COMMONWEALTH OF PENNSYLVANIA
HOUSE OF REPRESENTATIVES
HEALTH and HUMAN SERVICES
COMMITTEE HEARING

RYAN OFFICE BUILDING
ROOM 205
HARRISBURG, PENNSYLVANIA

THURSDAY, JUNE 17, 2010
10:00 A.M.

PRESENTATION ON
USE OF CHLORAMINES AS A
PUBLIC WATER DISINFECTION CHEMICAL

BEFORE:

HONORABLE BARBARA McILVAINE SMITH, MAJORITY CHAIRMAN
HONORABLE TIM SEIP
HONORABLE JOHN MYERS
HONORABLE EDDIE DAY PASHINSKI
HONORABLE VANESSA LOWERY BROWN
HONORABLE MATTHEW E. BAKER, MINORITY CHAIRMAN
HONORABLE BRYAN CUTLER
HONORABLE KERRY A. BENNINGHOFF
HONORABLE DOUGLAS G. REICHLEY

ALSO PRESENT:

APRIL RUCKER
EXECUTIVE ASSISTANT

KELSEY J. DUGO,
COURT REPORTER
NOTARY PUBLIC

****
KELSEY DUGO REPORTING
71 Willow Mill Park Road * Mechanicsburg, PA 17050
Phone: (704)996-9514

I N D E X

TESTIFIERS

P R O C E E D I N G S

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CHAIRMAN McILVAINE SMITH: Thank you, everyone, for being here this morning. We're here to hear testimony on the issue of the use of chloramine as a disinfect for public water. I'm State Rep. Barb McIlvaine Smith from Chester County and I'm acting chair today in place of Rep. Oliver, who could not be with us. I'm going to allow the other members of the committee -- the Health and Human Services Committee to introduce themselves and I'll start to my right.

CHAIRMAN BAKER: Rep. Matt Baker; titled in Bradford County, Republican chairman.

REP. CUTLER: Good morning. Rep. Bryan Cutler from Southern Lancaster County, 100th District.

REP. MYERS: Rep. John Myers; Philadelphia County.

CHAIRMAN McILVAINE SMITH: Thank you very much and I welcome all of our guests here today and you look like a sedate group, but I will remind you that this is a committee hearing for the committee members only. This is not a rally. There will be no hand clapping, cheers, etcetera.

I would like to also let you know that it's come to my attention that there are many hearings being held today in the Capitol, so many of our members could not be here because they are attending other hearings. But we have packets of information. We also have a recorder here today who is taking

notes and they will receive that packet of information. We also have written comments that have been submitted by people who could not be here in person to testify.

So we will get started. We will stay on time. We have so many minutes allotted and then questions after the people speak. The first people to testify is the Chloramine Information Center, Susan Pickford and Nancy Cox. And if you'll start please, Ms. Pickford.

CODIRECTOR PICKFORD: Thank you very much. Thank you for the opportunity to testify here today on this very important issue about health to the people of our state. My name is Susan Pickford, codirector of the Chloramine Information Center, a citizen organization of over 2600 members. This is Nancy Cox seated next to me, the other codirector.

Since the EPA announced Stage 2 disinfectant rural water companies across PA have rapidly increased the use of chloramine instead of chlorine as a secondary disinfectant into our drinking water. Chloramine is a combination of chlorine and ammonia. Our research indicates that chloramine produces highly toxic byproducts and is far less effective disinfectant than chlorine, exposing our citizens to a variety of serious adverse, long and short-term health effects.

Our research is based over 50 peer-reviewed scientific studies, discussions with the top disinfectant scientists in

the country, including Dr. Michael Plewa, of University of Illinois; Dr. Susan Richardson of the EPA; Dr. David Reckhow of the University of Massachusetts; Dr. Marc Edwards of the Virginia Tech; and Stuart Krasner of the Water Quality Standards Branch of Metro Water District in Southern California; and others, as well as accumulating personal accounts from people in 20 states who have reported to us similar effects of exposure to chloraminated water.

Chloramine is a complexed subject and not contusive to sound bite summary. Our written testimony gives in-depth explanation of the many and complexed issues surrounding chloramine.

In the limited time I have to speak to you today, I would like to tell you why chloramine is so threatening to public health and our environment, why it is not necessary to use chloramine in our water, and why a moratorium is not necessary to protect the public health.

First, let me state that we understand completely the need to disinfect our water. We also understand and appreciate the difficulty and complexity of that task. However, we are also quite aware of the devastating consequences of premature wide-scale use of chemicals to resolve life's problems. Our research indicates that chloramine is by far -- chlorine is by far the most effective method of cleaning our water and protecting us from waterborne disease.

Water companies claim that chloramine is necessary to produce the byproducts of chlorine to protect the public health from waterborne diseases and to comply with the EPA regulations. However, because chloramine is a more stable compound, chloramine is 2,000 times less effective in killing E. coli and 10,000 times less effective in killing rotaviruses.

The World Health Organization has discouraged opting for a lesser disinfectant in favor of by-product control. Germany has banned the use in their country because it's an ineffective biocide. EPA banned it from '78 to '79 because of biocidal ineffectiveness. 30 years of research later validates their initial finding. Yet, EPA has not reinitiated the banned.

Chloramine, while creating fewer regulated chlorinated byproducts, creates a whole knew array of much more highly toxic, unregulated byproducts. Scientists agree that these byproducts are 100 to 10,000 times more toxic than the regulated byproducts. These include NDMA, Iodo Acids, Hydrazine, and DXAA, which are genotoxic, cytotoxic, and mutagenic.

Dr. Plewa, who couldn't be here today, but did submit testimony, cautioned that the switch to alternative disinfectants may be opening Pandora's Box as we are finding toxic byproducts more toxic than anything we have ever seen. Emerging the regulated byproducts -- unregulated byproducts

associated with chloramine appear to be toxic in smaller quantity than the regulated byproducts. Monochloramine also speciates into di- and trichloramine when affected by temperature in pH.

Trichloramine is a known respiratory irritant responsible for swimmers asthma. Richard Bull attempted to study the dermal effects of chloramine using mice. A hundred percent of his mice died from inhaling the chloramine. They did not die in tests with chlorine or chlorine dioxide, only the chloramine.

People in 20 states are reporting adverse acute health symptoms resulting from chloraminated water, including respiratory ailments, digestive problems and persistent skin rashes. Some of those stories are including in your packets.

When mixed with baby formula, chloramine creates nitrates and can cause Blue Baby Syndrome, which is oxygen depravation to the brain. More corrosive in our distribution system, chloramine reaches lead from pipes and fixtures causing high levels of lead in children's drinking water. It will not evaporate or dissipate in air, it cannot be boiled out. While the monochloramine can be removed with expensive home filters, the byproducts cannot and we have evidence of that in your packets from NSF.

In the event of a main break, chlorine will dissipate as it runs down the stream, chloramine will not, which will

send ammonia and chlorine full strength into our streams and creeks, killing our fish as it did in Virginia, California and British Columbia Canada, killing 90 percent of aquatic life in nine miles of steam, protected steelhead trout and a thousand species of white fish and invertebrates.

We heard the stories of the Susquehanna River, the mother river of the Chesapeake Bay, as well as internationally known fly fishing creeks and streams. In one borough in the Conodoguinet, we have experienced over 50 water main breaks, pouring thousands of gallons of water in the Conodoguinet. Had that water been chloraminated, we may have lost the Conodoguinet. This area right here shows about 15 water main breaks that dumped right in to the Conodoguinet through the culvert under the highway. That happened in the last year. You have a copy of this map in your materials.

As most recently pointed out in a letter to an edited by Paul Zielinski, companies are claiming that chloramine is necessary to comply with increasingly stringent EPA regulations. That is simply not true. Stage 1 regulations set limits on chlorine byproducts to be calculated in an average yearly annual. You have this -- I believe you have this on top. Stage 1 regulations, these are testing locations, these ten state circles. The Stage 1 regulations require that when the average across all eight, that they be in compliance with the 80 parts per million of PHMs.

As you can see, these statistics are taken from PA American Water Mechanicsburg System in 2007, when they initially intended to put the chloramine in our water. The annual average for Stage 1 was 45.78, well within the compliance of the 80 parts per million EPA of requires. Stage 2 does not change those levels. The only thing Stage 2 does is change how they calculate it. In Stage 2, instead of averaging across the eight state locations, they have to average within a year over four-quarters over each location.

What I have done for you, I have taken the numbers from PA American's own data for the year of 2007, and as you can see, these red numbers on here that are the second column under LRAA on your handout, every single one of them is well below the EPA regulations. The highest one is 63. And if you'll note, these numbers in yellow on my chart are the third-quarter. In PA, because we have seasons, the third-quarter is always the highest in THMs because of the amount of leaves and or organic matter going into our streams and source water. Those are always higher than the other quarters. But when you average them with the other quarters, it brings that quarter into compliance.

If you'll note in 2007, the THMs in this one quarter were 99. That was the highest one for that year. In 2009 -- our 2009 water quality report is in your packet as well -- the THMs are even lower. They're 92 without chloramine. We do not

need to do this to comply with 2010 regulations in this system, the third largest system in PA.

We took water quality reports across the state, as many as we could get. From what we can see, every water company that we looked at is in full compliance with Stage 1 and from what we can tell, will be in compliance with Stage 2. There is no health related reason to change the chloramine at this time. The 2012 regs don't come into play for another two years. The compliance date is October of 2013 for most of our systems and 2014 for some of the smaller ones. We have plenty of time before anybody would need to comply with these regulations and from what we can see, they already are. We have good water in PA. Yardley, we looked at their water quality report, it was some of the purest water we have see in PA. Almost a third of what the EPA regulations are. That system was chloraminated in 2008. There is no reason in the world to do that according to the regulations.

In addition, this system was scheduled to be chloraminated in 2007. The company voluntarily delayed implementation and has now announced the intent to implement chloramination on July 12th of this year. Despite their claim that the switch was necessary to meet knew regulations, they have successfully run that plant well in exceeding compliance for the past three years.

If you'll look at the two -- also, the data from PAWC

shows the positive effect of upgrading the plant and getting in better facilities to take down the THMs. They had a problem in a child testing area. It was always over the limits. When they put online in 2006 the new plant, you can see from their data, there was no place that was out of compliance. They had better technology, new equipment and they brought the THMS into compliance just by doing that, not by adding chloramine.

The research in the area of chloramine byproducts -- the byproducts and alternatives began in earnest in 2005 and 2006. We know more now about chloramine than we did three years ago. And in three years from now, we'll know a lot more. Technology development has also increased exponentially in the last five years. Many new alternatives from filtration to GOS systems are emerging and being tested and certified. EPA, AWWA and Water Research Foundation are all calling for studies on acute and long-term health effects of chloramine. Filter companies are just learning about the chloramine and what they can do to remove it.

The lead crisis in D.C. may be resolved now, but it occurred in the first place because we knew so little about the use of chloramine and it's unintended consequences. As a result, thousands of people were permanently affected. Current EPA regulations did not protect those people. The water companies have not shown a public health related reason for switching to chloramine in facilities that are well within

compliance with EPA regulations. There is simply too little known about the unintended consequences of chloramine to implement this system across the state to meet regulations that won't go into effect for three more years. What little we do know indicates that with chloramine, we are making a bad situation far worse, replacing one toxic by-product with at least four others that are 100 to 10,000 times more toxic, and yet, unregulated.

Chloramine systems are required to transition to chlorine yearly to clean the distributions system of nitrates since chloramine is less effective in that regard. If the companies are constantly able to transition to chlorine, there is no harm to them to run chlorine systems until further studies and regulations can ensure the public that the use of chloramine is safe or until they prove that it does not. They have proven that by delaying their plans for three years.

The only possible harm to a moratorium would -- if a moratorium were imposed on the companies would be if they could not maintain compliance without it. Stage 2 does not come into effect until 2012 and we've shown you that they are already in compliance, well within compliance.

EPA acknowledges the deficient knowledge regarding chloramine. Quoting their website, gas and research on how monochloramine affects water should be filled. There are few studies on how monochloramine affects human health. There are

few studies on disinfectant byproducts that form when monochloramine reacts with nature organic matter and water.

Compared to chlorine, water treated with monochloramine may contain higher concentrations of some unregulated disinfectant byproducts. That's right from the EPA website. They say that NDMA is an unregulated by-product of chloramine and is classified as a probably human caseinogen. All though listed as a priority pollutant, no federal maximum containment level has been established for drinking water. That's right from the EPA website.

California has set a public health goal of three nanograms per liter of NDMA. That's a public health goal. Philadelphia city water is already reporting NDMA at 2.9.

In the letter to this committee, Dr. Plewa recommends caution in considering converting chloramine. His last comment in that letter -- and I hope you will read it -- is unless there is a serious problem with meeting the current Stage 2 Drinking Water Disinfection Rule, it may not be prudent for the utility to convert from chlorine-based disinfectant.

A moratorium until 2012 will protect the public health from what appears to be realistic and devastating human health and environmental safety. Allow time for further studies to be commissioned and published; allow time for alternative systems to be tested and approved would not negatively affect water companies and would error on the side of caution for the

benefit of our children, ourselves and our environment.

Failure to provide a moratorium could result in irreparable harm to populations of PA children as it did in DC, PA adults as those who are suffering in Vermont, and pose a risk to PA aquatic environments like we saw in Virginia, California, and Canada. The third largest facility in PA plans to convert July 12th, less than a month from now, unless a moratorium is granted. Ten of the twelve municipalities are in favor of further delay until research and regulations can ensure us that chloramine is safe. The appropriate question seems to be not why shouldn't we switch, but rather why should we.

