexibility to a certain extent by not having to worry about ammonia generally?

A Correct, yes. Yes.

Q I have a few just concluding questions. Before I get to that, I need to talk to you about this conversation you had with somebody in the Agency so I can object to it. First of all --

HEARING OFFICER TARALLO: What page was that on?

Q This would be on page eight. First of all, sir, do you know who you were talking to on that occasion?

A Yes, I do.

Q Who was it?

A I didn't ask his permission to release any of this information, but it was Hazel Acree.

Q Do you know the approximate date of this conversation?

A I would say it was one to two weeks ago, I don't recall the exact date. Very recently.

Q And were you under the impression that Mr. Acres was purporting to speak for the Agency, that is make a policy statement for the Agency, or did you believe on the other hand it was simply a personal conversation concerning opinions and so forth?

A This is not the first conversation I've had with Ward on the subject. It has been his consistent comment to me that is the Agency's position that RBCs will not be approved in the State of Illinois. He was not just making the comment to me on a friendly basis. This, as far as I'm concerned, this was a statement of the Agency's position.

Q Was the statement made in the context of Peoria's situation, that is having spent $4.7 million just a few years ago for RBC units?

MR. KIGGEL: I'll object to the form of the question.

MR. DAVIS: I believe it's a properly

phrased question.

HEARING OFFICER TARALLO: Go ahead. I'll overrule the objection.

Q Do you need it repeated?

A Yes, please.

Q What was the context of this statement by Mr. Acree, were you discussing Peoria's particular situation, that is, having spent a substantial amount of money? Or were you talking about whether or not RDC units would be grant funded in 1987?

A I asked Ward the specific question that I stated in my testimony that really did not go beyond that question, as I recall. I just asked him if we were to submit our plans today that we submitted back in the '70s would they be, for the RDC system, would they be approved.

Q Sort of a "What if?" conversation?

A Sure. I specifically called him to specifically ask him that question.

Q Was the conversation in the context of what the Agency might do with this proposal or did you even mention this?

A I did not even mention this proposal. I

deliberately did not even bring this up. I was just wanting to know what's the Agency's position now today, because I knew what the Agency's position was six months or a year ago, I wanted to see if it was still the same.

MR. DAVIS: Madam Hearing Officer, I would now pose an objection. I realize that the Board is under the impression that there is something called the regulatory standard of evidence, although I'm yet to see any proof of that in the procedural rules, and I realize that hearsay does have its place, but my objection is really to the weight. I don't think that this conversation, although accurately reported, is of any consequence here. So that's my objection. I would ask the Board to discount the usefulness of that statement.

HEARING OFFICER TARALLO: Okay. That objection will be noted for the record.

BY MR. DAVIS:

Q And, sir, I just have a final series of questions, and this pertains a little bit to the part two of your testimony, although I'll try not to get into the details of that. My question is what levels of ammonia nitrogen do you expect to discharge if relief is granted

by the Board, effluent concentration?

A It's very rare for our incoming ammonia, I'm talking about incoming ammonia into the treatment plant, to exceed 10 milligrams per liter, for example. I think it would be --

DR. FLEHAL: I didn't catch that number.

A 10 milligrams per liter. I think it would be an unusual circumstance for us to discharge more than 10 milligrams per liter. I'm not saying it can't happen, a lot depends on how much of this sidestream ammonia discharge I was referring to earlier through the Kraus process, that can raise the ammonia level say three or four milligrams per liter. Maximum, I can never recall more than say the combination of raw ammonia and the Kraus process ammonia being more than 20. So that's -- bottom line on this, though, we're looking at probably no more than 10.

Q And if I do understand the plan, so to speak, by the use of the formula and other formulae you would regulate flowrate to not exceed 10 milligrams per liter?

A Yes, that would be our intent.

Q What are the present levels, just offhand

without referring to any specific months, of ammonia nitrogen effluent discharge? Would it be right around one milligram per liter, sometimes less, sometimes a little more?

A On an average probably about one. But, again, this can be highly variable. This is what we're looking at right now, again, with the plant being underloaded, conditions being optimum.

HEARING OFFICER TARALLO: Conditions what?

A Being optimum. This could change substantially. I can recall having to struggle many times with that 2.5 milligram per liter standard.

Q Under optimum conditions such as October 1987 you were able to hit a 0.5 milligrams per liter?

A Yes.

MR. DAVIS: Thank you, sir, I have no other questions.

CROSS EXAMINATION

BY MR. KAMMUELLER:

Q I have some problems for you. You mentioned that the RBC process cannot always meet the ammonia effluent standard, and by RBC process I mean that process

plus downstream units and tertiary clarifier in your ponds. If the RBC process were operated in a steady state condition, in other words, a constant or pretty much constant food load you could probably do a better job with the RBC process and produce a more consistent effluent which would probably meet the ammonia standards, is that true?

A We would produce a higher quality effluent in terms of ammonia nitrogen, yes. I can't say that that higher quality, even though it would be more stable, would meet the standard. A lot depends on the loading. If we had a tremendous loading of BOD coming in, some of that BOD would be going into the RBCs causing a carbonaceous growth to form on the RBCs and nitrogenous growth and we wouldn't have enough capacity on the RBCs possibly to meet the ammonia nitrogen standard.

So in answer to your question, yes, stability is extremely important. If we can keep a steady state loading coming through, yes, we will see increased efficiencies, but I can't say that that increased efficiency would be enough to meet the effluent ammonia standard.

Q But counting the RBC process on the downstream units you would expect to be able to meet the standards assuming the RBCs were operated in a steady state mode?

A I just said that I can't say that. A lot depends on the loading, the BOD loading that's coming in.

Q But, to date, most of the time the plant does meet the ammonia limitation of 2.5 and 4?

A Yes, but today with the economy and the area as bad as it is and the loadings being as low as they are this is not the condition that we're going to be seeing, hopefully. We hope the economy improves.

HEARING OFFICER TARALLO: Pardon?

A We hope the economy improves. This is not the condition, the condition we're facing today, we hope, is not the condition we're facing say next year or three or four years down the road.

Q But really the key to maintaining a more constant food load to the RBC process goes back upstream through the performance of the activated sludge process?

A Yes, absolutely.

Q And that relates to the incoming food load?

A Yes.

Q And the raw sewage to the plant?

A Yes.

Q So in the future you may have to go back up the sewer and pose even more stringent controls upon your users such as ADM?

A Yes, that would be a possibility if we were not granted relief from this ammonia standard. That is a very definite possibility, yes, sir. Either that or add more to the plant.

Q Now, if you chose to say abandon the RBC process in the future and were not given this rule change by the Board and your food load to the plant increased you would have to either impose more stringent industrial user controls or you would need to add to the plant, as you just mentioned?

A Repeat that, Jim, that's got a whole bunch of things in it.

Q If the Board does not grant this rule change and in the future your food load to the plant does increase, and say it's due to ADM or some other industrial user, you will then have to place more stringent controls upon that user or perhaps expand the plant to meet even

20/25 as well as ammonia?

MR. KISSEL: I'm going to object to this. I think they are talking about hypothetical situations and engineer to engineer what they'd be talking about in the back room. I don't know if this is the kind of thing we want to get into here today, what will happen under various hypothetical situations. And I think there has been adequate testimony as to what the use of the RBCs will be, and I think we're going far afield of what the purpose of this hearing is.

MR. KAMMUELLLER: I can tie this up if you let me proceed.

HEARING OFFICER TARALLO: Go ahead.

Q I'm merely trying to ask what could be built in in place of the RBC process to provide further secondary treatment and/or nitrification?

A That's your question really?

Q Yes.

A If we had, let me restate and make sure I understand what you are saying --

HEARING OFFICER TARALLO: Go ahead and I'll overrule the objection at this point. Go ahead.

A If we were to add additional capacity to the plant for the removal of BOD and solids and ammonia, what would we be adding at some point in the future?

Q Yes.

A Tough question. I don't know that I can sit here at this point and answer that. There are a number of possibilities. I don't know that -- let's put it this way, if we had to do that at this point the EPA would not allow us to add RBCs.

Q But you to add say activated sludge --

A Yes.

Q -- and additional final clarifiers?

A Yes.

Q You are familiar with our Illinois design standard for sewage treatment works, are you not?

A Yes, I am.

Q If you were to compare the loadings on your activated sludge process, and by that I mean the aeration tanks and the secondary clarifiers, to those Illinois standards in effect today, would your process be working at or near design organic and hydraulic loading with current loads?

A I haven't checked that out. As far as looking at our loadings right now, the FDM ratio and these things, I have not checked that out with current design standards.

Q In terms of organic loadings and pounds BOD per thousand of cubic feet, gallons per day per square foot on the final clarifiers?

A I would say that we would be over on the gallons per day per square foot on the clarifiers. I really don't know about the pounds BOD per thousand of cubic feet.

MR. DAVIS: Excuse me. Since this does seem to be an important point, we would request that the District consider doing the necessary research in providing an answer if this gentleman is unable to do so today. I realize it's just a request. It does seem to be an important point.

MR. HUGHES: That kind of information I can generate fairly quickly.

HEARING OFFICER TARALLO: Pardon me?

MR. KISSEL: I'm not necessarily admitting it's important, I don't know if I understand the point. I don't know if anybody else does. I assume Jim does, but --

MR. HUGHES: I can summarize my whole point, if you wish.

MR. DAVIS: Could we take a break, five minutes?

HEARING OFFICER TARALLO: Okay.

(Whereupon a lunch break was taken at 1:40 p.m., and the hearing resumed at 2:35 p.m.)

HEARING OFFICER TARALLO: I will call the hearing back to order at this time. Is the Agency, do you have any other questions other than --

MR. DAVIS: We have a couple short ones on a different topic.

CROSS EXAMINATION OF LARRY HUGHES

BY MR. KAMMUELLER:

Q On page 14 of your testimony you propose to use the equation to regulate the ammonia discharged to the river by controlling the flow?