With that, I would like ask Nancy Cox, codirector of Chloramine Information Center to discuss the precautionary rule.

CODIRECTOR COX: Good morning. The EPA, the DEP and the Water Company keep saying the chloramine has been used for 90 years. This is only partly true. In 1938, only 16 percent of municipal utilities used it at some point during their treatment process. During World War II, it declined dramatically because ammonia was needed for the war effort. By 1959, the number was six percent and by early 1960, it was less than three percent.

Only since EPA set new drinking water standards, our water suppliers across the state are choosing chloramine to

meet those standards. This is in spite of recent studies by top scientists indicating 100 to 10,000 percent increase in the toxicity of its byproducts and warning against its use. In only in the last few years have all of the negative effects been published by top scientists, including those from EPA. But they are being ignored by the very agencies that exist to protect our health and the environment. Two other states are seeking legislation on this issue.

PA has an opportunity to lead the nation in declaring a moratorium on the use of chloramine. This is the right time and the right place to apply the precautionary principle. This basic tenent is when -- is when the health of humans and the environment are at stake, it may not be necessary to wait for scientific certainty to take protective action. It goes on to state, when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effects relationships are not fully established scientifically.

In this context, the proponents of the activity rather tan the public should bear the burden of proof. The process of applying this principle must be opened informed and democratic and must include potentially effected parties. It must also involve an examination of the full range alternatives including no action. Sometimes if we wait for certainty, it is too late.

Scientific standards for demonstrating cause and effect

are very high. For instance, smoking was suspected of causing lung cancer long before it was proven. By then, many smokers had died of lung cancer. In the 1930s, we knew that exposure to asbestos caused illness. 40 years later, the government began to warn about its use. Today, lawsuits abound, but money can't replace life or quality of life.

The precautionary principle is a guide to making wiser decisions in the face of uncertainty. It requires exploring alternatives especially in the use of toxic substances and place the burden of proof on the proponents rather than on the potential victims.

There is compelling evidence both in antidotal and scientific studies, that the use of chloramine to disinfect our water can cause irreversible harm to our health in the present and in the future.

I urge you to take the precaution of delay, which will do no harm to any water facility. Where as, to go forward with this treatment, will do irreparable harm to our health. A moratorium is needed until the magnitude of its effects are known. Thank you.

CHAIRMAN McILVAINE SMITH: Thank you very much. Before we go to questions, I would like the other members of the House who have joined us to please introduce themselves, starting to my left.

REP. BROWN: Good morning. State Rep. Vanessa

Lowery Brown; 190th District, West and North Philadelphia.

REP. SEIP: Tim Seip; representing part of Berks and part of Schuylkill Counties, Cabela's and Yuengling District.

REP. PASHINSKI: Eddie Day Pashinski; Luzerne County, 121st District.

REP. REICHLEY: Doug Reichley; 134th District and Lehigh and Berks Counties.

REP. BENNINGHOFF: Kerry Benninghoff; Center and Mifflin Counties.

CHAIRMAN McILVAINE SMITH: Thank you very much. I will start with a few questions. I know that you said -- had in your written testimony, Ms. Pickford, it said that in 1978, the EPA banned the use of chloramine for the single reason that studies indicated, it was an ineffective biocide against E. coli. When did they reverse their position or had they not reversed their potion?

CODIRECTOR PICKFORD: They reversed it 1979. They've indicated that field studies did not bear out the scientific lab studies. But there have been 30 years of research since and I think across the board, scientists agree that it is the least effective biocide of the available alternatives.

CHAIRMAN McILVAINE SMITH: And also, the disinfection byproducts, we know that the trihalomethanes,

THMs, are one of the byproducts from chlorine and HHAs -- which I can't remember what that is, but I know it's acidic acids or something. If you could tell me what the known byproducts of chloramine are. Do you know what they are?

CODIRECTOR PICKFORD: We know of the four most highly toxic are NDMA, which is one of the nitrosamines, the most toxic of them. Iodo acids, which is a whole family of iodated byproducts, which Dr. Plewa indicated initially seemed to be connected with cities near oceans, near salt water.

A new study just came out with Susan Richardson indicating that that is not the case, that iodo acids have been found in 22 American cities that are not coastal cities. Another one is hydrazine and DXAA which is a more toxic form of the HHAs and is unregulated at this time.

CHAIRMAN McILVAINE SMITH: And when you say the DXAAs are not regulated, so are -- has EPA, to your knowledge, looked at the toxicity and regulated the toxic byproducts? Have they regulated them in any way?

CODIRECTOR PICKFORD: No. They are studying them, but they are not regulated. NDMA and hydrazine were on the CCL prelist that just had come out probably a year ago now. I don't believe -- I'm not sure, but I don't think they were chosen to be studied.

CHAIRMAN McILVAINE SMITH: So if a moratorium is passed, how will facilities -- water facilities meet the

compliance of the EPA standards?

CODIRECTOR PICKFORD: We believe that they already do. We certainly know that the Mechanicsburg District -- Mechanicsburg facility absolutely exceeds the regulations.

CHAIRMAN McILVAINE SMITH: Excuse me, through the use of chlorination?

CODIRECTOR PICKFORD: Chlorination only. Their highest level was 63 for the THMs, they are allowed up to 80 and that's in our highest quarter.

We believe from looking at water quality reports that everyone we looked at will be meeting the 2012 regs without chloramine. If they are on the edge or close to that, two things can happen. One is that they can ask EPA for a variance until they can get filtration or some other equipment that can lower their THMs so they can ask for an extension of the 2012 regs. They can also look into now, two years before the regs take place, looking into better filtration. The EPA and all of these scientists are all recommending better pre-filtration as the way to get rid of these THMs so we can keep the chlorine.

CHAIRMAN McILVAINE SMITH: And I know that there are places that have been using chloramines for a number of years. I was hoping that Jeff Hines would be able to be with us. He's from the York Water Company and he's testifying today at another hearing in the Capitol, so he could not be with us.

York is one -- I think 1942 is when they started -- and

they haven't according to when we spoke to Mr. Hines that they haven't had any problems. Philadelphia, I think has been using it since 1969, somewhere around there. But, can you speak to that?

CODIRECTOR PICKFORD: Yes. The reason -- they say there are no problems. We don't know that. We know that no problems have been reported. There's a lot of reasons for that. One might be the levels of chloramine that they're using. York uses .02 parts per million of chloramine. American Water in Clarion uses 3.3, which is the maximum allowed by EPA. I believe there's probably a big difference in how that is chemically reacting in the system between .02 and 3.3. So I think that might be one reason.

Two, I question whether they have been using it regularly since the 70s or the 40s because in World War II, it was not -- you were not allowed to use ammonia because they needed it for the bombs. In '78 and '79, it was banned by EPA. What we believe is, a lot of places stopped using it in '78 when the banned came about and didn't start using it again until 2005. It's hard to tell actually who's using it and who's not and for how long.

The other problem is, and this happened in Philadelphia, people wrote in reporting black particles in their tap water. They talked about being sick from their tap water. And they called the Water Department and the Water

Department said, not us, look somewhere else. If you hear from some of the victims -- the sufferers that are here today and the ones who have submitted testimony, they went their doctors, they went to their water company, they went everywhere and everyone said, we don't know what it is.

There is no diagnostic tool for doctors to use because there are no studies on the acute health symptoms of chloramination -- of chloramine exposure or the by-product exposure. There's nothing for them to use as a guideline to diagnose with. So you get a diagnosis of undifferentiated because they don't know. Topical solutions and medicines don't help. The only thing that helps is removing you from the water.

So these people are lost. They have nowhere to report this. People say, well, we're not getting anything at DOH. Nobody is reporting anything to DOH. These are not reportable diseases. The only things that get reported to DOH are communicable diseases. That's not what this is. If these people are continually told, your symptoms aren't caused by the water. I can't diagnose this as a connection with the water. And the water company says, your water is perfectly safe. Yeah, we are not going to hear from the people because they are not making the connection or they are trying to, but they are being told that there is no connection.

CHAIRMAN McILVAINE SMITH: And I wanted to ask if

there are any other questions. Rep. Pashinski.

REP. PASHINSKI: Thank you very much and thank you for your testimony. Do you know what difference of cost is between chlorine and chloramine?

CODIRECTOR PICKFORD: It wouldn't really be a difference in cost between because it would still use chlorine to treat the water at the plant. The chloramine would replace straight chlorine in the distribution system only. We understand -- I mean, there's certainly our costs of buying the ammonia and storing the ammonia and transporting it. They will be able to use less chlorine because they're combining it with ammonia because it becomes more stable at that point.

We know that chloramine is the cheapest alternative to chlorine and I believe that's available in your packet as well. We have a chart on that from -- I believe, it's Rural Health Organization has that chart.

REP. PASHINSKI: And I'm sorry I missed your testimony. I came in a little bit late and I apologize for that. I'm just trying to understand why they would all of a sudden now want to go back to chloramine.

CODIRECTOR PICKFORD: The EPA's Stage 2 regulations are telling people that they have to get these THMs reduced. I'm not sure why there isn't a better analysis going on at the water facilities to determine whether they need to do that. I mean, I just showed you with their own data. They

don't need to do anything to reduce their THMs. They are already well within compliance.

So our only guess -- and it is a guess because we don't know what's going through their minds -- is that they can save an operating cost because they can tear down looser plants, they can operate longer lines because chloramine is more stable than chlorine and it doesn't dissipate, so last longer in the lines.

REP. PASHINSKI: So then cost would be a potential reason of why they're considering this?

CODIRECTOR PICKFORD: I believe so, yes.

REP. PASHINSKI: Who manufactures the chloramine?

CODIRECTOR PICKFORD: There is pre-manufactured chloramine, but there is also chloramine made on-site simply by adding ammonia to the chloramine before it goes --

REP. PASHINSKI: Okay. Thank you very much.

CHAIRMAN McILVAINE SMITH: Rep. Baker.

CHAIRMAN BAKER: Thank you very much and thank you for your testimony and for your passion and for your concern for public health. I've been in receipt of information and I'm only bringing this up because it seems that we have a lack of testimony in today's hearing from EPA, DEP, FDA, DOH. So I think it's justified that we, perhaps, bring in some issues that DEP has relate to me through a letter of Senator Mary Jo White, chairman of her committee.

In this letter, it says, DEP and the use of chloramines poses no threat to the public health of their customers. They go on to say, it's been used since the 1930s and about one-third of the water systems in the United States utilize chloramines.

It just seems to me that you've raised a lot of good valid issues and concerns and, yet, we do not have a banned anywhere in America on this chemical. It's used widely, ostensively for disinfection, for public safety purposes on the one hand and what we're hearing today, though, is that there is perhaps some concerns that need to be fully explored and resolved.

But I would be able to love to ask questions taking your testimony and the those that follow and then just to position that against EPA, DEP, Department of Health and, perhaps, FDA if we could get somebody to answer questions because there seems to be a major conflict and there also steams to be a lack of any litigation that seems to suggest that there is harm. I mean, normally, if you go into court, you have to prove injury to some degree. And have we proven any injury as a result of the use of chloramines? I'm not in receipt of any of that. I hear a lot of antidotal concerns.

It just seems to me that we lack definitive documentation or evidence that this is, in fact, harmful. Because we got our public entities there are created to protect

us saying, there's not a problem.

CODIRECTOR PICKFORD: Absolutely and I completely understand your concerns. We answered that letter from John Hanger to Senator Mary Jo White paragraph for paragraph. We took -- and I have with me today that I can hand out to you then too -- I took the EPA website on chloramine and copied that out and answered it paragraph for paragraph. Let me tell you what's happening.

First of all, we are not being given hearings. We asked for a hearing at DEP. They fought tooth and nail to keep us from having a hearing. We appealed that all the way up to the PA Supreme Court and we were denied a hearing. We went to the PUC and asked for a hearing and we had motion after motion to dismiss, to exclude our witnesses, to kick us out of court. They eventually gave us a hearing but told us we could not put on any evidence health or environmental impact, which is kind of the entire hearing. So we lost the hearing because we didn't present evidence. We appealed that to the Commonwealth Court and we are waiting for a decision.

We have never had the opportunity to have a hearing to prove these things. We would love one, we invite one because these scientists that I have mentioned, none of them have a doubt that this is a dangerous thing to be doing and we would love to being them in to testify.

DEP's website -- DEP has admitted that they don't do

their own testing. They don't do the health test. They leave that to EPA and the Department of Health. So they are not looking into those things. They say, if EPA says it's okay, then we can use it, our facilities can use it and that's fine.

So back to the EPA. When you look at the EPA website, they say monochloramine does not cause cancer. Monochloramine does not cause respiratory diseases. Monochloramine does not cause this. And that is all true, but what they fail to talk about is the rest of the story.

The monochloramine speciates to di and tri. We know that trichloramine is a respiratory irritant. We have the studies that show that that is causing swimmers asthma in lifeguards and people that spend a lot of time in pools. It doesn't talk about the byproducts. It doesn't talk about hydrazine and iodo acids. They do talk about NDMA and admit that it may be more toxic than the regulated byproducts. The problem is, EPA is not finished looking at these things. They have barely started.

I think it's foolhardy for us to put something in our water. This isn't food that we can choose to eat or not eat. It's not a product that we can choose to buy or not buy. This is something we have to live with and these are monopolies. We can't go down the street and say, I'm going to get our water from someone else. We have to bathe in our water, drink our water every single day. To put something that is still being

studied because it may be more toxic than what we already have in our water is crazy.

CHAIRMAN BAKER: I really appreciate your passion and your concern. I would like to get back to an earlier question. It's a very valid question. If one-third of the water companies are using this in the nation and there is reasonable doubt that it's safe, is it because of cost or is it because of ethicacy or -- I'm just trying to figure out why they still use chloramine instead of what the other two-thirds of the water companies in the nation use.

CODIRECTOR PICKFORD: Well, first, I would like to say that I'm not sure -- 20 percent or 30 percent has never seem to carry the day in American society. We usually look for the majority. The majority is using something else. So, obviously, we can do that. We can use something else to purify our water and not use chloramine.

I believe, because -- I believe that there might be areas where they have the THM problems, where they need to do something and chloramine works to get them into compliance.

CHAIRMAN BAKER: It may work better for them to --

CODIRECTOR PICKFORD: That may be true. It also might be true that if they looked at better filtration or a new plant, if they have a dilapidated plant, they could achieve the same result without using chloramine. I can't speak to that. I know that it has happened in places. I believe that the

reason is cost. I believe it is easier and cost effective for the company to use this because it does not dissipate, because it is more stable than chlorine. But that stability is what causes a lot of the problems for our environment and for us.

CHAIRMAN BAKER: Thank you very much. I know there are probably other questions and we have other testimony. Thank you.

CHAIRMAN McILVAINE SMITH: Thank you very much. Rep. Myers.

REP. MYERS: Thank you very much. I appreciate your testimony and like Chairman Baker said, there's a lot of questions that come to mind. You know, actually, you gave a good analogy earlier when you talked about, you know, the whole scenario of do cigarettes hurt. In the years that the government said no, the companies said no, those who smoke said no. What actually happened was that through further investigation, continuing, contrasting and comparing, then it was a decision that, you know what, really, it does. And I'm kind of convinced that's where we are today.

I kind of agree with the chairman that there's more than one shot to the story. Personally, I believe the side that I'm hearing today. I do believe that it is cost driven. You know, when it comes to means with money, people don't care. They're putting arsenic in the water and say that arsenic reduces the byproducts, but we don't care if it kills the

people.

I think, at least in my thinking, the best way for me to describe what I'm hearing today is like Stage 1 of collecting information. I too would like to hear what will the government players are saying. Why would they allow something that's toxic as you described to be placed in the water. The land, water and the air, we don't take care of those then we don't have to worry about that. So I too would like to hear some contrast and compare testimony around this.

However, like I said in the beginning, I do believe what I'm hearing today. And I think other folks would have to convince me that what I heard today is not the truth. But I think they ought to be able to tell their story so at least we would get an opportunity to engage them and hopefully prove some of their cause and effect analysis are not correct.

And I just want to close by saying this here, another parable or another example of how I'm hearing this, because this is like a lot of cross winds are going on around corporation versus people. And I clearly remember BP saying the spill ain't that bad. You know, all of our scientists say, we are going to be able to get this thing under control in 15 minutes and here, we're at day 60 and it's getting worse.

I think that some of the questions about who and why, I don't think the answers haven't emerged, you know, who want this and why. That's what we need to find out. And that will

give us a baseline for us to go after what we think is the truth.

Again, I just want to thank you for your testimony and I thought it was somewhat powerful.

CODIRECTOR PICKFORD: If I may make another comment about EPA. When we started this, everybody was saying, including me, we have EPA and DEP. They're supposed to be protecting us. Certainly they would not allow this to happen.

EPA turned their eyes away from D.C. for years while huge lead levels were poisoning children in D.C. and that's still going through, digging to find out what the heck happened down there. But EPA was telling people that those lead levels were safe. They were telling them that the water was not a problem for three years while thousands of children suffered from lead poisoning and are permanently damaged.

I hate to bring up Erin Brockovich. It was PG&E, those water people told the people that their water was good for them that this stuff that was in their water that was killing them was good for them. Unfortunately, we would like to be able to rely on our water company to keep us safe. We would like to be able rely on EPA and DEP to do their jobs. Unfortunately, in the real world, that just doesn't always happen.

CHAIRMAN McILVAINE SMITH: Rep. Pashinski.

REP. PASHINSKI: Thank you, Madam Chair. I would like to offer a request that we work towards planning, get some

more hearings on this from this committee and I would like to hear the scientists to prove from the standpoint to the scientists and then request DEP and the other agencies to be here. This is too critical to not pursue this thing and be fully confident to what direction we're going. To which this would go.

CHAIRMAN BAKER: I would concur with that and perhaps, in fairness, we should also allow one or two water companies to proper testimony.

CHAIRMAN McILVAINE SMITH: Yes, I agree. And the water companies were invited and also EPA, DEP, and DOH. Unfortunately Dr. Ostroff from the Department of Health could not be here. He is in Atlanta.

So thank you very much for your testimony. And we will move on now to Dr. Mark LeChevallier. He is the Director of Innovation and Environmental Stewardship with the American Water Corporate Center. Whenever you're ready, Dr. LeChevallier.

DIRECTOR LeCHEVALLIER: Good morning. My name is Mark LeChevallier and I am the Director of Innovation and Environmental Stewardship for American Water. What that means is that Innovation -- I direct our research program and the Environmental Stewardship is ultimately responsible for water quality and environmental compliance for the water system.

American water is the parent company to PA American

Water. And for 30 years I've done research on drinking water quality. I've published over a hundred papers in the area and the primary area of my research has been on disinfection to produce safe drinking water. And particularly, an important area of that has been the study of the role of chloramine as a disinfectant. In fact, I, as coauthor of two of the manuals of practice for application of chloramines through the water research foundation. So these are manuals of directing utilities on how to apply chloramine.

As American Water, we own or operate over 400 drinking water systems in the United States and 300 waist water systems in 35 states in the United States and then two provinces of Canada. And we have a lot of experience with water treatment, particularly looking at waters from different locations.

I believe the rest of my biography -- I won't go into more detail. I have been an advisory to EPA. I served most recently on the Federal Advisory Committee for the revisions of the Total Coliform Rule, which relates to my chloro water quality in the distribution system. And I have recently served on an EPA Committee on a research and information collection partnership on future research necessary for EPA to continue their rulemaking process.

I also serve as the chair of the American Water Works Association, that's a professional water industry, as chair or their research division. I served a number of different

capacities in research Advisory Committees, in particularly, member of the expert panel for the Strategic Initiative on distribution water quality research, which is particularly in this area around.

As we have already mentioned this morning, the use of chloramine is not new to the water industry. In fact, that use, for almost 90 years, Denver water, for example, is a long history of use of chloramines. And EPA, in 1998, estimated that 68 million people drink and use chloraminated water everyday and that number has increased, with a number of large municipalities having already switched to chloramines in the last ten years.

The chart that we show up here shows along the line, a number of major cities in the United States, Los Angeles, Philadelphia, Washington, DC, Boston, St. Louis. In fact, many communities in the southern part of the United States, the use of chloramine is a critical part because of the nature of the water there, the high temperatures, chlorine would react very quickly to form these disinfection byproducts. So it's fairly common across the United States.

Within PA, 4 million people -- and I if I could have my lovely assistant come back, I would like to show the PA locations. You can see on the right-hand side of that, the long list of communities within PA that use chloramines. That's typically one out of three people.

These utilities that use chloramines as a disinfectant include York Water Company, which we already mentioned, since 1942; the City of Philadelphia has been adding it since the 70s; Aqua PA and its main division in Suburban Philadelphia would service more than one million people in Montgomery, Delaware, Chester and Bucks Counties including Bensalem; Bristol use chloramines; the City of Lebanon water system adds chloramines; the Chester Water Authority in Delaware County also uses chloramine. So it's very likely that members of the panel here have personal experience in drinking chloraminated water. This is not an unusual uncommon situation.

And so American Water also has extensive experience with chloramine disinfection. We own and operate approximately 30 systems across the United States including seven systems in PA that have already been using chloramination. Why is this controversy now? There's a long history -- why is this coming to the forefront now? Well, the use of chloramine is needed to comply with new, more stringent EPA regulations that are already in effect. In compliance -- the monitoring for compliance needs to begin by the end of 2012.

These new regulations have many different parts so it's somewhat complicated. The first component of this regulation requires the water utilities to do what's called an initial distribution system evaluation, or IDSE.

So the IDSE required the utilities to monitor their

systems and propose to the EPA and to the state's new monitors locations that would change from the previous monitoring locations. So when we look at the existing day -- it's nice to get such a ringing endorsement on the quality of the water -- but the new regulations will require the utilities to monitor at different locations. Those that are farther at the end of the system, where the opportunity for chlorine to continue to react with the water, will produce high disinfection byproducts.

With that the information at hand, the PA American has made a decision that it's necessary to make changes in the treatment to comply with this new regulation.

This change is necessarily reduced, the levels of disinfection byproducts, that EPA has found to cause known health risks. So the reason that we're doing this is a public health protection. The basis for regulating disinfection byproducts goes back to epidemiological studies of human populations -- and these were published in the 70s and 80s -- that found an association with increases in cancer and bladder cancer and those that were exposed to high levels of trihalomethanes. And it is interesting that in those initial studies, it was studies -- communities that used chloramines where the baseline had lower rates of disinfection byproducts.

So the association was using chloramine as reducing the THM levels and was part of this overall study design and that's

why, let's focus on the concerns around disinfection byproducts.

PA American has evaluated various treatment options for reduction of disinfection byproducts in its Mechanicsburg systems. Chloramine was chosen as the -- since it was the best proven, long history, most cost effective method to reduce disinfection byproducts in the distribution system. And Pennsylvania American applied for -- to the Department of Environmental Protection for all of the permits necessary to allow chloramine treatment and all of these permits were received in 2006.

PA American evaluated many different options and some options are very extreme. To filter the water through membranes, for example, is technologically feasible, but it's extremely expensive. It produces its own problems with taking out the minerals that could cause corrosion problems, it has a side stream. So options were evaluated out of all of these and the use of chloramines was considered the best. Those permits were applied and the Department of Environmental Protection approved of that.

In fact, it was in the development of the Stage 2 Disinfection By-Product Rule that the USEPA anticipated many of the systems would move to the use of chloramine. And in their regulatory determination and their cost determination for this rule, made that anticipation; anticipating that the Industry

would move from about 30 percent of the utilities in the United States using chloramines to upwards of 50 or 60 percent. This is not an unexpected reaction that this would be the most cost-effective choice that utilities would choose.

Compared to free chlorine, chloramines produce substantially lower concentrations of disinfection byproducts that the EPA has found to cause known health effects. The federal regulations that are in affect now are -- to take a proactive approach. They're moving regulations to lower known health risks. And so it makes sense once we know what the solution is, to go ahead and take advantage of water -- the treatment -- to take an advance treatment so we would lower the known health effects. Therefore, the water then would meet the future public health standards.

In the review, chloramines, the USEPA reviewed the safety of chloramine application and established the maximum level by which that can be applied in water suppliers and that's a level at four milligrams per liter or four -- four, which is adequate. Should we emphasize that that's an annual average of four and USEPA also acknowledged that there would be times that, for various reasons, water suppliers may have to have higher levels as long as the annual average was at four.

This standard was set at a level which there were no human health effects expected to occur. That's particular language that the EPA uses. They did the evaluation of the

disinfectants, set this maximum disinfectant residual -- and that can be found in EPA regulations -- where they made the determination that there are no human health effects expected to occur. But what about unknown contaminants? What about future and ongoing research? EPA addresses this by including a safety factor because, clearly, at a point when the decision is made, not all information is known. And EPA is well aware that their own internal scientists, as well as the rest of the research industry, is continuing to look at this issue. So they include this margin of safety to account for the uncertainties and EPA explains this in their setting of this regulation.

So based on peer reviewed and validated research, the USEPA, the PA Department of Environmental Protection, PA Department of Health and other credible health institutions continue to recognize chloramine as a safe and effective disinfectant.

In 2004, the City of San Francisco made this change to chloramine disinfection too because of issues around disinfection byproducts in their system. And during that time, there were concerns raised, by different community groups around the health effects, particularly concerns around dermatitis, which is skin rashes. And the San Francisco Department of Health investigated these claims and concluded that there was no credible evidence that these claims were

linked to the water that many of the people making the claims had preexisting skin conditions and that there was no consistency among the complaints that could be related to a common cause, like water. And that report from Dr. Weintraub, I think, has been included in the proceedings because it is important study that has specifically looked at these -- some of these health complaints.

CHAIRMAN BAKER: Doctor, if I may interrupt just for a second. Thank you. And I apologize because I have to leave pretty soon. I noticed in the letter from DEP that the only cases that were elevated to the court system were in San Francisco, California and Champlain Water Company in Vermont. In the outcome of those cases, it was basically to further research. So it sounded to me somewhat inconclusive.

Do you know what, in fact, resulted later -- was there any follow-up and follow through with additional research relative to those court cases in those situations?

DIRECTOR LeCHEVALLIER: Research on the affects of chloramines is an ongoing issue. I don't know any specific studies related to those in particular, but there continues to be research, research that I have recommended.

Since we're studying -- since we have 68 million people in the United States served by chloramine, it would be an easy approach to look at communities that are served by chloramine and those that are not served by chloramines, look at HMO

records and compare populations. This is a common approach, an epidemiological approach that can be used. And there's research that have been proposed to --

CHAIRMAN BAKER: To your knowledge, is there any conclusive evidence inditing the use of chloramines connected to illnesses or injury or organ damage or anything?