A Yes.

Q The volume of flow of your effluent?

A Correct.

Q Will that be done at the end of each operating day? I mean how will you know when you discharged too much, will that be done after the fact or before the problem begins, or how will you handle that?

A This equation that we developed is predictive base on 10 milligrams per liter. At eight o'clock in the morning, as an example, we will measure our effluent temperture, the ET, and call, in fact, I have a direct number to Coppras Creek to the telemarket system there, we

can call and find out what the level is at Copperas Creek. At the same time we call the local Corp of Engineers' office and find out what the river stage is at Kinguton Mines or whether it was four hours late because of satellite. But that gives us at that point in time, in fact, essentially at any point in time we do this, Kingston Mines' river stage, Copperas Creek's river stage and the temperture of our effluent. Plug those three variables into our computer program and we will know immediately how many millions of gallons we would be able to discharge that day at a concentration of 10 milligrams per liter of ammonia nitrogen, and not exceed 1.5 milligrams per liter of ammonia in the Illinois River at the edge of our mixing zone.

Q So after you collect this data and run it through the equation you may have to go out and may reduce your effluent discharge?

A That's conceivably the case, yes.

Q So it could be possible that there is some lag time or response time, some lag in the response time, I believe, or there could be if you were to respond to the equation? You could be discharging too much and not find

out about it until you've ran it through your equation?

A We will know at approximately eight o'clock in the morning how many millions of gallons we can discharge for that day. We go on an eight to eight basis. Our sampling day is eight to eight essentially, so I don't understand, there would be no real lag time there.

HEARING OFFICER TARALLO: I didn't hear you.

A I don't believe there would be any lag time. We would know how many millions of gallons we would be allowed to discharge for that day. As the day wore on, if we saw we were going to be over that limit, we would have to cut back, we would have to divert some of our flow on the first flush basis to the storage basins or both. But I don't see any lag time there.

Q Will there be instructions for your operating staff? I mean will this equation be constantly reviewed and the effluent flow adjusted during all hours of the day and night?

A We would do it, the concept is to do it once a day as early as possible in the workday so we will know what we will be allowed to discharge that day.

Q Well, I guess what I'm leading to is if you have a storm event or an excess flow event and your flow changes there is a certain response time to adjust that flow upward or downward -- downward, I would assume, if you have a storm event and you can't store or you are always discharging effluent?

A Yes.

Q At times that effluent will increase --

A Yes.

Q -- in volume due to storms or high flow?

A Right.

Q And how can you use, how can you control that and store? Say you can only discharge a certain amount of flow to meet the 10 milligram per liter concentration and you have a high flow event, how can you store that over a long period of time or at all?

A Theoretically we could reach a point where we would not be able to, would not be able to store enough, we would have to discharge more than what the equation might say we can discharge. But under those conditions, again, theoretically, we would be having a very dilute flow coming in, you are talking about a lot of rain, so I

would imagine our ammonia concentration should be substantially less than the 10 milligrams per liter we're talking about. That was one of the reasons I mentioned the other in my testimony, the other thing that we can do is determine after the fact and once we know for that day what the ammonia nitrogen level actually was and know -- yes, knowing what the ammonia nitrogen level actually was then we can go back and determine really what the allowable flow should have been. Am I saying that right? We can go back and then determine what the allowable ammonia level would have been. Once we know the "Q" -- that's it -- once we know the "Q" then we can go back, plant "Q", go back and determine how much ammonia nitrogen we actually could have discharged. So we would be, if it's less than that 10 milligrams per liter then we'd be in good shape.

Q There is also a chance it could have been more than what you wanted to discharge?

A Okay, theoretically. But in all likelihood probably not because we're talking about a very dilute wastewater under those conditions.

Q I'm almost done here.

When the plant, at the present, is performing well you can be a one milligram per liter of ammonia concentration, or perhaps a little bit less on a real good operating day or month?

A Right.

Q Sometimes you struggle to meet two and a half or perhaps even four seasonally?

A Yes.

Q But if you propose to go up to 10 that will result in anywhere from up to 10 times more ammonia being discharged to the river under certain conditions?

A If we are given a standard of 10, yes.

Q And then you mentioned some problems with other RBC installations?

A Correct.

Q Failures, horror stories, if you will?

A Yes, sir.

Q Do you know what brand of RBC that was, these stories dealt with?

A Hormel was the principal manufacturer that I can recall that had problems. However, I don't think that the horror stories are limited entirely to Hormel. I

think our own manufacturer, Autotrol, also has had some problems.

MR. KAMNUELLER: I have nothing more, thank you.

HEARING OFFICER TARALLO: Do you have questions, DENR?

MS. VOGT: Just a few.

CROSS EXAMINATION OF LARRY HUGHES

BY MS. VOGT:

Q You were discussing earlier with IEPA the question of $190,000 per year being budgeted for replacement cost. The RBC units have been in operation for eight years, I believe, was 192,000 budgeted each year for replacement cost or is this relatively new budget item?

A I'm sorry, I can't answer that. Money has been allocated each year. I can't say that it's been $192,000. I don't generate those numbers.

Q Do you have any idea historically how much has been spent on -- I gather from your testimony that historically no money has been spent for replacement of that, is that for the whole eight years?

HEARING OFFICER TARALLO: I'm sorry, I can't hear you.

Q I gather that for the eight years of operation of the RBC units that there has never been a unit replaced and no money has been spent on replacement for eight years, is that right?

A As far as a total unit replacement, I believe that's correct. We have not replaced any RBCs. We've had two major failures and have not replaced any RBC. However, some of the replacement/improvement moneys have been spent for other repairs or other parts of the system, for example, the bearings.

Q And that was for $6,000, you say?

A I really don't know for sure, I didn't check all that out before this hearing.

Q And, again, historically you couldn't speak to how much has been spent?

A Well, of course, other moneys have been spent for operation and maintenance costs. We're looking at --

Q But we're not talking about that.

A For grease and things of that nature.

Q The other question I wanted to ask you is in

regard to if you want to a system where you operate the RBCs for some sort of rotating schedule would you then still be budgeting a certain amount per year for replacement cost?

A I can't answer that, I don't know. Again, that's not something that I, as Director of Waste Treatment Facilities, would be involved with.

MS. VOGT: Those are my questions.

HEARING OFFICER TARALLO: Did you have some questions?

EXAMINATION OF LARRY HUGHES

BY DR. FLEMAL:

Q Mr. Hughes, I believe you stated at one point that the average ammonia concentration in the influent to your plant is about 10 milligrams per liter, is that correct?

A I would say that's true, yes.

Q General ballpark figure?

A General ballpark. It varies.

Q Did you also state that your effluent, this being the discharge to the Illinois River, is rarely over 10 milligrams per liter?

A No. I believe I stated that the effluent currently after complete treatment is, I would average, currently because of present conditions about one.

Q That's after it goes through the RBC operation?

A Yes.

Q Then that statement that the effluent rarely is over 10 milligrams per liter, was that the discharge then prior to the RBC process?

A That would be, I believe the question was a worst case situation, and I was stating that our average incoming ammonia is in the neighborhood of 10; therefore, if we removed no ammonia that would be approximately the worst case discharge, 10.

Q I see. To further my understanding in this matter then, if the proposal that you have before us would be granted, and there was no change in the character of the influent to your plant, you would be expecting to put out an effluent into the Illinois River that was rarely over 10 milligrams per liter?

A That's true, yes, I think so.

Q You stated in your testimony, however, that you expected that the secondary effluent ammonia levels will

deteriorate dramatically as a consequence of likely additions to your system?

A Yes, sir.

Q How do you marry the thought that your ammonia levels are going to "deteriorate dramatically" and the statement that you will maintain discharge levels that rarely exceed 10 milligrams per liter?

A I'm sorry, would you repeat that.

Q Your current circumstance, you say, absent the RBCs, would produce an effluent rarely over 10 milligrams per liter of ammonia?

A Okay.

Q You've also said in your statement that you expect your ammonium nitrogen effluent, your secondary effluent, to "deteriorate dramatically." I assume deteriorate dramatically means that the number will increase and, therefore, is it increasing above 10 regularly?

A No, I'm not saying that it would increase above 10. I'm saying that, for example, this last month we discharged a level of 0.5 milligrams per liter of ammonia. I'm saying that if we were receiving a substantially

larger BOD loading we wouldn't be discharging 0.5, it would be substantially, could be substantially higher than 0.5. Worst case condition probably would be in the neighborhood of 10. Conceivably could be an occasion more than 10, but generally it would be 10 or less.

Q We still have to clarify some things for me. I think we are talking about three different scenarios, and I have to understand at least two of them. We're talking about the status quo which includes the operation of the RBCs, and you are within your permit limits on ammonium to that certain extent. The second scenario is the removal of the RBCs from the line under the current influent conditions, and that I think you are telling me that you would rarely be over 10 milligrams per liter?

A Yes.

Q What I want to know is the third one, in the future when this "dramatic deterioration" in your secondary ammonia effluent, what will be the concentration discharged into the river under that third scenario?

A As I said, with 10 milligrams per liter coming in, the only other place where the ammonia would be coming from would be from the Kraus process.

Q Aren't you telling me that in the future that you expect that more 10 milligrams per liter will come in?

A No, I'm not saying that. I'm not saying that. I'm saying that in the future I'm expecting more BOD to come in, and the more BOD comes in the less likely it is that we are going to be able to treat down to the 2.5 ammonium discharge level. That's what I'm saying.

Q Let me call your attention to the equations on page 12, the equation on page 12 of your written testimony. Could you explain how this or from what this equation is derived, the equation present on page 12?

A Yes. The base equation is the equation that came from the State Water Survey report, and it would be the one you have there on Table 8, the 15 percent contour.

Q I am looking at Exhibit 6, Table 8, and an equation which is under the 15 percent contour line. I don't see anything in the same form here. You have done something to change the form of the equation?