DIRECTOR LeCHEVALLIER: No. The USEPA is obligated in setting drinking water standards to consider all known human health effects. If this research was available inconclusive within the scientific community, based on the best available science, EPA would be obligated to act upon that. That does not exist. We have only these antidotal pieces of information, which are inconclusive.

CHAIRMAN BAKER: Thank you and I apologize for the interrupting.

DIRECTOR LeCHEVALLIER: Every water source and the quality of that water source is different and that's why the choice of disinfectant treatment process and disinfectant byproducts must be considered on a case-by-case basis.

We have heard some research by Dr. Plewa, who's a professor of toxicology in that water treatment, the University of Illinois, and this study came from some analysis of Corpus Christi, Texas, a coastal community, where iodine was at high levels in the water, where these iodinated byproducts would perform. We've tested the water in Mechanicsburg. Iodine is

not present. These suspected byproducts would not expected to perform.

The other critical part about the studies was the sequence in which chlorine and ammonia is added to form the chloramines. And Corpus Christi was a very unusual circumstance where the ammonia was added before the chlorine. That is not typically added.

In fact, since pointing that out, they have since then changed their treatment process and that's because the stability of some of these compounds that we've heard about are highly unstable and not formed at the Ph's and the sequence and the contact times that are found in water. And so it is a very complexed process. And one has to consider all of the complexities of the water, the water chemistry and the sequence of addition in evaluating disinfection byproducts.

By drinking water, we're regulated by many different regulations to produce safe water. And one of the other important ones for drinking water safety is the Lead and Copper Rule, which addresses the corrosivity of water primarily to address concerns about reaching lead or copper that would be primarily found customer's plumbing. And proper corrosion control is necessary to reduce the risk of lead, reaching in copper as well. PA American has extensive experience in this area.

When this Lead and Copper Rule came into effect in

1992, many of the water systems and the American Water System utilized a phosphate based corrosion inhibitor because our research had shown that was the most effective way to comply with this regulation and, in fact, has worked out excellent. The Mechanicsburg system has been in compliance with the Lead and Copper Rule since 1992, when the rule came into effect and has used the phosphate based corrosion inhibitor all during that time.

I've heard situations around and Washington, DC was a very unusual situation. When that utility converted to chloramines, they had an increase level of lead and that's an ongoing area of research. Chloramine is thought to be a component of that. The other complexities is the changes in pH and alkalinity that they normally see in the water in the Potomac River.

As part of that crisis in Washington, DC, the USCPA reached out to American Water because of our extensive experience with water companies across the United States. EPA, at that point, was proposing a whole series of research and studies into how to address the situation in Washington, DC. We advised them that if this was our system we would -- while the research was great -- we would be advising them to implement to use phosphate based corrosion inhibitors. We had over 80 systems that were using this. And in compliance and in addition, just across the river, the City of Fairfax County was

using that same water, using phosphate based corrosion inhibitors and not having a problem with lead and copper, they were also using chloraminated water.

Based on that recommendation, Washington, DC implemented the use of phosphate based corrosion inhibitors in 2004. Within six months, the levels declined and they have been in compliance with the Lead and Copper Rule ever since. But why do we not expect this situation to be relevant in PA? We have been using phosphate based corrosion inhibitors for nearly 20 years.

So in closing, I would like to reiterate that chloramine has been used for nearly 90 years as a safe and effective disinfectant. Large cities have been applying chloramine for many years, in fact, decades, including Philadelphia and suburbs in York, with no clinical documentation of adverse health effects.

American Water is a strong supporter of ongoing research. After all, that's my job and we invest over $3 million a year on drinking water research as well as support national organizations. So we continue to look -- address uncertain issues. But at the same time, we have to make decision today and federal regulations are currently in effect to address known health effects.

And we believe that taking prudent proactive approach to ensure that our water meets all public health standards is

necessary. And the use of availability of chloramine as a tool to do that is a necessary tool. And we encourage you to continue to allow water professionals to make those kinds of decisions. Thank you.

CHAIRMAN McILVAINE SMITH: Thank you very much, Doctor. I have a few questions. I wanted to ask, first of all, about the E. coli. I know that chloramines are not as effective in killing E. coli as chlorine. And I know there have been many outbreaks on lettuce, etcetera. Could you please speak to that for me with?

DIRECTOR LeCHEVALLIER: Certainly. This has been an area of research because it's a well known scientific fact that free chlorine is far more effective in disinfecting microbes than chloramine. So it would seem foolish to use chloramines. Why wouldn't that be the case? In water treatment, we essentially have two place where we apply two disinfectants. One is a primary treatment. And the effect of the primary treatment is to remove the pathogens from the water. And so the USEPA recommends -- and utilities generally apply -- using chlorine or ozone, ultraviolet light or chlorine dioxide. There's a number of different tools that are very strong primary disinfectants that will kill the pathogens that might be present in the source water.

The second reason for applying a disinfectant is to maintain that quality of water as it leaves the treatment plant

and travels through the distribution system. And here, the concern is primarily to prevent growth of microbes on the inside of the pipes. And so our research -- and we published this work in the early 1990s and, in fact, won some awards from the American Water Associations for this insight -- is that here, now, the rapid action of a disinfectant is not necessary. The pipes are going to be there for years. And so it's not necessarily the speed of the disinfectant, but the stability of the disinfectant to penetrate into the films and after they ate the microbes is more critical for the secondary part. So it was a whole change in thinking around disinfection.

We want a fast-acting disinfectant but really we would like to have disinfectant in the treatment plant but really, we would like to have a slow-acting, persistent disinfectant in the distribution system.

So we find that, in fact, the chloramines are more effective than free chlorines in activating microbes that are on pipe surfaces. So there's two different sides. This has been recently supported by studies by the U.S. Centers for Disease Control.

Legionnaires' Disease is rapidly increasing to becoming the most commonly reported waterborne pathogen. The U.S. Centers Disease Control has shown a number of studies including those done in San Francisco that systems that are on use of chloramines have a 10-time -- 10-fold less rate of Legionnaire

outbreaks and they should be the stability of the chloramines in penetrating the films that might be on the inside of plumbing, particularly in hospitals or other institutional buildings.

CHAIRMAN McILVAINE SMITH: Because I know in my town, when they dumped the chlorine in at the beginning of the system, out at the treatment plant, that it's my understanding that they must put more chlorine in at the beginning so when the chlorinated water gets to the end of the pipeline, it still has enough oomph in it to kill all of the bacteria and all of those microbes and the pathogens, etcetera.

Do you need to do that with the chloramines, that you have to dumped more in at the beginning of a system or does it reduce it, and you put the same amount in and you know that it'll always get to the end at the same amount, I guess I want to say?

DIRECTOR LeCHEVALLIER: I understand the question. Well, we prefer not to dump chloramine. We inject it in the mixing of the disinfectant, which is very important for its proper effectiveness. But understanding the question about the addition at the beginning, utilities might approach this differently.

We typically would add a previous disinfectant and then boost it again at various points in the system so it doesn't have to dump large amounts at the beginning, but meet it at the

end for a particular difference in applications.

CHAIRMAN McILVAINE SMITH: Because I know that there is a difference between the primary and the secondary disinfectant, if a water company is using chloramines, must they also have a primary disinfectant use because chloramines are only a secondary disinfectant, correct?

DIRECTOR LeCHEVALLIER: Only in rare cases, the surface water treatment rural. Another regulation by EPA that regulates how this disinfection is done would limit the use of chloramine only in very unique circumstances where the contact time and the pretreatment would be exceedingly long, which is very rare. Outside of being able -- a utility that does that has to prove then, in fact, that treatment process meets EPA regulations. So it's generally not practiced.

Most of the systems use chlorine or ozone as a primary disinfectant and then maintain a residual. That regulation requires the water utilities that use surface water to maintain a disinfectant -- a detectable disinfectant residual throughout the rest of the distribution system. It is a requirement to necessarily maintain that chlorine to the end and utilities that have problems being able to do that could choose a more stable disinfectant by chloramines to be able to put that --

CHAIRMAN McILVAINE SMITH: I'm confused then because if you say -- it was my word, "dump". I know that isn't correct -- it's not a technical term. But if you say

that treatment plants can put more, whatever the disinfectant is, at different points along the line, so to speak, then why do they need to use chloramines? If chloramine is the primary and secondary, because it is used for both, primary and secondary disinfection, then why are water companies choosing to add chloramine as a secondary disinfectant?

DIRECTOR LeCHEVALLIER: It's possible to what's called, boost the chlorine residual. Through the pipes system, half way through the system of the level, are not meeting the requirements for maintaining a disinfectant residual. It's possible, based on the configuration, to reinject chlorine again and boost it up. And there are systems that do this. So it's not necessary to go to a use of chloramine simply to maintain a residual. But each time you boost that chlorine, you're creating more disinfection byproducts.

CHAIRMAN McILVAINE SMITH: And the disinfection byproducts of chloramine, because there are disinfection byproducts, known as DBP -- the uses of these wonderful acronyms. The DBPs of chloramine are not as well know or have they all been studied and are they all regulated?

DIRECTOR LeCHEVALLIER: The USEPA recognizes that there are unknown byproducts for both free chlorine and chloramine. And in setting the disinfection by-product levels for THMs and for haloacetic acids, or HAAs, there are a set of each of those. It's a group of different compounds. They are

not only being set because they know that these disinfectant byproducts have been associated with human health effects, like the bladder cancer studies and --

CHAIRMAN McILVAINE SMITH: And they were able to specifically determine that the THMs and the HAAs specifically created those cancers?

DIRECTOR LeCHEVALLIER: No. What they have found is that, that has been associated with those cancers. The studies of the byproducts themselves have been focussed on the individual toxic effects that -- actually it's interesting to know that those have been associated with the original bladder -- source of bladder cancer.

CHAIRMAN McILVAINE SMITH: So THMs and HHAs have not been distinguished as the DBPs that have created bladder cancers?

DIRECTOR LeCHEVALLIER: Right. So the EPA uses those as an overall index of disinfection byproducts because when efforts are taken to reduce THMs and HHAs, they result in an overall lowering of all the disinfection by-product. So EPA has used them not only -- those individual compounds do have a toxic -- levels of toxicity that --

CHAIRMAN McILVAINE SMITH: But I'm confused. If the THMs and the HHAs have not been specifically determined to create and cause bladder cancer or other types of cancers in humans, then why is EPA deciding that we need to no longer --

that we have to focus on those byproducts and that we have to make sure that they're not in our water if we use chlorination.

DIRECTOR LeCHEVALLIER: Those byproducts associated with other forms of cancers and other toxic effects. The original epidemiological that's associated this with bladder cancer, the studies have shown that these particular ones are not related to other cancers.

CHAIRMAN McILVAINE SMITH: You just said that. I do believe that we have you on record saying that these two byproducts of chlorine were -- that they were the cause of bladder cancers and other cancers. And so now you're saying that they are now not. So my question is -- and, of course, we don't, I don't think, have anybody here from EPA, they were invited. But we're going to have to find out about that. And I won't be put you on the spot anymore, but I will ask you a couple of other things.

DIRECTOR LeCHEVALLIER: If I may clarify --

CHAIRMAN McILVAINE SMITH: Sure.

DIRECTOR LeCHEVALLIER: -- because I think it's been -- what you just said, I think it's been misquoted. I said the original epidemiological that looked at the concerns around disinfection byproducts would do to bladder cancers. What I just said is that these disinfection byproducts have been associated with other cancers. It's interesting that they are not associated, not thought to cause the original bladder

cancer that started this entire concern. But they do have public health concerns.

EPA must regulate compounds that have known health effects and in doing so, setting maximum contaminant levels. So in doing so, EPA set these levels based on known health effects.

CHAIRMAN McILVAINE SMITH: And what are those levels again for THM?

DIRECTOR LeCHEVALLIER: THM has a combined 80 micrograms per liter and the haloacetic acid, a combined of those is 60 micrograms per litter.

CHAIRMAN McILVAINE SMITH: Okay. Thank you. I have just a couple of others and then we must move on. Let me find my notes. You said that chloramines were the most cost effective and have a long history and that you could use membranes to take out the chloramination -- I mean, the chloramines out of the water, but it would be expensive. What kind of membranes are you speaking of, please?

DIRECTOR LeCHEVALLIER: The membrane treatment would remove the organic carbon, which the chlorine reacts with. These would be the different categories of membrane treatment in order to move organic carbon, it would require a level called nanofiltration or reverse osmosis. Perhaps you've heard about it.

CHAIRMAN McILVAINE SMITH: Yes, I have.

DIRECTOR LeCHEVALLIER: And all of these have a wave stream that has to be disposed. So that's a concern, what you do with this concentrated waist. They also remove the minerals from the water so they cause problems with having to readjust for the corrosivity of the water after the membrane treatment.

CHAIRMAN McILVAINE SMITH: Forgive me, but if you take, say if it were the nanofiltration and those remove the minerals. Those minerals were good minerals to have in the water and it would take those good minerals out so then you would need to put good minerals back in to balance the pH.

DIRECTOR LeCHEVALLIER: The pH and the corrosivity of the water, yes.

CHAIRMAN McILVAINE SMITH: And then I already spoke to you about that, about the antidotal evidence. You did say that a lot of what has been presented as far as chloramines causing problems that it's been antidotal and there hasn't really been any scientific studies.

I just have a question because I thought of this yesterday as I was reading through a lot of chloramine information. Don't all studies begin with some sort of an antidote because I know that unless you hear from people that there is a problem, then why would you study it? And I know on my end of town, I can name six people that live around me that are no longer with me, that have all died of cancer. And each

one died of a different type of cancer, but we haven't been able to figure out exactly what caused each of those specific cancers for each person that died.

I think we can all agree in this room that chemicals cause cancer. That each of us in this room, again, I mean, I may not -- somebody in this room may have a cold or have a fever. I may not get it because of my immunities. I have an immune system that can withstand a lot.

Say the person next to me has a lowered immune system and they will be effected. So I am asking you, I guess, as a scientist, when antidotal information is brought to bear -- I mean, somebody has come forward and said I have six that have died around me from cancer. Wouldn't that start a study of some sort or couldn't it start a study of some sort, a scientific study?

DIRECTOR LeCHEVALLIER: In the development of drinking water regulations, the USEPA must consider all of the available science in making a determination on the safety of water. In doing so for the development of these regulations and the Disinfection By-Product Rule of the Stage 2 regulations, as well as determination on use of chlorine and chloramines, EPA considered all of this information in making this determination. It's weighing all of the available -- the weight of evidence of all of the information in coming to a best decision.

So, yes, all of this scientific information as well as antidotal information is taken together. If we simply look at a piece of it outside of the context of everything else, it's possible to come off into a different conclusion, what we're hearing when you take all of the information together and weigh it all together. For example, the toxicity that you've heard about, like I said, are very unique situations that are not formed, they have been studied as -- Dr. Plewa is a toxicologist that studied these in laboratory systems, not in drinking water systems, not in human health effects.

So when all of this information is taken together, a decision is made based on for the safety of water. So, yes, all of this information is considered in making a sound decision.

CHAIRMAN McILVAINE SMITH: Yes, as long as you have all of the information. And that, I guess, is my question because, again, I don't know what caused the six people around me who died on my street from cancer. I don't know what cause their cancer.

DIRECTOR LeCHEVALLIER: Exactly. But people that are in decision making positions know that they never have all of the information. There's always an uncertainty, there's always some loose ends. You have to take together the information that you do have in hand and make the best decision that you can then.

CHAIRMAN McILVAINE SMITH: And just as, for me, a final comment and please feel free to final comment after my final comment. I think about how that if one chemical is put with another chemical and then another perhaps we don't know with another chemical that's in whatever substance that -- how do we know how it reacts? And I guess I think of Rachel Carson. We have the Rachel Carson building here in Harrisburg just down the block.

Rachel Carson, back in the 60s wrote that famous book "Silent Spring" which I devoured and I just found it fascinating that through her studies that we could get rid of DDT. And yet, DDT is still found in humans and in the atmosphere and in our soils all the way up to the Arctic Circle. That's something that I just read the other day.

I found out also that, yes, it was banned -- DDT was banned in the United States, but third world countries, where the beneficiary of the chemical companies, sending the DDT over there to use.

So I thank you so much for your testimony. If you have a comment after mine, I would be glad to hear it. And Rep. Pashinski has a question, but did you have any comment on mine? You don't have to.

DIRECTOR LeCHEVALLIER: It's important to carefully and prudently make these decisions because they're complexed and there's many different components. And,

therefore, it's important to consider all of the information. And all of us have been motivated by a desire to protect the environment and to produce safe water. That doesn't change. And we want to be making the best decisions.

So there will always been ongoing information of which there will be loose ends. And so that's why we continue to make the decision now, but research and collect better information so that it's an ongoing decision making process.

CHAIRMAN McILVAINE SMITH: Rep. Pashinski.

REP. PASHINSKI: Thank you very much. You've had some pretty good ideas of how to manage my pool water. A little light note here just for a moment, but it is serious. I mean, water, we all need it. It's a matter of life or death. And I know there has to be safeguards and constant review of the process.

Your testimony, along with Susan's testimony, is very enlightening here. And I just want to follow through with just a few questions in remarks.

It's obvious now that you have different formulas that you use in order to purify the water that will be fit for drinking and that's depended upon the source of the water and the conditions surrounding in particular reaches; is that fair to say?

DIRECTOR LeCHEVALLIER: I probably wouldn't have used formula, but yes. We have to consider the water

chemistry, the treatment and the process, yes. Each water is unique.

REP. PASHINSKI: And how many different kinds of chemicals do you use and what are they in these various water sources?

DIRECTOR LeCHEVALLIER: Well, there's many. For disinfectants, chlorine is the most commonly used in the United States, chloramine is the second most common, ozone, chlorine dioxide, ultraviolet light is a light, it's not necessarily a chemical. But there are coagulants used to cause the particles of water to stick together. There are polymers that help those coagulants work. That are adjustments to pH and the alkalinity, which is the buffering capability of the water. Florid is added where that's required by state or local requirements. And that's just a few of the chemicals that are added. It can be a long list.

REP. PASHINSKI: The point being, it has to be a very carefully scientific method in order to create that mixture to make sure that that water is pure. And I think all of us can agree that an improper mixture could definitely, certainly cause a threat. Chlorine that we use in our pools, if you use too much, it can be harmful for those that are swimming. An Aspirin is a wonderful drug that helps us out, but if we abuse that, it can certainly have terrible side effects.

Here's my concern. I had the wonderful opportunity of visiting one the water treatment plants back home in Northeastern, PA. And I can say that my experience with American Water has been very positive, very accessible. We've had many discussions about making sure that the water is pure. And I'm one of these visual learners, so I have to go see it. And it's a very impressive operation.

The thing that was a little concerning to me was that it's basically operated by maybe one or two engineers in this huge plant and then everything is done electronically. I'm not familiar enough or knowledgeable enough to make sure that there are safeguards placed in there so that when an improper mixture does become evident, obviously, the proper alarms go on. But I think all of this now, I'm questioning the systems, primarily because of BP because there were supposed to be safeguards, mechanical and electrical safety systems that were supposed to prevent what happened.

I guess what I'm finally coming to is, if chloramines are cost effective and they sustain that level of protection longer than this chlorine, why is it that only one-third of the company is using it and why haven't we been using chloramines much more actively?

DIRECTOR LeCHEVALLIER: Good question. There are many different facets to that. I'll start by saying, the chemicals that are added all have to be approved by the

Department of Environmental Protection.

So unlike your pool -- which you're kind of free to do whatever you would like to your pool -- the chemicals that are added have to be certified to be used for water applications. The operators have to be certified for that application. The chemicals have to be -- that process has to be approved. They have to be approved within a particular monitoring area. So it's not just kind of do it the way you that pleased to. That's a carefully controlled process because, just like you've pointed out, it's an important job. One that, as American Water, we take very seriously because we recognize the important role we have in the health of the community and the necessity to provide that safe water 24 hours as day, 7 days a week, 365 days a year.

And so despite the few people that are there, there's quite an army of people behind that that are monitoring and providing the quality control and support around that. This work is not only at the local facility in PA, but water quality professionals at the state level and then at the corporate level. And we're constantly looking over each other's shoulders because of the important responsibility that we do. And so the integrity of that treatment process is very important.

But the final question was, again, why are more using chloramines? There was a question before around cost. The

addition of chloramine is more expensive than just adding chlorine alone. You have to add another chemical, you have to have storage, you have to have delivery and you have to have regulations around that. So it is an increase in expense on the overall cost of water. That's a fraction of a penny more expensive per gallon. So it's not an extraordinary cost.

But if you're a water utility and you can meet the regulations without having to go to chloramines, it's a cost that is not necessary. So utilities are only implementing this when it becomes necessary in order for compliance with the regulations.

REP. PASHINSKI: So then are you saying that the science is getting better to provide a safer product?

DIRECTOR LeCHEVALLIER: I would say a certain amount of the science of this question had come up. When I started my career, the understanding of chloramine as a week disinfectant and free chlorine as a powerful disinfectant would make it -- why would we use chloramine? That would be silly.

Yet, when utilities went to use chloramine because of the first Disinfection By-Product Rule in 1979, they did it with their fingers crossed. And when the quality of the water was fine, in fact, my protocol in the water was improved, they just thought that was to their good luck. And it was our investigation of that that said, no, it's not just good luck. In fact, this disinfectant, when it is applied in the pipe

system, actually has an advantage because it's slower reacting. It's able to penetrate into the pipe crevices and activate the microbes, and that's actually beneficial.

So the science of chloramine is understanding. And, certainly, the work published recently by the Centers for Disease Control on the effect of chloramine on reducing the risk of Legionnaires' Disease is very much an advancement in the science of water supply. So we continue to advance our understanding. Both understanding the toxic risks, as well as the benefits. And this is an overall balance one has to look at in making a decision on the safety of drinking water.

CHAIRMAN McILVAINE SMITH: Thank you very much, Doctor.

CHAIRMAN McILVAINE SMITH: Thank you very much, Doctor. I really appreciate your testimony today. We will now move on to our next testifiers. Annette Smith, Director of Vermont for Clean Environment and Brie Hoblin. Thank you. You may start when you're ready.

MS. HOBLIN: My name is Brie Hoblin, and I live in Burlington, Vermont. Thank you for the chance to testify today in support of ending the use of chloramine in our water.

I'm here today to tell you about my own experience living in a water district that uses chloramines to disinfect the water. My health started to deteriorate in May 2006 when I started having mild intestinal discomfort. I went to see my

doctor, who recommended some diet changes that brought no relief. Because of the changes in my diet, I increased my water intake significantly. My symptoms did not improve, and continued to get worse. I felt more tired and had more intestinal discomfort, not less. By June, my health reached crisis levels when I had an episode of intense rectal bleeding that left me unable to drive myself to the doctor.

When I saw my doctor she recommended that I switch from drinking the tap water to only drinking bottled water. I ignored her advice, thinking there was no way tap water could make me feel so terrible.

By July, I was extremely weak and started having dizziness and breathlessness in addition to intestinal distress. For the rest of the summer I was debilitated by my symptoms. I lost close to 20 pounds and had severe stomach pains after trying to eat most foods. The muscles around my stomach were clenched in a permanent knot, and felt rock hard to the touch. Eventually I learned to eat easily digestible food like white fish or pureed squash, the stuff you would use as baby food.

Words cannot describe how weak I felt at this point. I was too sick to go to work and nearly got fired from my job. I was unable to garden. I had trouble walking my dogs just a few houses down the street because I felt like I was going to pass out. I couldn't vacuum or carry laundry from the washer to the

dryer.

Exerting myself physically also gave me brain fog and made it hard for me to concentrate. I spent most of the summer sitting in a reclining chair or lying in bed while other people in my family did the things I would normally do. I remember being scared and wondering if I was dying because I felt so weak, and had so little energy.

Given how much I was suffering, you may wonder why I didn't take my doctor’s suggestion to switch to bottled water more seriously. The answer is that I thought it was such a ridiculous suggestion that I didn't feel it was worth trying. It didn't seem possible to me that something in tap water, water made safe and sanitized for me by my water district, could possibly make me feel this sick.

In October 2006, I sought a second opinion. This doctor felt I probably had anemia and maybe an ulcer because I had experienced repeated intestinal bleeding that summer. She prescribed 30 milligrams of Prevacid per day.

That fall, I was able to sign up for a few college classes. I continued to be frustrated by my symptoms, and had to miss so many classes that I needed special accommodations in order to pass. It’s hard to drive yourself to class when you're seeing black spots in front of your eyes or feel too weak to carry your own backpack.

I continued feeling pretty sick, although I no longer

felt quite so intensely weak as I had during the summer of 2006. In July of 2007, I decided I was desperate enough to try anything, no matter how ridiculous it sounded. After 13 months of feeling half-dead at age 27, I finally stopped drinking the tap water.

The results were immediate. I felt some sort of underlying tension leave my body and spent a lot of time sleeping over the two weeks following. It felt like my body was detoxifying. The day after I started my bottled water regime, my doctor did a kidney test that indicated my kidneys were a little dry. She recommended that I drink more water; a suggestion that made no sense to me as I routinely drank six or seven glasses of water a day.

The first glass of bottled water I drank surprised me. After over a year of drinking the tap water with chloramine in it, I felt like I was drinking water that actually hydrated me for the first time in months. It tasted wet and refreshing and surprised me by how different drinking it felt in comparison to drinking my tap water.

After those two weeks of sleeping more than usual, I had a surge in energy and felt like maybe I wasn't dying after all.

Life improved enough to where on good days I could carry light bags of groceries again and walk my dogs to the end of the block. But the dizziness and breathlessness continued.

I got more tests done, saw more doctors. I was tested for anemia twice, but the tests showed I was fine. My doctors took me off the Prevacid twice because they couldn't see much wrong with me after performing an endoscopy and colonoscopy. Each time the doctors took me off the Prevacid, I felt weak and ended up back in bed again, with intestinal symptoms and stomach pain, dizziness and breathlessness.

By the summer of 2008, I still had some dizziness and definite times of being incapacitated, but it was not an ongoing part of my daily life every week. I felt better enough to take two small vacations that summer, where I was away from my house for three and four days. Both times I noticed feeling more energetic and I was capable of doing more physical activity. It occurred to me that being completely away from the chloraminated water was what caused me to feel better.

My doctor, the same one who told me not to drink the water, had also advised me to stop showering in it. While it had taken me over a year to believe that tap water could make me feel so ill from drinking it, it took me closer to three years to believe that simply showering in it, and not ingesting it at all, could also make me sick.

Finally, on January 12, 2009, I started showering using a camping shower bag hung up over our bathtub, filled with heated filtered water that I bought outside the water district.

Again, I was astounded at how huge a difference this

change made. Within a week I felt energetic enough to try running short distances. After a few day, I started seeing how fast I could walk to class before the dizziness and black spots happened. I arrived at class that day extremely out of breath, but not at all dizzy. Once I caught my breath, I felt fine, and experienced no brain fog, and no breathlessness.