A Yes. I have taken the "D", which is the first part of the equation, and substituted 250 feet. I have taken the "Q", which was the Illinois River flow, and substituted the equation in brackets, the portion of the

equation in brackets, the "KM" minus "CC" divided by "NFC". That is an equation that was given to the District by the U.S. Geological Survey. And then I've also substituted in that equation the base, the root equation is "t" is equal to .5T plus 12, I believe. I solve the "T" and then substituted that "T" into the equation you are looking at. So the end result is I ended up with "q", "t" and then the USGS's equation for "Q".

Q The base equation then that you worked from, the equation that is in Table 8 of Exhibit 6, am I not correct in assuming that this is a regression equation?

A I think you need to review to the Illinois State Water Survey, I did not generate the equation.

Q I assume given that it has a correlation coefficient associated with it that it is, in fact, a regression equation, and that correlation coefficient is listed in the table of .827?

A Yes, that's right.

Q You indicated that you used that base equation and into that base equation you substituted two other equations, were those also regression equations, to your knowledge?

A The U.S. Geological Survey, I can't say that that was a regression equation, I don't know. And, again, the temperture equation, I'd have to, really should refer that to the State Water Survey. I took the equation that was given to me and I took two other equations that were given to me and I came up with the equation that I put in my testimony.

Q All three of these equations are probably stepastic equations, are they not?

A Probably.

Q And all of them, therefore, would have an error associated with them as we can see by the fact that the correlating coefficient and base equation itself is not one. Have you given any consideration to the error that is introduced into the equation or equations as a consequence of them being stepastic equations?

A From my own working with the equations, I feel that the error would be very small, very minute. For example, the "T" equation, that was based on 663 data points. Statistically that should be a very sound equation.

Q It may be sound in the sense that it has a

correlation different from zero, and that is a statistically significant equation, but that doesn't mean it's necessarily good in terms of a predictive nature. You are using this equation in a predictive sense, I'm trying to get some feel for what error bounds you have on the predictions that you would derive from your equation.

A Again, I really don't feel I'm qualified to answer that question. I think that is something that the State Water Survey should.

Q I will follow up that line of thought, if I might, later with those gentlemen. I think that's generally what we ought to address.

Have you, in fact, tried to calculate some typical values of "q"?

A Yes, I have.

Q Under worst case scenarios, for example?

A I believe I did sometime ago. We've been generating these "q's" monthly just to make sure that the system would, in fact, work.

Q What kind of range of numbers have you encountered in those calculations?

A I do have a sheet here that has that. For the

month of September 1987 the range would have been on the high flow would have been 86.8 million gallons per day, and low would have been 41.9 mgd.

Q That range then would encompass the discharge volumes that you could have discharged had the September month conditions prevailed and had the relief that you are requesting today been in place during that time?

A That's correct, yes, sir. Incidentally, the average for the month would have been 54.7 million gallons per day.

Q Have you encountered in any such calculations times when the permissible discharge would have been less than your current average daily discharge?

A I can't recall actually doing that in reviewing the data. I hadn't noted it. I'm not saying that it hasn't happened.

Q From your experience, what month of the year would you expect would be the month under which your ability to discharge would be most limited under the proposal you offer?

A I think that would be during the summer months, I believe, when the river temperture is higher, I believe.

Q July perhaps?

A Probably July. July, August.

Q Have you done any calculations of what your "q" might have been for those July-August type of conditions?

A Yes. However, I don't believe I have that data with me.

Q You don't recall though that any of the "q" values so calculated would have been less than your current average daily discharge?

A No, I don't recall. I don't recall that happening.

Q Can you envision that under your proposal there would be times when you would have to refrain from discharging a significant portion of your influent volume under this proposal?

A I can see times when we would have to divert a portion of our incoming flow into our first flush pond and/or our diurnal storage basin for later returning through the plant as conditions change, yes, sir.

Q How much capacity do you have available for that type of conversion?

A The first flush basin will hold about eight

million gallons, as I recall, and the diurnal storage basin will hold almost 16 million gallons.

Q You have the potential maximum storage capacity there equal to approximately one day of your average influent, stoce a day's discharge?

A Assuming they are both empty, yes.

Q Would you expect that the conditions in the river, the temperture of the water, for example, stage of the river, change sufficiently rapidly that you could store or that you wouldn't use your storage capacity very rapidly and, therefore, no longer have any diversion possibilities?

A I don't believe the condition would change that much. What I think could possibly cause us problems would be a heavy rainfall. A heavy rainfall with dilute ammonia. And, conceivably, we could under a very heavy rainfall condition exceed the capacity of first flush and diurnal storage and still have this high flow coming at us. Unusual situation. I'm not saying that it couldn't happen, but that would be the worst situation I would see. But, again, under those conditions, I'll restate to reiterate, the ammonia level would be less than 10 coming

into the plant, should be less than 10 based on past experience.

Q As I look at your predictive equation, the larger number of the variables that are present have nothing to do with operations here at the plant, they really basically relate the conditions in the river, am I correct in that? Stage readings, for example, normal fall curve, and so on?

A Yes, that's true. Yes. The main thing that would relate to the plant, of course, in this equation, would be we are assuming 10 milligrams per liter of ammonia, and the only other factor that really relates to the plant is the effluent temperture of BOD.

Q All of the variables that are in this equation though tend to change relatively slowly, do they not? One wouldn't expect a dramatic day-to-day variation in your ability to discharge, am I correct in that understanding?

A That's true. As an example, if you'd like me to I'll briefly run through some of these day-to-day changes that our program has generated for September to give you an idea of how it does change.

Q I think you've already given us some of the

numbers there.

A Okay.

Q Maybe that wouldn't serve a whole lot of purpose.

A Okay.

Q I would just like to be able to gain for myself and hopefully for some of the other Board members some idea of the sensitivity that's involved in this equation both in terms of its ability to predict and the range of numbers that one could reasonably expect under normal operating conditions and under worst case conditions. If perhaps at a future time in the additional comment period or something if you have further thoughts on that that you would think of the Board would appreciate that.

A I will say that the change in flow is not extremely rapid. For example, the very first day of the month starts off at 87 million gallons a day, the next day is 80.1, then 84.7, 83.1, 75.8.

Q Those are "q" values?

A Those are "q". Those are the values of the flow that we would be allowed to discharge based upon 10 milligrams per liter and the effluent temperture.

Effluent temperture, for example, start off at 27 for four days, 28 for two, 26 for one, 27 for three, 28, 27, fairly stable.

Q Under the proposal that you offer, would you expect that the river at the edge of your mixing zone would commonly have concentrations of 1.5 milligrams per liter, or would that itself be a rare event?

A I honestly believe that would be very rare.

Q Is there any basis of support for that feeling on your part?

A Based on the fact that I really don't believe we'll be discharging 10 milligrams per liter of ammonia very often.

Q How do you, or would you propose that society, if you like, be guaranteed that you will not be exceeding 1.5 milligrams per liter outside your mixing zone?

A Society be guaranteed? Well, this equation, if adhered to, I believe will give about the best guarantee that we can give. I believe on its face it's a good equation. I think if it's followed, if we do our job and in not exceeding the determined "Q", plant flow of "Q", I don't believe it will be.

The other thing is, I have to say, it's the staff itself. A lot depends on the staff. It is not our intent to discharge more ammonia than would increase the concentration of the river above 1.5.

Q I certainly appreciate good intentions and the motives, but don't we need somehow to be able to actually demonstrate in the end that what we hope we are going to do we've actually done? If that's the case, should we not be looking at some final proof that what we hope we are accomplishing we actually do?

A I suppose that, I'm just thinking out loud, but I suppose that we've had two studies of the Illinois River that have demonstrated, that have generated the equation and have demonstrated that there would be no major impact on the river. I suppose if you wanted a true guarantee the only thing would be to go out there and measure the river again. Go with this, let us generate the "Q's" discharge and measure the river, see what happens.

Q Go out and actually monitor under the conditions you are posing to see if --

A If we want to -- in answer to your question, if we want to demonstrate to our public that we are, in fact,

doing what we believe we can do, then I believe it would take a study to generate data to show that.

Q Do you think it would be worthwhile to undertake that kind of effort? Would you like to shut down your RBCs for awhile, for example, and monitor and see what happens?

A To answer your question, I think that's the only way we can truly know. And if we need to prove to the public, yes, I think a study like that would be worthwhile.

Q Exhibit 6 on page 35 proposes that there are three major management strategies which could provide assurances that stream ammonia nitrogen standards are not violated. Two of these management strategies are characterized by the author of this report as simple and easily administered. The third one is characterized as the one most difficult to administer. I gather the proposal that you are presenting today, in fact, is this third option basically, the one that the authors characterize as the most difficult to administer. Am I correct in my understanding there?

A I believe so. I haven't reviewed that

particular provision for quite sometime, but I think that's correct.

Q I wonder if we might present Mr. Hughes or give Mr. Hughes a copy of Exhibit 6. I'd like to have him see that. Page 35 in particular I'm making reference to, beginning on the third paragraph there are listed three management studies. The first strategy in the third paragraph down, the second in the next paragraph and so on.

A Yes.

Q Is my understanding correct that the proposal that you are offering today is basically the third of these three management strategies presented here?

A Yes. Although, again, its been awhile since I reviewed this, I think we are looking at kind of a combination between the first and the third.

Q I see.

A We are using a fixed, on a predictive basis we are using a fixed 10 milligrams per liter at the 15 percent contour, which would be, it says, the simplest and most easily administered management strategy would be an across the board adaptation or adoption of the 20 percent

contour. I think that particular question, again, we're trying to, I'm trying to respond to something that's been drafted by the State Water Survey, probably I should defer my response to the State Water Survey.

Q Just one last area of questioning then, Mr. Hughes, at least at this moment. I gather that there would be some operational costs that would accrue to the District as a result of the proposal before the Board. Do you have any idea what those costs might be, the magnitude of those costs?

A Say that again, sir.

Q There will be some costs in doing this constant monitoring and maintenance of your flow. At the minimum, you have got to call Coppras Creek on a regular basis. I realize that's a small cost, but what cost elements might be there for you?

A Virtually none. We're talking about employees who are working for the District already. We're not going to be hiring anyone to do this, so these people are already here. It's just simply a matter of taking some time that they might be doing something else to make a very short phone call. The data I'm talking about, the

temperture data is being generated currently, so that's done by the operators. So it would be the office staff that would merely make a phone call to Coppras Creek and to the Corp of Engineers, we're talking about a minute a day, and then plug the information into the computer, etc., generated very quickly. So the cost would be virtually nothing.

Q There would be no capital costs associated with that?

A No. No, sir, not at all.

HEARING OFFICER TARALLO: Do you have further questions?

MR. KISSEL: Yes.

REDIRECT EXAMINATION OF LARRY HUGHES

BY MR. KISSEL:

Q Mr. Hughes, in the questioning by Dr. Flemal concerning the data, confidence and so forth, are you not confident about the predictive nature of this equation as satisfying the District that it will not exceed the 1.5 milligram per liter?

A I am completely confident of the equation, but Dr. Flemal was referring to a guarantee, and that's the

difficult part. I feel that based upon all the information that I've read in the State Water Survey's report that the equation is adequate, will generate excellent numbers and is quite good. I have no problem with that.

Q If we had to put a confidence level, which we do in statistics, on your confidence level of that equation, where would you put it?

A I think we have to go with the confidence level of the equation itself and, as I recall and was just pointed out, I think the correlation coefficient is 82 percent, I think. So I would have to say that I'm 82 percent confident in the equation.

Q And what would this, you referred to another study or monitoring or whatever, would that increase your confidence?

A Pardon me?

Q This other study or monitoring or whatever, would that increase your confidence of the predictive nature of this equation?

A No. The only reason for a study would just be, again, if he's referring to guaranteeing to the public

that they are, by us not doing this, that they are, in fact, actually getting from the District what we say we will be doing. I have no problem at all with the equation. I wouldn't hesitate to use it myself.

Q The other general area of questions, the implication of some of your answers might be taken that the moment we get a site-specific relief from the Pollution Control Board we are going to somehow turn on a spigot that now takes us from .5 milligrams per liter of ammonia to 10 because we've seen this great happy day where relief has been granted, is that the case?

A No, absolutely not. I don't see that happening. In the first place, currently, I think I pointed out earlier, that our secondary effluent ammonia level, second effluent with no RBCs is right now about .5 milligrams per liter. So there is certainly a long ways between .5 and 10. I don't see that happening.

MR. KISSEL: That's all I have.

HEARING OFFICER TARALLO: Mr. Davis?

MR. DAVIS: No recross.

HEARING OFFICER TARALLO: Thank you.

RALPH EVANS,

a witness called by the Petitioner, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KISSEL:

Q Would you identify yourself for the record, please.

A My name is Ralph Evans.

Q And you have in front of you a statement, I believe, is that correct?

A Yes, I do.

Q And did you prepare that statement?

A Yes, I did.

Q And is it true and correct to the best of your knowledge and belief?

A Yes, it is.

Q Thank you. Proceed.

A My name is Ralph Evans, and my home address is Rural Route 1, Morton, Illinois. I have been engaged in the water quality business in Illinois for over 30 years. For 20 years I was Head of the Water Quality Section of the Illinois State Water Survey. Prior to that time I was

a staff engineer with the Bureau of Stream Pollution, Illinois Department of Public Health. While with the Bureau, much of my activities were related to the policies and enforcement procedures of the Sanitary Water Board, a forerunner of the Illinois Pollution Control Board. I retired from state service in September 1984. I'm a licensed professional engineer and since retirement have performed some consulting services.

The substance of my testimony is contained in the petition before the Board today. It is my purpose to elaborate on some of the considerations that I believe lead to the Board's adoption of Section 304.122(a) of 35 Illinois Adm. Code -- that section from which the Greater Peoria Sanitary District now seeks relief.

During the latter part of 1970 and early 1971, the Board had held a series of public hearings at several locations throughout the state regarding certain proposed effluent requirements. The hearings were recorded as a part of the Board's Docket No. R70-8 in the matter of effluent criteria. I participated in some of the hearings, and more recently reviewed the testimony recorded during them. A memorandum report summarizing my

review was prepared. It is Petitioner's Exhibit No. 1. My review of the record was limited to the aspects of ammonia nitrogen. My memorandum report is similarly limited.

The first public hearing was held in Chicago during December of 1970. At that hearing Dr. Currie, Chairman of the Board at that time, told a witness that the Board had received a report from the State Water Survey regarding a study of the LaGrange pool of the Illinois River. The implication that he drew from that report was that nitrogenous BOD had to be removed from the river if adequate dissolved oxygen was to be maintained in it. At a second public hearing in Chicago during January 1971 a document entitled "Dissolved Oxygen Resources and Waste Assimilative Capacity of the LaGrange Pool, Illinois River, 1970" was introduced into the record as the Pollution Control Board's Exhibit 12.

Q For the record, that is Exhibit No. 2 in these proceedings.

A It is Report of Investigation No. 64 of the State Water Survey. The report refers to a significant nitrogenous demand in the LaGrange pool representing about

54 percent of the total oxygen demand in the upper part of that pool.

I testified at a third public hearing held in Peoria during January of 1971. At the time I was Head of the Water Quality Section of the State Water Survey. In that part of my testimony related to ammonia nitrogen, I said that the major cause for low dissolved oxygen in the LaGrange pool is ammonia nitrogen and that it is responsible for 54 percent of the total oxygen demanding load. Further, about 112,000 pounds of ammonia per day is discharged into the Illinois Waterway throughout its length and 95 percent of that load comes from Chicago. In response to a question, I further stated that 70 percent of the ammonia load applied to the LaGrange pool originated in Chicago. I suggested that either treatment must be initiated on a selective basis to remove ammonia nitrogen, or the dissolved oxygen must be augmented and that selectivity for effluent standards in this case would be more appropriate than the uniform application of ammonia effluent standards for all municipalities along the river. My testimony was primarily based on the findings in the Report of Investigation No. 64.

Following the series of hearings, the Board authorized the publication of a proposed final draft requiring limitations on ammonia nitrogen concentrations and treatment effluent. It was quite similar in language and intent to that now included in Section 304.122(a). It limited the concentration of ammonia nitrogen to 2.5 milligrams per liter during the months April through October, and 4.0 milligrams per liter at other times. The application of the rule was limited, it applied solely to the Metropolitan Sanitary District of Greater Chicago, the City of Joliet and the Greater Peoria Sanitary District as, indeed, Section 304.122(a) does today.

I am convinced that the Report of Investigation No. 64 produced by the State Water Survey in 1970 played a major role in the Board's decision to limit ammonia nitrogen concentrations in the treated effluent of the three municipalities located on the Illinois Waterway. I say this for the following reasons:

After the public hearings, Dr. Curris developed an explanation of the final draft for effluent requirements. His comments are included as part of the Director's Exhibit 1. On page seven and eight he states,

in part in Section 406 of his statement, "The State Water Survey has conclusively shown that reduction of ammonia from the larger sources feeding the Illinois River is necessary if existing standards for dissolved oxygen, essential to aquatic fish population, are to be met."

Also, after the public hearings, Mr. Dumelle, a member of the Board, sent to me a letter dated May 5, 1972. A copy of it is included as part of District's Exhibit 1. In that communication is the following statement, "Your testimony at Peoria on January 20, 1971 was strongly relied upon in enacting an ammonia effluent standard for sewage plants with an influent population-equivalent greater than 50,000."

The Report of Investigation 64 was published in 1970, it is offered here as District's Exhibit No. 2. The field work on which this report is bared was performed in the summer months of 1965, 1966 and 1967. It was an extensive undertaking for the equipment and personnel available to the Water Quality Section at that time. To my knowledge, it was the first attempt made to develop a waste assimilative capacity model, a waste assimilative model for the Illinois River. The most current

methodologies available were used to rigorously evaluate the assembled data. The evaluation effort was a main reason for the three year lapse between termination of the field work and publication of the resultant report.

The effects of nitrogenous demand on the dissolved oxygen resources of the river had been reported earlier by Hurwitz, et al, in 1947. The Hurwitz group, employees of MSD, observed that nitrification upstream of Peoria accounted for as much as 73 percent of the total oxygen demand, of the total biochemical oxygen demand in the vicinity of Henry, Illinois. Later, Kohlman and his co-workers also with MSD, isolated the carbonaceous for the nitrogenous demand during three summer months in 1946 and 1948 for the upper reaches of the river. If I may back up there, they isolated the carbonaceous from the nitrogenous demand during three summer months. They concluded, as reported in 1950, that though ammonia is a liability for the dissolved oxygen balance it must be accepted as a pollutant because complete oxidation of ammonia in the waste treatment process at that time was impractical.

The data collected by the State Water Survey in

'65, '66 and '67 and subsequently evaluated, clearly showed that the nitrogenous demand in the LaGrange pool was significant. It represented 54 percent of the total BOD. This was reported to the Board.

During the summer months of 1971 and '72, a State Water Survey undertook a water quality study of the upper Illinois Waterway extending from Chillicothe, Illinois, upstream to Lockport, Illinois, a distance of about 113 miles. The study included the pools of Brandon Road, Dresden Island, Marseilles, Starved Rock and the upper Peoria. The resultant report "Water Quality Features of the Upper Illinois Waterway, 1975." It is State Water Survey's Report of Investigation 79, and offered here as District's Exhibit No. 3.

This report is pertinent to these proceedings because for the first time in an effort to model the water quality features of the Illinois Waterway a combination of dissolved oxygen demanding sources were included in the modeling process. In addition to carbonaceous and nitrogenous demand the influence of benthic extraction and sediment oxygen demand were examined.