After spending a year basically camping in my own home, in July 2009 I moved out of the water district. Since I was forced to move, I have regained my strength completely. I have returned to my normal life and daily activities. I can take out the trash and lift five gallon jugs of water without a problem. I can carry wet laundry downstairs to the dryer. I go on long bike rides with my friends and I hike up mountains. My symptoms return only when I am re-exposed to the chloraminated water.

You can come to your own conclusions. I know what caused my symptoms. Knowing that hundreds of people have had the same symptoms and experienced the same outcome when they eliminated their exposure to chloraminated water, I strongly support placing a moratorium on the further use of chloramine. Thank you.

DIRECTOR SMITH: My name is Annette Smith. I am Executive Director of Vermonters for a Clean Environment, a grassroots organization that assists citizens in participating in the regulatory processes and finding solutions to

environmental problems in their communities. I live in Danby, Vermont, but I am a seventh-generation Pennsylvanian. My mother lives an hour north of here, and I have always been proud to call Lewisburg, PA my hometown.

I would like to thank Madam Chair, Rep. Pashinski and the committee members who aren't here for hearing my testimony today on the use of chloramine as a secondary drinking water disinfectant, and share with you the experiences we have had in Vermont since the largest municipal water system, which serves 68,000 people, switched from chlorine to chloramine in April 2006.

In the last four years, I have read as much science as I can find about chloramine and its related chemistry, talked to as many experts as I can track down, learned about water treatment technologies, and read hundreds of symptom reports from citizens. Too many are as severe as Brie's. And like her, many of those symptoms began right after the water disinfectant changed. People have suffered rashes like chemical burns, respiratory problems like asthma, and gastrointestinal problems, all of which disappear when people stop cooking with, bathing in and drinking their tap water, or, like Brie, move.

After reading the first hundred symptom reports, I was alarmed. After reading more than 300 symptom reports, I am convinced that chloramine is toxic, chloraminated water is

making people sick, and there are better ways to ensure safe drinking water than mixing chlorine with ammonia.

Here is some of what we have learned and experienced over the last four years in Vermont: In 2006, I advised citizens, who contacted Vermont for Clean Environment saying the water was making them sick, to report their symptoms to the Health Department and the water district, and I was sure they would be taken seriously. Instead, they were ridiculed, hung up on, and dismissed.

In 2007, the Centers for Disease Control came to Vermont and interviewed people who said the water is causing skin rashes, breathing and stomach problems and loss of energy. People thought they were dying. The CDC admitted on the television news that evening that studies for the health effects people were reporting have not been done. Their report -- which they said wasn't a report -- found that data gaps remain.

Also in 2007, the state of Vermont's Department of Environmental Conservation sponsored a water disinfection conference in which one of the speakers, Dr. Richard Bull, a highly regarded researcher, talked about a study he did, which Susan referred to, in which mice were put in chloraminated water with their heads held above the water, and they all died. He cited numerous instances in his talk where research had not been done, and raised serious concerns about chloramine's

unknowns.

EPA staff confirmed in 2007 that chloramine's disinfection byproducts are not regulated, except those that are shared with chlorine, and they told us that EPA is extremely slow to make changes to regulations.

Vermont legislative committees took testimony in 2007, 2008, and 2009. And some of the material in the packet you have are letters that were presented as part of those testimonies. Our citizen legislators know people who are suffering symptoms since the change to chloramine and they are taking the problem seriously.

As a result, in 2008, suffering citizens, my organization, the Water System Operator, the State Health Department and the State Water Supply Division participated in a facilitated series of meetings where we tried to figure out how to assess whether or not the chloraminated water is making people sick. All the investigations we suggested were ruled out as not possible or too expensive. We got nowhere and no studies took place.

In 2009, the legislature required an engineering study of water systems in Vermont to assess water disinfection options. Rather than doing an independent investigation of cost-effective alternatives, the study's authors failed to identify practical solution.

Efforts to engage EPA in a meaningful dialogue about

how to address the problems with chloraminated water have been frustrating and fruitless. Your packet contains a letter from my organization to EPA and their response. A letter from our congressional delegation Rep. Peter Welch, Senator Patrick Leahy and Senator Bernie Sanders all wrote a joint letter and you can read their response.

Citizens in California and New York are experiencing the same health problems since their water systems switched to chloramine. We have letters from them in the packet. The California group has heard over 600 people. That's the San Francisco area. And people who live in many other states and countries report the same health effects.

Not everyone is affected, and not everyone experiences the same set of symptoms. Not everyone is affected right away.

Doctors are unable to make clinical diagnoses because health studies have not been done. And the packet contains letters from doctors to that effect. As a result, health departments get no formal complaints, and make the claim that there is no problem.

Water system operators are being required to reduce chlorine's disinfection byproducts because, they say, chlorine is very reactive. We have learned that chloramine is also reactive, and the toxic chemicals that can be created in reaction with chloramine are not regulated in drinking water. For instance, the way to make rocket fuel, hydrazine, a highly

toxic chemical, the formula is to combine chloramine with free ammonia. Both are present in the Vermont chloraminated system.

The carcinogenic nitrogenous compound called NDMA can be present in chloraminated water systems, and can be created when chloraminated water reacts with quaternary amines, which are common chemicals in shampoos and detergents. And my printed testimony contains links to scientific information about that.

We do not know what is causing people to get sick from the water. It could be monochloramine itself, which has not been adequately tested for safety. Monochloramine could be speciating to di- or trichloramine. And it is well known that trichloramine and dichloramine both have health effects. People could be reacting to chloramine's disinfection byproducts or some other chemical reaction could be taking place. The Vermont system uses zinc orthophosphate, hydrofluorosilicic acid, sodium hydroxide, potassium permanganate, a coagulant, and a flocculent, all in addition to sodium hypochlorite solution and ammonium sulfate.

We do know that once a water system switches to chloramine, resources are not in place to address the health problems people experience. They are dismissed as statistically insignificant.

We are aware of new technologies that are coming to the marketplace that can eliminate the need for chloramine. And

there are two pieces of testimony in your packet that were delivered in April and May at DC WASA, dealing with Washington, DC from someone who has the technology that they're trying to get the EPA to take seriously.

EPA may be considering new regulations regarding chloramine and its byproducts, but these changes could take years to implement. Meanwhile, people are suffering. That is why you must act to protect the public's health. Even if EPA decides today that chloramine in drinking water is a bad idea, it is not an entity that can move quickly where drinking water regulations are concerned.

Dr. David Ozonoff wrote in his letter of 2007 -- and it's the top letter in your packet -- "health complaints from water users attendant upon any treatment change are a red flag and need attention." Our experience in Vermont is that no mechanisms exist to evaluate and address health effects caused by chloraminated water, and once a water system switches, it is nearly impossible to get it to switch back. You would be wise to avoid the nightmare that has been created by the use of chloramine for some Vermonters and look for the best technologies to provide the safest drinking water.

Common sense says that we can do better than combine chlorine and ammonia and call if safe. Science says that chloramine creates an environment in which complex and unregulated chemical reactions can take place. You have the

opportunity to lead the way in drinking water treatment and I urge this committee to give water system operators a push towards using fewer chemicals, while doing everything possible to protect source water and require precursor removal. The real solution begins up front by removing the organic matter with which chemicals react, not by adding more chemicals as you're sending the water out to customers.

Thank you and I would be happy to answer questions. I also would like to respond to specific things that Dr. LeChevallier said. I can do that now or in --

CHAIRMAN McILVAINE SMITH: Yes, if I could ask because I forgot to ask Ms. Pickford and I think that you just mentioned it too, about the mice. Do you know if that was using monochloramine -- it is. I just got that answer. And I am just very curious if you could repeat -- you said something about there's a new system in Washington, DC somebody presented. If you could just tell me if there's a --

DIRECTOR SMITH: It's a technology called electrocoagulation. It is not a new technology. It's been around for a long time. It's been developed and perfected by a company that's trying to bring it to market. They've taken it to D.C. WASA and they've taken to EPA and they -- it's a type of technology that can sort of -- think of it as zapping all of the organic matter upfront. So all of you need is a little chlorine going out in the distribution system.

CHAIRMAN McILVAINE SMITH: Okay. Thank you. Now you may respond.

DIRECTOR SMITH: Dr. LeChevallier said that it would be easy to do it at the epidemiological approach. Now, when Dr. Bull came to Vermont, the head of people concerned about chloramine and I said, could we please have lunch with you. Even though he was clearly the one that everybody in the room was looking up to, he agreed to have lunch with us. He said that there's nothing easy about doing an epidemiological study. And he said that it would be extremely expensive and it's never going to happen.

So I dispute anybody who says that's easy. If it were easy, we have been told by state epidemiologists that you have to have a population the size of Vermont to study it and it's just enormously expensive.

He referred to a June Weintraub study from California. That was a phone survey of fewer than 20 people. When the Citizens Group heard about it, they called to say, we wanted to participate in this and they shut the study down. It's not a study. And it's being used by health department over the country to validate something that was a joke. No scientist would take that seriously.

He referred Fairfax, Virginia. And I just want to point out that one of the environmental issues that we're very concerned about is fish kills. And Fairfax, Virginia is one of

the places that Susan Pickford has provided you information about 90 percent of the aquatic life died in a stream that was -- that had a water main break from chloraminated water. It's not just fish, it's all of the aquatic life.

He referred to Legionnaires' Disease in reference to your question about microbial effects. The one thing that chloramine apparently is very good at is controlling Legionnaires' Disease, not the other things, but that's -- you thought that chloramine was only used as a secondary disinfectant. Dr. Susan Richardson of EPA has told me that there are very few systems that use chloramine as a primary disinfectant.

The first that I've heard that there are no real links proven between THMs and HHAs and bladder cancer was today. Dr. Susan Richardson told me that she feels that most scientists feel that there's a strong link. However, Dr. Richard Bull said his talk -- and we can provide you with a transcript of his talk -- in fact, he does not believe that there has been a direct connection made.

And one of the further things that has not been mentioned today is the spectrum that's been raised about chlorine's disinfection byproducts cause of -- alleged cause of birth defects or pregnancy issues. And it's something that we've had to deal with in Vermont because the water system operators come in -- alarmists and say, look, if you make us go

back to chlorine, we're going to see an immediate increase in birth defects. There have been a lot of studies some that initially showed that there were issues and that's one of the reasons that we're here today.

CHAIRMAN McILVAINE SMITH: Would you -- I'm sorry, but I just want to make sure that I understood you correctly. You just said that there would be birth defects if we did what?

DIRECTOR SMITH: If we went back to chlorine.

CHAIRMAN McILVAINE SMITH: I thought you said chloramine.

DIRECTOR SMITH: Exactly, because after chloramine, these are the kinds of things that we hear. And there have been studies that have been done since then that have pretty much debunked those initial studies. It is -- the most generous thing that I can say is that it is an extremely unsettled area. And there are, I think --

CHAIRMAN McILVAINE SMITH: If I may.

DIRECTOR SMITH: You may, please.

CHAIRMAN McILVAINE SMITH: If I could because we are running behind. But if you would please provide the transcript from Dr. Richard Bull to Karen Shaffer in Chairman Oliver's office, that would be most helpful and then she can distribute that to the rest of us.

I thank you so much for your testimony and I thank you for your testimony. I'm so glad that you are well again. And

we will be in touch. I'm looking forward to holding another hearing. Rep. Pashinski would like to ask a question.

REP. PASHINSKI: Thank you, Madam Chairman. And thank you very much for your testimony. And I also concur, I am so happy that you're feeling better and enjoying life. Could we, just for a moment, talk about your situation. In the community that you lived, any other cases similar to yours?

MS. HOBLIN: Yes, I believe that there were other cases of people having symptoms from chloramine.

REP. PASHINSKI: Now, you said I believe there were. Either there are or not or you either know or don't.

MS. HOBLIN: I don't know personally. I don't have access to, you know, the information about all of the sufferers.

REP. PASHINSKI: Okay. Has it ever been determined through all of the medical attention that you received, whether you might be -- and I know we're all unique in our own special way -- but is there something chemically within your system that may have triggered that particular source of water?

MS. HOBLIN: The doctors have not found anything significantly different about me that would account for why I had such a reaction. And, personally, I would love to know because I think if there is a specific health condition or imbalance of enzymes in your stomach or whatever is going on, I

think it would be very helpful to know that so other people would be aware if they had that condition, that this could be a problem.

REP. PASHINSKI: Absolutely.

MS. HOBLIN: But no answers have been found.

REP. PASHINSKI: What water company supplies your water to your community?

MS. HOBLIN: When I lived in Winooski, Vermont where I had all of the symptoms, it was supplied by Champlain Water District. And I moved to Burlington, Vermont, so now I'm under Burlington's Water District.

REP. PASHINSKI: And you don't have a problem now?

MS. HOBLIN: I don't have a problem there and they just use chlorine for their water.

REP. PASHINSKI: And obviously, the water that you used prior to moving, that was tested?

MS. HOBLIN: That was not tested.

REP. PASHINSKI: That water wasn't tested?

MS. HOBLIN: Not specifically.

CHAIRMAN McILVAINE SMITH: Tested in which way? I'm not sure if I understand the question.

REP. PASHINSKI: Well, I would have like to have had the source -- the water source tested to see exactly what kind of combination of chemicals that were identified within that water.

CHAIRMAN McILVAINE SMITH: In the Champlain Water District you mean?

REP. PASHINSKI: Yes, especially where she lived.