During the interim between the LaGrange pool

work and this particular study, the State Water Survey had developed the equipment and technique to effectively measure the sediment oxygen demand. This development came about largely due to the efforts of Tom Butts of the Survey, and it expanded the capability of the researchers to realistically measure that oxygen demand source other than that either n a dissolved or colloidal state within the waters of a river and/or lake.

The sediment oxygen demand, historically, has not been considered a significant source of oxygen demand on overlying waters of streams and rivers. Its magnitude is proportional to residence time and the residence time overlying waters in a free-flowing stream is often minimal. However, in dammed rivers, such as the Illinois River, the residence time can be quite lengthy in pools during low flow periods. Sediment oxygen demand measurements performed as part of the upper Illinois Waterway study demonstrated that SOD is a significant oxygen sink in its navigation pools.

The work reported in the State Water Survey's Report of Investigation 75 conclusively demonstrated that the sum of the carbonaceous and nitrogenous oxygen demand

was not, as assumed for the LaGrange pool study, the total oxygen demand imposed upon waters of that pool. Rather the carbonaceous and dissolved -- rather the carbonaceous and nitrogenous demand were the total oxygen demand. Thus, the nitrogenous demand in the pool was not of the percentage magnitude reported by me to the Board in 1971, or included in the State Water Survey Report of Investigation 64.

The application of the Board's rule limiting ammonia nitrogen in the treated effluent of the MSD has been very beneficial to the fishes and other aquatic inhabitants of the Illinois Waterway. More recent studies than those described by me today suggest that the application of Rule 304.122(a) to the treated effluent of the Greater Peoria Sanitary District has not been measurably beneficial.

Q For the record, I do not believe we have included in this record SWS Report of Investigation 75, is that correct, has that been included?

Investigation 64 is our Exhibit No. 2.

A I beg your pardon, I think that 75, when I referred to it on page six of my testimony here, the

report reported in SWS Report of Investigation 79.

Q Okay, then that is Exhibit No. 3?

A Yeah.

Q Thank you.

MR. KISSEL: No further questions at this time.

HEARING OFFICER TARALLO: Mr. Davis?

MR. DAVIS: None of us from the Agency has any questions.

HEARING OFFICER TARALLO: Anyone from DENR, do you have any questions?

EXAMINATION

BY MS. VOGT:

Q The only question I have is in relation to the last sentence of your testimony. "More recent studies than those described by me today suggest that application of the rule to the treated effluent of the GPSD has not been measurably beneficial." By "beneficial" do you mean beneficial to the fishes and other aquatic inhabitants of the Illinois Waterway, or do you mean beneficial in regards to the water quality?

A Has not been beneficial to the water quality of

the pool in terms of water quality standards.

MS. VOGT: That's all.

HEARING OFFICER TARALLO: Do you have any questions?

EXAMINATION

BY DR. FLEMAL:

Q One area of questioning. If you were to go back to the statements that you made in the original rulemaking before this Board where you had stayed, I believe, that 54 percent of the oxygen demand in the LaGrange pool is nitrogenous demand and correct those figures to your understanding at present, how would those figures be correct?

A There will be testimony later by Mr. Butts on the most recent studies that he's made whereby he has assigned percentages to carbonaceous, nitrogenous and SOD.

DR. FLEMAL: That will be satisfactory then, I'll get my answer later.

HEARING OFFICER TARALLO: Mr. Kissel?

MR. KISSEL: Nothing.

HEARING OFFICER TARALLO: Any other questions?

DR. FLEMAL: Just one.

EXAMINATION

BY DR. FLEMAL:

Q I gather you have some familiarity with the Illinois River locally?

A Yes.

Q How would you characterize the recreational activity in the region where we are immediately now say up river from Peoria lock and dam?

A From the, from this area down to the lock and dam it's a rather narrow river with a pretty good sized bend in it and with a considerable amount of barge staging suggesting to me that normal outdoor recreation in terms of water skiing and boating and whatnot would be somewhat limited in contrast to farther upstream where the channel is not so narrow, or farther downstream in the LaGrange pool.

Q In your experience have you seen recreational activity in this reach of the Illinois River?

A From this reach down I have not seen too much recreational activity. Immediately below the dam a lot of fishing, but between here and the dam not too much

cavorting around in terms of recreational activity.

Q In terms of that stretch of the river below the Peoria lock and dam you indicate a fairly large amount of fishing below the dam, does that high level of fishing activity continue any distance downstream from the dam, or is it just in the spill area?

A I think it does. I think, I was talking very recently with Mr. Butts and he was telling me about fishing tournaments down in the Havana area and, as I pointed out in the District's petition, there are several sandy beach areas along the pool, and there are probably about four or five public access ramps in the LaGrange pool suggesting that people are using them.

HEARING OFFICER TARALLO: Okay. Any further questions by anyone?

MR. DAVIS: No. But I would point out, since Dr. Flemal has raised the issue, that a gentleman is here from the Department of Conservation strictly to provide information on that issue. I don't want to interrupt Petitioner's presentation, though.

HEARING OFFICER TARALLO: Do you want to go ahead then?

MR. KISSEL: Sure. We'll go on to another witness.

HEARING OFFICER TARALLO: Thank you.

THOMAS A. BUTTS,

a witness called by the Petitioner, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KISSEL:

Q Would you identity yourself, please.

A My name is Thomas A. Butts, I am a Research Engineer and Assistant Section Head with the Water Quality Section with the Peoria Lab here in Peoria.

Q And did you prepare a statement for today's hearing?

A Yes, I have.

Q And is that true and correct to the best of your knowledge and belief?

A Yes.

Q Would you proceed with it, please.

A I am an engineer. I received my Bachelor of Science in Civil Engineering from the University of Iowa in 1962. I received my Master of Science Degree in

Sanitary Engineering from the University of Iowa in 1963. Upon graduation with my Master's, I worked for a year and a half as a Field Engineer for the Illinois Sanitary Water Board, precursor to the present IEPA. Then the next two years I spent as a commissioned officer with the United States Public Health Service. And for the last 20 and a half years I've been an environmental research engineer with the Illinois State Water Survey. I am a registered professional engineer in several states.

From June 1920 -- excuse me, from June 20, 1979 to September 5, 1979, the Water Quality Section of the State Water Survey conducted a water quality study of the Illinois River between the LaGrange lock and dam at river mile 80.2 to Peoria at river mile 166.1, a point approximately six miles upstream of the District's treatment plant outfall.

The major objectives of this study were; 1) To collect and analyze water quality data so that the oxygen demand sinks and attendant reactive rates persistently manifested within the pool could be isolated and better defined. And, 2) To evaluate the potential effects of increased Lake Michigan diversion on the overall water

quality and waste assimilative capacity within the pool. The study was sponsored and funded by the Division of Water Resources of the Illinois Department of Transportation at the request of the Chicago District of the U.S. Army Corp of Engineers. Results were published in the Survey's Contract Report No. 260 entitled "Water Quality Assessment and Waste Assimilative Analysis of the LaGrange Pool, Illinois River," dated June 1981, with the principal author being Thomas A. Butts. The report is offered as the District's Exhibit No. 4.

On page seven the report states:

"Since the 1965-1967 study, the State Water Survey has monitored the DO levels throughout the LaGrange pool twice: once during the summer of 1973, and once during the spring and summer of 1977. Although the 1973 summer flows were relatively high during most of the sampling period, DO concentrations as low as 3.0 milligrams per liter were observed. During 1977, the flows were somewhat less than those of 1973 and

the minimum DO recorded was 2.2 milligrams per liter. These unfortunate conditions still persist in spite of the fact that millions of dollars have been spent since 1967 on expanding and upgrading existing sewage treatment facilities and providing new treatment plants where none had existed. Obviously, some unique problems are associated with the waste load inputs to the pool and with the ability of the pool to assimilate them."

Three dissolved oxygen, DO, sinks were requested. They were carbonaceous biochemical oxygen demand, CBOD; nitrogenous biochemical oxygen demand, NBOD; and sediment oxygen demand, SOD. SOD rates were measured in situ throughout the pool, and this is the first time an attempt had been made to incorporate SODs into the DO balance of the LaGrange pool.

On page 98, the statement was made that: "On the average the SOD represented about 25 percent of the total demand on the oxygen resources of the pool."

Further, on page 105, the report states:

"The relative influence of the three primary oxygen demand sinks, carbonaceous BOD, nitrogenous BOD and sediment oxygen demand on the DO resources of the pool were examined. For seven-day, 10-year low flow conditions at 30 degrees centigrade, using assumed CBODs and NBODs at 6.5 milligrams per liter and 5.5 milligrams per liter, respectively, in conjunction with measured SODs, the relative impact of each oxygen demand component is as follows: CBOD, 56.5 percent; NBOD, 13.4 percent; SOD 30.1 percent.

"These values reflect pool averages only. At the beginning of the pool under seven-day, 10-year low flow conditions, the CBOD accounts for 65 to 72 percent of the oxygen usage while at the end of it it accounts for only 35 to 40 percent. In the meantime, the SOD fraction increases from 15-20

percent to around 40 percent, and the NBOD increases from about 15 percent to a little over 25 percent."

This is due to the fact that the dissolved CBOD and NBOD, introduced at the head of the pool, is biologically reduced with time-of-travel within the pool and is supplemented only by minor inputs along the way, whereas, for BOD, this is not true. During the 1979 study, the BOD rate was higher near the LaGrange than at Peoria. The average BOD rate for the upper 20 miles of the pool was .04 grams per meter squared per day, compared to an average rate of 1.07 grams per meter squared per day for the lower 20 miles.

The Water Quality Section of the State Water Survey monitors Illinois River water quality twice weekly at river mile 161.7, approximately 1.6 miles above the District's outfall. During 1979, the year just prior to the startup of the ammonia treatment facilities at the District's plant, the average ammonia nitrogen load in the river based on 51 sampling dates was 72,477 pounds per day. For the same 51 sampling dates, the District discharged an average of 1,832 pounds per day. This

represents only about a 2.5 percent addition to the total ammonia nitrogen load in Peoria. The District's effluent elevated the ammonia nitrogen concentrations into the river to unprecipitous values ranging from .001 milligrams per liter to .086 milligrams per liter. This is not surprising considering the fact that the dilution ratio of the plants average design flow of 37 mgd to the seven-day, 10-year low river flow of 3,000 CFS is over 52 to 1.

During 1984, a study, partially funded by the District, was conducted to ascertain the effects the D' trict's ammonia nitrogen discharges have on downstream water quality. One objective was to determine the effects District treatment plant discharges have on the dissolved oxygen resources of the Illinois River. The results were published in the Survey's Contract Report No. 373 entitled "The Impact of Greater Peoria Sanitary District Ammonia Discharges on Illinois River Water Quality," dated November 1985, with the principal author being Thomas A. Butts. The report is offered as the District's Exhibit No. 5.

On page 135 in the summary and conclusions section, the first three conclusions given are:

"1) The requirement that the GPSD meet a 2.5 milligrams per liter ammonia effluent standard is unjustified and severely restrictive;

2) Ammonia nitrogen loads in the range between those historically and presently discharged by the GPSD affect Illinois River DO resources very little;

3) A permissible increase in GPSD effluent ammonia concentration is limited to a maximum value dictated by toxicity and mixing zone standard requirements as set forth in the IPCB Rules and Regulations.

Thus far, this testimony has offered, for the Board's consideration, a brief history of the genesis of 35 Illinois Administrative Code 304.122(a) as technically formulated on the assumption that only dissolved carbonaceous and nitrogenous oxygen demands impact the DO resources of the waterway. Also, certain exhibits have been offered which reflect the findings of subsequent investigations showing that sediment oxygen demand is also a major cause of oxygen depletion in the LaGrange pool.

This was done, not to negate the importance of the dissolved BOD factions, but to demonstrate that these factions constitute a smaller percentage of the total demand as previously thought. Finally, this testimony has presented evidence strongly supporting the view that past and present ammonia nitrogen loads, discharged by the District's treatment plant, are insignificant compared to those existing in the Illinois River immediately upstream of the District's outfall and which, in turn, impact the LaGrange pool. In essence, the District's secondary treatment facilities produce effluent ammonia nitrogen loads even in the absence of specialized ammonia removal processes, that will not adversely affect LaGrange pool DO resources.

The District is well aware of its obligation to maintain or to adhere to other water quality standards, besides those pertaining to DO, relative to ammonia nitrogen in its treated effluent. As mentioned earlier, the District does not seek relief from existing water quality standards. The District considers Section 304.105, 302.210 and 302.12 of the 35 Illinois Administrative Code applicable to the relationship between

water quality standards and the ammonia nitrogen in the District's treated effluent.

These matters, in part --

Q For purposes of the record, why don't we just assume that that's been read so he doesn't have to.

HEARING OFFICER TARALLO: Okay.

A Okay.

"These sections, in part, stipulate that:

Section 304.105: No effluent shall, alone or in combination with other sources, cause a violation of any applicable water quality standard.

Section 302.210: Any substance toxic to aquatic life shall not exceed one-tenth of the 96-hour median tolerance limit (96-hour total) for native fish or essential fish food organisms.

Section 302.212: a) Ammonia nitrogen (as N: Storet Number 00610) shall in no case exceed 15 mg/l.

b) If ammonia nitrogen is less than 15 mg/l, then un-ionized ammonia (as N)

shall not exceed 0.04 mg/l.

c) Ammonia nitrogen is less than 15 mg/l are lawful regardless of un-ionized ammonia concentration.

e) The following table indicates the maximum ammonia nitrogen concentrations allowable for certain combinations of pH and temperture.

AMMONIA NITROGEN
WATER QUALITY STANDARD (mg/l)

Temp. C (F)	6.0	6.5	7.0	7.5	8.0	8.5	9.0
5(41)	15	15	15	9.6	3.1	1.5	1.5
10(50)	15	15	15	6.5	2.1	1.5	1.5
15(59)	15	15	13.9	4.4	1.5	1.5	1.5
20(66)	15	15	9.6	3.1	1.5	1.5	1.5
25(77)	15	15	6.7	2.1	1.5	1.5	1.5
30(86)	15	14.9	4.7	1.5	1.5	1.5	1.5
35(95)	15	10.7	3.4	1.5	1.5	1.5	1.5"

Section 302.212 is principally predicated upon the toxicity of ammonia nitrogen to native fish and essential fish food organisms in Illinois waters. Ammonia nitrogen concentrations up to 15 milligrams per liter are permitted in Illinois waters provided the un-ionized ammonia as N does not exceed .04 milligrams per liter.

Roseboom and Richey reported that .04 milligrams per liter of ammonia nitrogen was 1/10 of the 96 hour TL for certain native fishes. This is referenced to State Water Survey Report of Investigation No. 85, published in 1977. Section 302.212(e) shows that the maximum permissible ammonia nitrogen concentration in any waters is a function of water temperture and pH. It follows that compliance with Section 302.212 is also compliance with Sections 304.105 and 302.210.

A water quality standard for ammonia concentration in the Illinois River is shown in the table of Section 302.212, is a function of water temperture and pH. Appendix D of the District's Exhibit No. 5 shows that the Illinois River water tempertures range from zero to three degrees centigrade. Illinois River water pH values rarely fall outside the 7.5 to 8.5 range at Peoria and normally falls between 8.0 and 8.5. A review of the table in Section 302.212(e) shows that the ammonia nitrogen concentration in the Illinois River at Peoria, for the temperture and pH ranges noted, should not generally exceed 1.5 milligrams per liter. The District contends that 1.5 milligrams per liter ammonia nitrogen is a

reasonable water quality standard for the Illinois River at Peoria.

From 1984 through 1986, the District sponsored and partially funded a State Water Survey study of the impact of the District's ammonia nitrogen discharges on the water quality of the Illinois River. One of the objectives of the work was to define a mixing zone for the District's treated effluent discharges as allowed in 35 Illinois Administrative Code 302.102(a) (b) and (c). Results of this work are compiled in Exhibit 5 and another report entitled "The Impact of Greater Peoria Sanitary District Ammonia Discharges on Illinois River Water Quality, Part 2," dated November 1986, with the principal author being Thomas A. Butts. This report is offered as District Exhibit No. 6.

Section 302.103 of the 35 Illinois Administrative Code stipulates, in part, that:

> "a) Whenever a water quality standard is more restrictive than its corresponding effluent standard then an opportunity shall be allowed for the mixture of an effluent with its receiving waters. Water

quality standards must be met at every point outside the mixing zone."

On January 28, 1986 a request was submitted to the Illinois Environmental Protection Agency, IEPA, for a favorable endorsement of a mixing zone as permitted within the constraints of Section 302.102. The request was supported by the report designated in this testimony as Exhibit No. 5. On September 22, 1986 an amended request was submitted to the IEPA. It was supported by the report designated here as the District's Exhibit No. 6. On December 5, 1986, the IEPA approved a mixing zone for the District. A copy of the IEPA approval letter and a sketch depicting the configuration of the mixing zone is presented here as District's Exhibit No. 7.

This concludes my formal presentation.

MR. KISSEL: Nothing further at this time.

HEARING OFFICER TARALLO: Agency, do you have any questions?

MR. DAVIS: Just a moment, please.

We have no questions.

HEARING OFFICER TARALLO: Would you identify yourself.

MR. RAY: Lyle Ray.

CROSS EXAMINATION OF THOMAS BUTTS

BY MR. RAY:

A You mentioned in one of your reports that there were low DOs in certain segments of the Peoria Lake area and, I assume, in the LaGrange pool and certain spots, do those conditions still exist in any of your more recent studies?

A There are still standard violations, but not near of the magnitude as I have reported here. There have been dramatic improvement in the last 10 years.

Q They still exist in certain times in certain locations?

A Certainly.

If I may add, in my opinion there is probably very little in terms of on-bank or anything else we can do to improve those situations. As Ralph Evans mentioned in his testimony, we have pools out there now that act more like lakes and you know that even in lakes, like this summer when we got 30 degrees centigrade temperturee and stagnant conditions and high algae boom, waters that receive no waste whatsoever were experiencing low DOs

because of the physical set-up and the nature of the waterway. Now we're going to experience these during these extreme conditions no matter what we do on-bank.

HEARING OFFICER TARALLO: Any further questions?

EXAMINATION OF THOMAS BUTTS

BY MS. VOGT:

Q On page 36 of Exhibit 5.

A Okay.

Q Could you, in the second paragraph, the paragraph at the bottom of that page, could you speak to the significance of your statement "This leads to the suspicion that the ammonia concentration in the effluent may possibly be influencing the ammonia concentration in the river in the outfall area and downstream."

A Let me digest, I haven't read this particular statement for awhile.

Well, actually I'm stating the obvious, I went through a statistical test really to state the obvious. Sure, when you have a point discharge in which you are going to have a higher concentration of ammonia than you have in the river it's going to, obviously, in that

localized area, it's going to impact it. That's really all I'm saying.

Q And also on page 116 of that same study under "Discussion," the first sentence of that study or in the second sentence you mention nitrogenous compounds. In the study on page 116 it's mentioned that, "Nitrogenous compound in water can creat a number of environmental and ecological problems. Such coumpound can be acutely toxic to aquatic, fauna and flora, and tend to depress dissolved oxygen throughout ammonia oxidation." You also state, but you don't elaborate on later, "Can cause public health problems, can stimulate algea growths and can produce disinfection efficiencies during chlorination of the potable water."

A That's all true. Do you want me to elaborate on that?

Q Yes.