MS. HOBLIN: There's other sufferers that have had Champlain Water District come out and test their water. And in Champlain Water District, I don't think they've ever found anything different, specifically, at the houses of sufferers. But that might be something Annette could address more effectively than I can.

REP. PASHINSKI: Okay. Thank you. Annette Smith, you indicated the California study was not legitimate, only 20 people were used in the survey.

DIRECTOR SMITH: Fewer than 20. I can't remember if it was 11 or 17 and it was just a phone survey.

REP. PASHINSKI: Do you know what the name of that survey is?

DIRECTOR SMITH: I would find it by Googling June Weintraub in San Francisco. I don't know the name of the study.

REP. PASHINSKI: And you indicated that this is the same study that the EPA is using as a basis for making the determination about chloramine?

DIRECTOR SMITH: No, this is the study that Dr. LeChevallier referred to as a study that is being used by state health departments to justify the use of chloramine.

REP. PASHINSKI: And the title of that study?

DIRECTOR SMITH: I'm story, I don't know the title of it, but it is something that I can easily provide you with.

REP. PASHINSKI: Who conducted it?

DIRECTOR SMITH: It was conducted by Dr. June Weintraub. And to get the full story, I would recommend that when you do have a follow-up hearing, that you hear from the head of Citizens Concerned About Chloramine. Her name is Denise Johnson-Kula.

And I would also encourage you in that hearing to make telephone testimony available because not only Denise, but other people, especially the scientists that you want to hear from are very, very busy and will not be able to get here.

REP. PASHINSKI: Do you have that contact information that you can supply to our --

DIRECTOR SMITH: I can supply any information that you would like.

REP. PASHINSKI: Thank you very much and good luck.

CHAIRMAN McILVAINE SMITH: Thank you. And I would just wanted to make a comment also about testing water. When you test water, if you're taking it to a water lab, you need to ask them to test for specific things. You can't just hand them water. And you all may know this, but I'm just putting it on the record. You just can't hand them the water sample and say,

will you test my water for me, because they normally test for any kind of pathogens, making sure that it's potable so they don't have any bacteria in it.

And I know if you're looking for pH hardness, those kinds of things, they will test normally, routinely for those. But if you're looking for the majority, any of those kinds of organisms, you must ask them to specifically look for those things and chemicals. You would have to say, would you please tell me every chemical that you could find. It would be very, very expensive, but --

DIRECTOR SMITH: We actually have done testing.

CHAIRMAN McILVAINE SMITH: Pardon me?

DIRECTOR SMITH: We did do testing. Last fall we purchased testing equipment and we went out and we tested the water in ten different locations in the Champlain Water District and five different locations in the Burlington System. And we tested five locations where people are suffering and five locations where people weren't suffering. We did it over a six-week period, so we controlled for any -- and what we found were there were two significant differences between the two systems.

One was that the Champlain Water District has a lot free ammonia and the Burlington System does not. And we got a preliminary test for hydrazine in the Champlain Water District System. We then sent it out to a lab to try and get it

analyzed and we came back with a negative.

We brought that information to Dr. Richard Bull, and he said, you know -- excuse me, to Dr. David Reckhow, he said, I would not actually dismiss that. He said it may be that the chemical reactions that are taking place are not taking place in the distribution pipes, they are taking place in the people. And we have been trying to figure out how to get the people tested for hydrazine now. And I cannot believe the lack of intellectual curiosity from doctors, researchers, chemists. I have never worked on any issue that has so little -- and it's all about money.

CHAIRMAN McILVAINE SMITH: And I wasn't going to but, I've got to share this. I had some sort of an allergy that it finds the weakest part of your body. And on my left leg in my calf area, it will flair up and it gets very itchy. I went to my doctor many times and she gave me some sort of steroid. And I didn't realize that a steroid will take away your melanin in your skin, so now it never tans. But it never took away the itching and that is what was what the problem was.

But, when I was finally sent to a dermatologist, I looked her in the eye because she was saying, well, I'll give you some cream. I said, the cream does not work. There is something in my body that is rising up and causing this reaction on my skin and can you investigate and find out what

is causing this itching skin because it's driving me crazy? So she locked me in the eye and said, no. So I agree with you on that intellectual curiosity because it's all about give them the cream, get them out and collect the money.

Thank you for your testimony and we will have to move on --

MS. HOBLIN: Can I make a quick comment?

CHAIRMAN McILVAINE SMITH: Yes, go ahead, quickly.

MS. HOBLIN: I had a thought to share with you. I never got the water tested in the home where I lived, but since I moved out of the district, occasionally, I have to go shopping somewhere inside the water district and I often experience the same symptoms when I have to do that, which means that my symptoms are not specific to the house. It's specific to the water.

REP. PASHINSKI: Are you suggesting that you're still drinking that when you go visit?

MS. HOBLIN: No. Just to fumes in the air make me dizzy and breathless in about an hour.

CHAIRMAN McILVAINE SMITH: Thank you. Thank you very much for being here today. I appreciate it. Now, we'll move on to Lawrence Zinser from Master Water Conditioning. Thank you for being here today, Larry, and you may proceed.

ENGINEER EDUCATOR ZINSER: Madam Chair, ladies and gentlemen, thank you for the opportunity. I'm from Master

Water Conditioning. We're a -- first of all, I'm an Engineer Educator from Master Water Conditioning. We've been around since '67. We are a manufacturer of residential, commercial and industrial water treatment equipment. I have included some illustrations with my testimony because I also am a visual person.

This presentation will address the use of chemical disinfectants to treat the public water supply. The reason that we disinfect the water is to control the presence of pathogens. Pathogens are biological agents that cause disease and thereby threaten health and well being of the public. Pathogens include three principal categories of microbes: Bacteria, virus and protozoa.

Water for public consumption is drawn from two sources: Surface sources, such as reservoirs, rivers and lakes; and ground water, which is drawn from the underground aquifers. The character of these two sources is generally distinguished between a higher level of organic matter in surface sources to a higher level of minerals from ground sources.

From whatever source, the treatment of the water typically includes a primary treatment step which is focused upon removing viable pathogens from the water, and a secondary treatment step whose purpose is to provide a residual disinfectant to prevent the regrowth of pathogens as the water flows through the public distribution system.

Since the early 1900s, chlorine has been sued as the disinfectant of choice for primary and secondary treatment. The reason for this is that chlorine is fast acting in killing pathogens, it is relatively inexpensive to use, and it maintains its potency for a reasonable length of time, especially as compared with ozone, which is used in Europe. The efficacy of disinfectants is rated as contact times, or CT, against various pathogen reductions. The CT is the product multiplication of disinfectant concentration -- usually represented in parts per million -- multiplied by the exposure time in minutes. The CT for chlorine for 99.99 percent reduction of virus, for example, is the number three. This means that a 99.99 percent reduction in virus can be expected if the water is exposed to three parts per million of chlorine for one minute -- three times one -- or to one parts for minute of chlorine for three minutes -- one times three.

Chloramines have been used as a secondary treatment for public water treatment since 1917 in Denver, and 1969 in Philadelphia. In 2002, about 20 percent of water treatment systems in the U.S. used chloramines, and today, the number is about 30 percent. The reason that chloramines were first used was to achieve a longer residual time for public distribution systems. Chloramines retain their potency much longer than chlorine.

Chloramines consist in a nitrogen atom plus one to

three attached chlorine atoms. They are produced onsite by introducing ammonia to chlorinated water. There are three members of the inorganic chloramines family: Monochloramine, which has one chlorine atom, dichloramine, with two, and trichloramine with three. The amount of each depends upon the character of the water and the ratio of the concentration between chlorine and ammonia. In most cases, monochloramine is the dominant species. It is also the most reactive.

Although chloramines are more stable than chlorine, they are also less reactive and less effective as a disinfectant. For example, the CT for 99.99 percent reduction of virus for chloramines is 643, as compared to three for chlorine. But since chloramines are a secondary treatment, the exposure time will include all the time that the water is traveling through the distribution system. The City of Philadelphia, for example, doses chloramines at about two parts per million, so the 643 CT factor would be achieved in about five hours.

In 1974, it was discovered that when chlorine combines with organic compounds in water one result is another family of products called trihalomethanes, or THMs. These products are called disinfection byproducts, or DBPs, since they result from the disinfection process. The organic compounds are called natural organic matter, or NOM. NOM are primarily humic and folic acids, which come from the decomposition of plants and

animals. NOM is found primarily in surface waters. It should be noted that NOM, most of it, can be removed from water by carbon absorption or by ultrafiltration.

Trihalomethanes consist in a single carbon atom attached to one hydrogen atom and three halogens. The halogens being: Chlorine, bromine, iodine or fluorine. Trihalomethanes are suspected carcinogens from animal testing. The actual mechanism that causes this is still being studied. The answer to this is important so that the results can be extrapolated to human exposure dangers. The term TTHM refers to the total trihalomethanes, including all members of this family of compounds. The EPA has established a TTHM limit in water of 80 parts per billion, which is eight one-hundredths of a parts per million. With the increased concern for TTHMs, more and more public treatment facilities started using chloramines as their secondary treatment, because although chloramines do also form TTHM from natural organic matter, they do so at a much slower rate.

Chloramines, however, have their own set of concerns. When chloramines are exposed directly to blood, the blood looses its ability to bond with oxygen. Consequently, chloramines are particularly dangerous for hemodialysis patients and to fish. In both cases, the blood is exposed directly to the chloramines. In hemodialysis, this danger is eliminated by a mandatory filtration with carbon to remove

chloramines. When chloramines are ingested orally, they are typically broken down by saliva and gastric juices, so this threat doesn't appear again. The danger to blood is minimal.

Chloramines are also more likely to dissolve lead in pipes. Chloramines react with lead to produce a soluble plus three valence lead variety with the soluble form, whereas as chlorine reacts with the same lead to produce an insoluble plus five valence variety, which is insoluable. Some recent studies with rats and monkeys indicate potential danger to the liver and other organs, but other studies do not.

Since 1974 and more recently, there have been growing concerns for the other DBPs of chlorine and chloramines disinfection. These are sometimes referred to as TOX or the total organic halides. They include many compounds that have not been thoroughly studied, but have the reactive potential for damage to human health.

In closing, there are some relevant facts regarding the use of chlorine and chloramines: A public water supply and distribution system requires a disinfection protocol; two, there is a significant amount of infrastructure currently in place for the use of chlorine as the primary disinfectant for public water treatment; three, chlorine is an effective disinfectant; chloramines are less so; other primary disinfectants, such as ozone, would require significant infrastructure investment; four, disinfectants, by their

nature, are aggressive to other chemistries, including the biochemistry of pathogens, and also any other organic matter in water; and lastly, the important ingredient for trihalomethanes and for total organic halides is the natural organic matter, which can be removed from water.

Thank you.

CHAIRMAN McILVAINE SMITH: Thank you very much, Mr. Zinser. I'll take the last one first. When you say those NOMs can be removed from water, how are they removed? What is the best way the remove those NOMs?

ENGINEER EDUCATOR ZINSER: They are used two primary ways. One is by carbon absorption. The other one is by membranes. I know that the previous speaker referred to nanofiltration and reverse osmosis, which do, in fact, remove some minerals. The primary factors are called molecular weight cutoff. That is the term that is used to specify which molecular size is removed by a membrane. And with the technology today in membranes, you can fine-tune a membrane to remove certain organic -- levels of organic matter with the system.

CHAIRMAN McILVAINE SMITH: Just out of curiosity, and maybe you've already said this, but if we use nanofiltration, say in my water system, West Chester Borough, if we had a nanofiltration system installed when we were doing an intake of the well water, and after the nanofiltration, we

put in our chlorine or chloramines, then that would be a really good way to make sure that the water has been effectively disinfected and also to make sure that nothing buildups on the pipes within, or would that not?

ENGINEER EDUCATOR ZINSER: Two things. The nanofiltration that was used would remove some of the minerals from the water, the larger molecular wave minerals, and it will also remove much or probably most of the organic matter, except the very soluble forms. Then you would have that organic matter going through the pipes, but it wouldn't necessarily remove, what was commonly referred to as biofilm because you have to have a disinfectant because bacteria are the most ubiquitous creatures on this planet. They can come from anywhere. You have to have -- it's a constant battle.

CHAIRMAN McILVAINE SMITH: So then the chlorine could be added in or chloramine, but would they still come up with those THMs and those other --

ENGINEER EDUCATOR ZINSER: That is the actual key. That's what my logic tells me. The combination of these highly toxic disinfectants, chloramines, they act -- that's why they're disinfectants, they're aggressive. And if you put that with organic matter, the result is DBPs and -- all of these different types. Why not remove the part of the equation?

CHAIRMAN McILVAINE SMITH: Right. And that would be removed by the nanofiltration?

ENGINEER EDUCATOR ZINSER: Yes, ma'am.

CHAIRMAN McILVAINE SMITH: Okay. I went through your testimony last night so I made notes to myself, so I just have to look at my notes. And then where you said the reason that chloramines were first used was to achieve a longer residual time for public distribution systems because chlorine does not have a long time, right?

ENGINEER EDUCATOR ZINSER: Yes, ma'am.

CHAIRMAN McILVAINE SMITH: It starts to dissipate?

ENGINEER EDUCATOR ZINSER: Yes, ma'am. It turns into chlorides. It becomes ineffective after a certain amount of time.

CHAIRMAN McILVAINE SMITH: And when you said that the 643 -- I know that's in here but I can't fine it. But it was five hours that -- so the City of Philadelphia, for example, doses chloramines at about two ppm. So the 643 CT, contact time, factor would be achieved in about five hours. Is that a good thing, when I know that you put chlorine at a small dose but within a minute or three minutes, boom, you've got it?