A First off, the easiest one to elaborate on is the fact that ammonia is a nutrient. I mean you add ammonia to your yard to make your grass grow better, and the same way if you add ammonia to the water you are going to make the algae grow better, that's one of the three

essential nutrients for primary growth. But I'm mentioning, this is not a real factor in this case, it is one of the things that can be considered as significant in other areas or other streams maybe.

Public health significance, again, is not a significant fact here, but maybe you've heard the term "blue babies," maybe 40 parts per million of nitrogen can cause effects in infants a year, less than a year old. Again, we're not dealing with levels near this high in the waterway below, and certainly Peoria is not used as a water supply. So, again, this is significant of ammonia discharges to a stream, but it's not significant here.

What was the third one now? Disinfection. Ammonia compounds can tie up chloride into a form they call chloramine which it's a more stable form of chlorine but it's less effective in killing organisms. And, again, we're not dealing with a significant factor here. I just pointed those out that, you know, maybe to show my professional knowledge that I didn't neglect these, I was aware of them.

Q On page 17 of the petition that was submitted there is some reference to the fact that the RBCs can also

reduce concentrations of biochemical oxygen demand. Was this taken into account in your equations when you were calculating the effect on the Illinois River?

A Well, in my testimony I indirectly, and if you read, I guess it's Exhibit 5, it goes into detail of the worst case conditions and that in effect of increasing BOD loads. So that is in the report in a section in the report, I believe in Exhibit 5, the first mixing zone report. Yes, it's in Exhibit 5. Your question can be answered in there.

MS. VOGT: That's all the questions that I have.

HEARING OFFICER TARALLO: Do you have questions?

EXAMINATION OF THOMAS BUTTS

BY DR. FLEMAL:

Q Mr. Butts, I believe you heard my questioning of Mr. Hughes a short time ago regarding the predictive accuracy of equations?

A Right.

Q Without repeating those same questions to you, and after having heard those questions, would you care to

comment on your understanding of the error bounds associated with the equations?

A I understand the significance of the errors. The coefficients themselves in equations were derived at a 95 percent confidence level, which means that, you know, there is a 5 percent chance exists that the coefficients in those particular equations may not be exactly as stated.

And as far as correlation coefficients go, the square of the correlation coefficient really gives the explained variation. So an equation where, I don't have my calculator here, and I don't have, I'll have to recall from memory, but it was around .927, or something like that, if you square that that gives you somewhere roughly around 65 percent. So there is a, those four variables only explains around 65 percent of the variation observed at the time of the sampling. So there is a relatively, if you want to call 35 percent, there is a probability that there are other factors associated with that. In fact, 35 percent of the variability is not explained by those four factors. But that doesn't negate the utilitarianness of those equations, you know, you got to take the whole study

into perspective.

I think in Exhibit 6, and we were talking about safeguards, in the study itself the way it was designed we more or less monitored ourself as we went along. Because if you turn to the conclusions in that section and we read let's see, and we look at conclusion number five, it says, "At no time during the warm or cold weather study were the IPCB's river water quality standards violated outside the mixing zones, as defined by this study, even though effluent ammonia levels as high as 15.06 milligrams per liter were observed. Under study conditions, summer discharge concentrations range from 7.14 milligrams per liter to 149.92 milligrams per liter could have been tolerated without violating the standards." And so we ran, we were out there 20 times and essentially we monitored the river 20 times during the study and not once did we find a violation even close to being outside the mixing zone.

And you got to realize, there is a tremendous amount of data that went into generating these equations and, as you know, the more data you got the less error you can generally generate if you have a solid basis around

which you are developing your data. And so, you know, I feel confident that if we could generate more data it would support or improve our predictive nature even more.

Q Again, I appreciate your confidence in that matter, but I wonder if we are not going about this wrong in terms of trying to show the accuracy, if you like, of the equation. Why not a standard deviation, standard error of the estimate on the "Q" on the "D" values or confidence intervals around either number?

A Because we're dealing with a mixing zone. We have to define the mixing zone. So we got to develop a methodology to define the mixing zone.

Q Mixing zone is defined for us, is it not, in Exhibit 7? We know what the mixing zone is.

A Exhibit 7 was an outgrowth of Exhibit 6. Without Exhibit 6 and 5, there would be no way that Exhibit 7 could come about. And in my testimony is presented the fact that the District submitted both of those, the first cut through was not evidently totally acceptable but with renegotiation a final acceptable mixing zone was accepted based on these two exhibits.

Q We seem to be talking about different things

here, and I've got to know in the end what the answer is because I have to ultimately make a decision on this matter.

I was asking Mr. Hughes specifically about "q" values. He indicated based upon back calculation through September that they could have discharged somewhere as much as 40 million gallons per day down into 30, I forget the exact numbers, but it was substantially in excess of what the current discharge is. That calculation is a determinative calculation, it does not recognize the fact that there is an error associated with each one of those estimations, be it 40.3 million gallons per day or something else. I'm trying to find out what that error is. Do you have any reflections on what that error might be?

A The only way really in this case that you can determine what that error would be to continue, continuing, I would say, on basically a concentrated one-shot deal to determine how your predictions or the predictions made with the equations check out with what you actually find in the field.

Q I'm not particularly asking for more field

information. Aren't there statistical techniques that allow you to determine what --

A Yes.

Q -- the potential error is?

A It can be derived.

DR. FLEMAL: This is obviously something that it doesn't look like we can get an answer here today, at the minimum it obviously requires some reflection, probably also requires some calculation. I guess I would ask, given that situation, that the District might wish to look at that aspect.

MR. KISSEL: Can I ask what this is sort of leading to? I have no problem putting together whatever calculations. So we understand what we are doing and what we are trying to accomplish by this. If I could ask --

DR. FLEMAL: I think the logical question that has to be asked on any decision in this matter, since this equation, presented by Mr. Hughes, is critical to how the District proposes to operate that we understand the District's ability to actually perform as implied. I think we need to know, therefore, something about the accuracy of the underlying equation. I don't think we

have that yet and I think it would be useful for the record if we did.

MR. BUTTS: I think we have based on our sampling of ammonia in conjunction with the mixing zone study. I mean we don't have it defined finitely in terms of mathematics in terms of standard error, or that type of thing, but we do know that at least we're not probably going to find, if we sample 20 times, because we didn't. We already sampled 20 times and we've never found it in violation.

MR. KISSEL: I was just wondering what calculations we would actually do. Whether this has a 95 percent confidence level or whatever, my understanding from the testimony, and talking to Mr. Butts is that we believe the model has been verified in the field, that's really what we are saying.

MR. BUTTS: Yes, that's what I was saying. To a limited degree. You can always generate more data.

MR. KISSEL: I think, and my understanding of what he's saying, that calculations won't change what is, in fact, a model that has been field tested. And the way you make it better in your field testing is do more

sampling which he believes will confirm what has already been confirmed.

It's like having an air quality model that you've done sampling at the point you predicted and found what you predicted was true. It's verified. I believe that's -- we can certainly look into it further, but that's what I understand his testimony to be. Confidence levels, or whatever, are not really the point. It's the point of verification which has happened here. That's what I understand it to be. If that's not the case, we'll -- I'm not testifying, I'm just trying to clarify.

DR. FLEMAL: I understand, Mr. Kissel.

MR. KISSEL: I've never testified before the Board.

DR. FLEMAL: I'm not testifying either, Mr. Kissel.

I understand fully your point about field testing a model, and I agree that going back to the field is not what we are looking for today. But if you can answer for me, and perhaps my colleagues on the Board as well might conceivably have some interest in this, that if I take the equation and I calculated "0" for day X and

that "Q" comes out to be 30 mgd per day, what is the -- there is a plus or minus value associated with that as a standard deviation or a 95 percent confidence interval or 99 percent confidence interval that tells me how much faith I can put in that number 30 that I calculated for that X.

What I find missing is I don't know what the confidence associated with any estimate calculated from this equation is. And that's it.

MR. KISSEL: Why don't we take a look at that.

MR. BUTTS: I understand fully what he's -- he's saying. I have no problem with that.

EXAMINATION OF THOMAS BUTTS

BY DR. FLEMAL:

Q One other area of questioning, Mr. Butts. You are employed by the State Water Survey at the present time?

A Yes.

Q Does your testimony here today in any way reflect upon a position taken by the State Water Survey?

A I'm only expanding upon results and data as we

have generated them. No bias whatsoever.

Q I gather that the reports you have produced, or at least have been offered, Exhibits 5 and 6, have gone through peer review by the Survey?

A They have been reviewed by the Survey, edited and reviewed.

Q Standard State Water Survey editorial procedures for those reports?

A Correct.

DR. FLEMAL: That's it.

HEARING OFFICER TARALLO: Mr. Kissel?

MR. KISSEL: Nothing further.

HEARING OFFICER TARALLO: Thank you.

MR. KISSEL: I don't have a copy of, we've given away all of our copies, but I would like to introduce as Exhibits, starting with Exhibit No. 8 -- I hope to use somebody's copy, mine are marked up. We can get copies. But Exhibit No. 8 would be the testimony of Mr. Carlisle. Exhibit No. 9 would be the testimony of Mr. Hughes. Exhibit No. 10 would be the testimony of Mr. Evans. Exhibit No. 11 would be the testimony of Mr. Butts.

Is that acceptable to have that put in evidence? Because they do have some numbers that we are were not actually testified to but, like the equation, for example.

HEARING OFFICER TARALLO: Okay. Those will be admitted.

(Whereupon Petitioner's Exhibit Nos. 8 - 11 were admitted in evidence.)

MR. KISSEL: With that, we have no further evidence at this time.

HEARING OFFICER TARALLO: We need a five minute break.

MR. KISSEL: Right now I have a 5:05 airplane, that may be impossible. I don't know how long we are going to go from this point.

HEARING OFFICER TARALLO: Why don't we talk about that. We'll go off the record.

(Whereupon a short recess was taken.)

HEARING OFFICER TARALLO: We'll call the hearing back to order.

MR. DAVIS: The Agency has a short presentation which has narrowed down essentially to the

introduction of four exhibits, all of which are self-explanatory.

No. 1 is a couple tables representing summary data as to the District's treatment efficiency.

No. 2 is what might be called the CSO study, it's entitled "An Assessment of the Impact of Combined Sewer Overflows at Peoria on the Waters of the Illinois Waterway." That was a State Water Survey Contract Report No. 330.

Exhibit No. 3 is the Illinois River Action Plan, which is Special Report No. 11 of the Illinois State Water Plan Task Force, dated October 1987.

Exhibit No. 4 is an internal memorandum prepared by Mr. Kammueller and Mr. Ray containing their comments on their review of the proposal and also raising issues of contention.

We had intended to have Mr. Kammueller testify, however, the memo, Exhibit No. 4, we believe fairly represents the subject and substance of his testimony.

The purpose of Exhibit No. 3 is to inform the Board of really the latest study or plan focusing on the Illinois River, Peoria pool specifically. There are two

portions that we would ask the Board to take specific note of, page 90 and following dealing with water quality, and page 142 and following dealing with wastewater disposal.

Finally, there is a witness here who we have requested to come, his name is Wayne Herndon of the Illinois Department of Conservation. We would request that he be sworn in and be allowed to make a statement.

MR. KISSEL: If I might, the District's position on those exhibits is that we would not object to them on the basis, at least -- let's take the first one, Exhibit No. 1. We understand from Mr. Hughes that those are accurate data. Whether they are relevant or not is another matter, but we believe they are accurate, therefore, we would not require a foundation for their admission into this record.

As far as the two studies are concerned, the second study was done by the State Water Survey and Mr. Butts was involved so we would have a problem objecting to one since he is our witness.

The third study, the Action Plan, I have not seen or evaluated, and so it is a public study, as I understand it, and we would appreciate getting copies of

it. I personally do not have a copy of it.

As far as the Kammueller memo, we would not object to it on the basis that it is what he would testify to if called as a witness, but we may and probably will, based upon our cursory review, have some comments about it in terms of the relevancy of what he says or we dispute certain things he says.

So with those statements, I think these can be entered into the record as far as we're concerned with those reservations.

(Whereupon Agency Exhibit Nos. 1 through 4 were admitted in evidence.)

HEARING OFFICER TARALLO: Okay. We can swear the gentleman in. Also, Ms. Vogt is going to make some statements, so we can swear her at the same time.

Miss Vogt?

MS. VOGT: What did you say?

HEARING OFFICER TARALLO: You can be sworn in at the same time as Mr. Herndon for the interest of time.

MS. VOGT: I'm not sure if I need to be sworn in. I just want to correct a portion of the

petition that is inaccurate.

HEARING OFFICER TARALLO: Well, that's all right then. All right. You can make your statement after he's done.

WAYNE E. HERNDON,

a witness called by the Agency, being first duly sworn, was examined and testified as follows:

MR. HERNDON: My name is Wayne E. Herndon, Jr., I am a District Fishery Biologist with the Illinois Department of Conservation.

I would like to address page four of the petition where it outlines the recreational use of the area downstream from the effluent of the Peoria Sanitary District.

It has been our experience that we have exceedingly heavy fishing use in the channel proper, especially downstream from the Peoria lock and dam extending to a point close to Havana, Illinois. In fact, that is the most popular fishing area and not the backwaters as stated in the petition.

The other comment that I would like to make, is that there are six public launching facilities between the

Sanitary District outfall and Beardstown on the Illinois River.

The other point that I would like to address is that there is also a commercial fishing activity on that stretch of river where the fish are sold as food source. The major activity in that stretch of the river is not fishing but is, in fact, boating, and there is an exceedingly heavy boating traffic in the months of June through August in that particular stretch of river. Also, within that very stretch of river between Beardstown and the Peoria Sanitary District outfall there is 12 miles of public access shoreline available.

And that concludes my remarks.

HEARING OFFICER TARALLO: Any questions?

MR. DAVIS: Yes, we do.

EXAMINATION OF WAYNE HERNDON

BY MR. DAVIS:

Q Sir, what's the basis of your familiarity with this area?

A Annually we sample the area biologically for fish population, and that particular stretch we have three sampling points that are sampled annually in order to

determine fish populations.

Q How long have you been with the Department?

A I've been with the Department 16 and a half years.

Q And how long has this part of the State and this part of the Illinois River been within your region?

A Ten years.

Q And do you also frequent the river on your free time, your personal time?

A Yes, I do.

MR. DAVIS: Thank you, no other questions.

HEARING OFFICER TARALLO: Miss Vogt.

EXAMINATION OF WAYNE HERNDON

BY MS. VOGT:

Q Do you anticipate that the proposed riverfront development along Lake Peoria, will that cause any increase in recreational activities in the area that we are talking about as far as the outfall and the Sanitary District?

A One would speculate that that would be the probable case.

MS. VOGT: That's all.

HEARING OFFICER TARALLO: Do you have any questions?

MR. JOHNSON: I don't have any questions.

HEARING OFFICER TARALLO: Dr. Flemal.

EXAMINATION OF WAYNE HERNDON

BY DR. FLEMAL:

Q Do you have any feeling for whether or not the proposal, as adopted, would affect the recreational activities in the LaGrange pool?

A The activities themselves, no, I don't suspect that it would have an effect.

Q How about the quality of those recreational activities?

A I'm uncertain at this point whether that would, in fact, be the case. I can't really answer that. I have reservations.

Q In what way might adoption of this proposal affect recreation or recreational quality?

A I'm concerned about the possibility of ammonia levels affecting over-wintering catfish populations in the channel of the river.

Q Could you explain further how catfish might be

so affected?

A It's been the result of recent research that catfish tend to inhabit the channel areas of the river in wintertime of the river. I'm not entirely certain that high ammonia levels at that time would be of a benefit to those fish in an over-wintering situation. I don't think we have any research or any answers to those questions at this time.

Q The way the catfish are affected relates to the total ammonia or to the un-ionized ammonia?

A Well, it would basically be un-ionized ammonia levels but, as I noticed in the exhibit, those would probably increase in the wintertime when water temperturas are low.

And I would have a problem, I think there may be a problem when pH levels are above eight and water temperturos are low, but I'm not entirely sure what those would be. I'm not directly involved with the research regarding catfish populations over-wintering in the channel area of the river, but I think there may be a possibility that that might be a problem.

Q Are there any other environmental concerns that

you are or problems that you perceive?

A That would be the one outstanding thing that may need to be addressed, but otherwise I can't think of anything.

HEARING OFFICER TARALLO: Any other questions? Yes, Mr. Butts.

EXAMINATION OF WAYNE HERNDON

BY MR. BUTTS:

Q Mr. Herdon, have you read the two reports on the mixing zone and the management scheme?

A No, I have not.

Q Are you aware that considerable safeguards are set up to prevent any increase in ammonia levels in the channel area, based strictly on the mixing zone requirements are you aware that you are only allowed to account for 25 percent of the volume of the area of the stream which in itself presents any influence on the channel?

A No, I've not read any of the documents that have been presented and testimony. All of my awareness is just as a result of what I've overheard during the petition hearing.

HEARING OFFICER TARALLO: Thank you.

MR. DAVIS: The Agency has no other evidence or comments to make.

HEARING OFFICER TARALLO: Okay. Do you have any -- oh, yes, that's right, you have a comment to make.

MS. VOGT: I have one comment. I'd like to note that on page one there is a statement that says --

HEARING OFFICER TARALLO: Page one of what?

MS. VOGT: Of the petition.

There is a statement that says, "An economic impact study need not be prepared." And I'd like to just correct that statement, reading from the public law, it says, the public law states that "An economic impact study need not be prepared when the net economic impact of the regulation is favorable and the cost of compliance is small or inborn by the proponent of the regulation." It ends there and does not include the District as tax payers and as rate payers. In fact, we would look at those affects.

And also that this provision would generally apply to a case where compliance was being considered on

the part of the proponent and not where the petitioner was seeking to avoid the cost of complying with the regulation.

HEARING OFFICER TARALLO: Thank you.

I think we can adjourn the hearing at this time. I believe we have a comment period, as Dr. Flemal has mentioned, but we didn't set a particular time for that.

MR. DAVIS: What I would suggest is, as I mentioned at the beginning, we do expect a written statement by USEPA.

HEARING OFFICER TARALLO: Yes.

MR. DAVIS: I would suggest that that be allowed to be filed before the comment period.

HEARING OFFICER TARALLO: To allow people to comment on that?

MR. DAVIS: Certainly, yeah.

HEARING OFFICER TARALLO: How long do you expect that to be?

MR. DAVIS: Hopefully by the end of the year, this year.

HEARING OFFICER TARALLO: Does the District

have any response to that?

MR. JOHNSON: I don't suppose we would object to it if it's done by the end of the year, but if it goes on any further, we'd like to get the thing resolved.

MR. DAVIS: We'll file the comment as soon as we get it.

HEARING OFFICER TARALLO: If there isn't an objection to December 31st, 1987 to wait for that document to be filed, we can do that and then have the comment period after that. We're adjourned.

(WHICH WERE ALL OF THE PROCEEDINGS HAD AND EVIDENCE OFFERED IN THE HEARING OF THE ABOVE ENTITLED CAUSE.)

STATE OF ILLINOIS :
: SS
COUNTY OF TAZEWELL:

I, Lea Bousman, a certified shorthand reporter in and for the County of Peoria, State of Illinois, do hereby certify that the foregoing transcript of proceedings is true and correct to the best of my knowledge and belief.

That I am not related to any of the parties hereto by blood or marriage nor shall I benefit by the outcome of this matter financially or otherwise.

Lea Bousman

Lea A. Bousman, CSR.

Lea Bousman, Court Reporter