ENGINEER EDUCATOR ZINSER: The difference, again, between the primary and the secondary. The primary, your want to essentially kill as much off as you can.

CHAIRMAN McILVAINE SMITH: Quickly.

ENGINEER EDUCATOR ZINSER: The secondary, your concern now is that you want to minimize -- because you're

never going to eliminate it completely. It's never going to happen. You want to minimize the regrowth of bacteria, virus and protozoa within the treatment system and if you have breaks in the pipe or other things, which occur everyday.

CHAIRMAN McILVAINE SMITH: And that's where one of my thoughts came. When we put the chlorine in -- and I know that it dissipates as it goes along -- in the initial injection of chloramine -- at least in my town, because I asked my guy who does this -- they put a lot more in at the beginning so there will be some at the end. But if they're able to put enough in there and it's dissipating as it goes and then the chloramines go in and they're more stable -- oh, gosh, I lost the question. I was trying to explain it. It'll come back to me. Because there's a correlation there that I'm missing at the moment.

ENGINEER EDUCATOR ZINSER: Ma'am, one of the things too that you explained is the level of chlorine. Part of my -- when I first got out of the drains and went into water treatment, I dealt a lot with dialysis and I've become very sensitive to their unique needs. And chlorine levels and chloramine levels are extremely important. And there had been occasions where the levels have been arbitrarily -- not arbitrarily, but have been changed for not a sufficient reason and when those changes occur, it threatens patients on hemodialysis.

CHAIRMAN McILVAINE SMITH: So when someone is on a dialysis machine -- it's somewhere in this testimony. I can't find it fast enough -- they make sure that they are taking out the chloramines in all of their water because is it fatal for them if they get chloramines?

ENGINEER EDUCATOR ZINSER: It can be fatal. What they have -- because, as I mentioned, it effects the blood. It effects the ability to bond with oxygen. The same problem with fish.

CHAIRMAN McILVAINE SMITH: And if someone didn't know that they had a kidney problem, would they effected by chloramines?

ENGINEER EDUCATOR ZINSER: No, ma'am. This has to do with the hemodialysis process itself, where the blood is put into the artificial kidney. And actually, the blood is put right next to the treatment water through a membrane.

CHAIRMAN McILVAINE SMITH: I see. I'm going back to all of my little notes here. Excuse me for a second. And the character of the water, that is something that I remember reading somewhere. When you have a difference in pH in your water, then chlorine and chloramine, when you're injecting it in, that can cause chlorine or chloramine not to be as effective, say, if you have a high pH or a low pH?

ENGINEER EDUCATOR ZINSER: Yes, ma'am.

CHAIRMAN McILVAINE SMITH: Now, because the low pH

-- forgive me, but I'm drawing a blank. The high pH is acidic?

ENGINEER EDUCATOR ZINSER: Yes, it's the low pH that causes chlorine to be less effective.

CHAIRMAN McILVAINE SMITH: So low pH, then your chlorine would not be as effective or chloramines also would not be as effective if you have a low pH.

ENGINEER EDUCATOR ZINSER: Yes. The problem is that when the chlorine -- the pH is low, it's better as an oxidizer trying to move iron, but if it's high, it's better -- vice versa.

CHAIRMAN McILVAINE SMITH: So when someone is treating the water to make it potable and to make it safe drinking water, then the person who is in charge of that, really has to be aware of the pH.

ENGINEER EDUCATOR ZINSER: Yes, ma'am.

CHAIRMAN McILVAINE SMITH: -- the iron also? Iron in the water or --

ENGINEER EDUCATOR ZINSER: Iron will make the chlorine go away. It'll use it to oxidize the water.

CHAIRMAN McILVAINE SMITH: Okay. Does it do that to chloramines?

ENGINEER EDUCATOR ZINSER: What, chlorine?

CHAIRMAN McILVAINE SMITH: If you have a lot of iron in the water, would it not also cause the chloramines to oxidize as quickly as it does with chlorine?

ENGINEER EDUCATOR ZINSER: Ma'am, that's a great question, I would suspect yes, but I don't know that as a fact.

CHAIRMAN McILVAINE SMITH: Just a couple of other things. I was also very interested in what you said, chloramines react with lead to produce a soluble variety of lead, whereas chloramine produces an insoluable. So when chlorine is in the water, it's not reacting -- it's not leaching lead out of the water; is that correct?

ENGINEER EDUCATOR ZINSER: What happens is when chloramine combines with lead, it almost passivates the inside of a pipe, if that's where the lead is at.

CHAIRMAN McILVAINE SMITH: Passivates means that it doesn't --

ENGINEER EDUCATOR ZINSER: It builds up a covering of oxidized lead.

CHAIRMAN McILVAINE SMITH: But doesn't leach out.

ENGINEER EDUCATOR ZINSER: It doesn't get into the water.

CHAIRMAN McILVAINE SMITH: Okay. So the lead doesn't get into the water, but when chloramines are added, then it does pull the lead in and it becomes soluble?

ENGINEER EDUCATOR ZINSER: Soluble, which means lead can be in the water.

CHAIRMAN McILVAINE SMITH: Okay. That's good to know. And then it says some recent studies with rats and

monkeys indicate potential danger to the liver and other organs, but other studies do not. Do you have any thoughts of why?

ENGINEER EDUCATOR ZINSER: No, ma'am. And that was part of -- before I came in, I read a lot of different studies and I couldn't make heads or tails on it to tell you the truth. Some said yes, some said no. I really question -- where this is going? That's why I go back and say, well, why not look at the basic equation? Disinfectant plus a national occurring matter produces disinfection byproducts. Why look at all of these -- because they're discovering more disinfection byproducts everyday, not literally, but everyday they're --

CHAIRMAN McILVAINE SMITH: It's sort of like an error that the things that can react -- I know that when coal powered plants that put in mercury out into the air, and if you got more and have other types of chemicals floating around, now, as we all know, little particles, atoms, carbon atoms, whatever atoms, they can all band together and create a new chemical of some sort. I did learn that much in chemistry.

And my last one is could public water companies use other methods such as a reverse osmosis or UV lights to kill the bacteria as successfully as they do with chlorine?

ENGINEER EDUCATOR ZINSER: Osmosis is not going to kill the bacteria. In fact, dialysis, for example, they have to be very careful because the bacteria can actually grow

through the RO membranes.

CHAIRMAN McILVAINE SMITH: ROs aren't taking out the matter, the NOMs --

ENGINEER EDUCATOR ZINSER: It can take out the matter, but cannot be dependant upon to take out the bacteria. Ultraviolet light is becoming a much more recognized treatment for biosides.

CHAIRMAN McILVAINE SMITH: Now my last question because this is something that I thought about. And not to say that this is the most practical but, if anyone has water that is being treated by a public water company, if they had some sort of a carbon filer system at the point of entry of that water into their home, they could be guaranteed, number one, that their water is safe, because it has no bacteria in it because the chlorinated water or whatever came into their home. But they had a carbon filter in their home right where the water comes in, then would that keep them safe from the byproducts, the bacteria, anything else?

ENGINEER EDUCATOR ZINSER: When the carbon filer's force is being used, that's probably a true statement. There are some organic materials which could go through the carbon based on their solubility. And after awhile, the bacteria would start growing in the carbon --

CHAIRMAN McILVAINE SMITH: Even though that was chlorinated? Now, I'm not talking about chloraminated, but

chlorinated water that came into your home?

ENGINEER EDUCATOR ZINSER: Yes, ma'am.

CHAIRMAN McILVAINE SMITH: That's good to know. I did not know that.

ENGINEER EDUCATOR ZINSER: But if the carbon is cycled periodically.

CHAIRMAN McILVAINE SMITH: So back washed?

ENGINEER EDUCATOR ZINSER: Well, change actually, because carbon is an absorber.

CHAIRMAN McILVAINE SMITH: Can you back wash carbon.

ENGINEER EDUCATOR ZINSER: Yes, ma'am.

CHAIRMAN McILVAINE SMITH: And that wouldn't take out the things that have built up?

ENGINEER EDUCATOR ZINSER: Not necessarily, ma'am, because many of those organic materials would be absorbed within the carbon. And, actually, based on the solubility of the organic matter, you'll soon that the bed will become stratified with the most soluble being at the bottom or the least soluble on top.

CHAIRMAN McILVAINE SMITH: And how would you know when to change that carbon then? Would you have to have it tested or would you decide that every so many days?

ENGINEER EDUCATOR ZINSER: Testing is the most accurate way.

CHAIRMAN McILVAINE SMITH: To test your water?

ENGINEER EDUCATOR ZINSER: Yes, ma'am.

CHAIRMAN McILVAINE SMITH: Okay. Thank you so much, Mr. Zinser. I really appreciate you being here.

ENGINEER EDUCATOR ZINSER: Thank you very much.

CHAIRMAN McILVAINE SMITH: Now we're moving on to our last testifier, Dr. Josephine Rakow. Please start whenever you're ready, Dr. Rakow.

HEALTH OFFICER RAKOW: You know what my name is and you know I'm a physician and you know that I'm the Health Officer for Camp Hill. I certainly appreciate being here for this wonderful opportunity.

This is the 21st century. Since the early 1900s, there have been major changes in medicine, the automobile industry, electronic technologies and the water industry, electronic technologies and the water industry. These changes came about as a process of evolution and are recorded in decades of records. They comprise a paper trail of reasons why old techniques are discarded and better methods are discovered or invented and adopted. So it is with the disinfection of drinking water with chloramine. What was used 90 years ago has been replaced and adopted by many water companies worldwide: Ozone, ultraviolet radiation, granular activated carbon, microfiltration, nanofiltration, and reverse osmosis.

Our investigations have shown -- and you know this --

the following: Chloramine leaches lead from lead pipes, lead solder, and lead and brass fittings. An example of this -- and you are aware of this -- is what happened in Washington, DC in the years 2001 to 2004, in which thousands of little children were permanently damaged by lead poisoning, even though it was denied by the authorities.

Childhood lead poisoning is a major preventable environmental health problem. Elevated lead levels are associated with harmful health effects ranging from children's learning disabilities and behaviors, hearing problems, problems with every organ in the body including seizures, coma and death.

Chloramine is a less effective biocide and is about 2,000 to 100,000 times less effective than free chlorine for the inactivation of E. coli and rotoviruses respectfully.

As we have heard over and over today, the byproducts of chloramination, namely the n-nitrosodimethylamine -- which are the NDMAs -- are believed to be the most toxic and carcinogenic chemical compounds known to man.

Nitrates in drinking water at levels about 10 parts per million is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome or methemoglobinemia and recurrent respiratory infections.

You're probably wondering why I'm carrying this green

bag today. It's not to match my outfit, I assure you. Water was the -- water and public health was the theme for the 137th public health meeting in Philadelphia in November and we attended along with 13,000 other people. So water is the topic of the decade. To me, as a physician, the bottom line is, chloramine is a lesser biocide. And now we're hearing -- everybody knows what MRSA is. MRSA has increased tenfold in children in the last few years. Are we using a lesser biocide? Is this coincidence or is this reality?

Chloramines are carcinogenic. Chloramine is cytotoxic. Chloramine is genotoxic. So, to me, the communities that are using chloramine are a sicker population than those that are not using chloramine, because chloramine is cytotoxic and genotoxic and carcinogenic and a lesser biocide.

I'm willing to entertain questions if you have any.

CHAIRMAN McILVAINE SMITH: I do. And what you just said, I wrote a question. I think that's interesting when you listed that chloramines are carcinogenic and cytotoxic, etcetera. Why aren't chlorines classified the same way or are they?

HEALTH OFFICER RAKOW: Well, as we heard earlier and we know, the trihalomethanes are responsible because it's reported for bladder and colon cancers. To answer your question chloramine is a less biocidal than chlorine. It is more genotoxic than chlorine. It's more cytotoxic than

chlorine.

CHAIRMAN McILVAINE SMITH: But not so much more carcinogenic than chlorine?

HEALTH OFFICER RAKOW: I don't know the answer to that question.

CHAIRMAN McILVAINE SMITH: The only reason that I was asking is because in our area, we've only ever used chlorine. So I was just trying to get a comparison. And what you said is very important and I'm glad we have a recorder to record it, that chloramines are more cytotoxic, etcetera. But because everyone is so concerned about cancer, carcinogenic is, for me, sort of at a level playing field. Are chloramines more carcinogenic than chlorines or vice versa? But if we didn't know the answer to that, that's something that we should be looking into.

HEALTH OFFICER RAKOW: Yes, we should be looking into that. As far as public -- as far as the Department of Health records, the only reports that the Department of Health will get -- and I'll leave these so you can pass these out -- are the ones on the reportable diseases.

Now, the colonic diseases of arthritis, heart disease, diabetes, and all of those, are not reportable diseases. Therefore, the Department of Health will not have records from patients all over the community like they do with the reportable. The reportable diseases effect public health in a

different way. They're infections that can be transmitted and wipe out a whole community.

CHAIRMAN McILVAINE SMITH: So it would be -- the easy way to understand that then is the reportable diseases are transmittable diseases. That's why chronic disease is not reported in the same way because they're not transmittable. If I have arthritis, you don't have arthritis because I'm sitting in the same room with you.

HEALTH OFFICER RAKOW: Let me give you a sampling here of what the reportable disease are: AIDS, of course, the waterborne diseases, anthrax, brucellosis -- I'm just going down these quickly -- cholera, diphtheria, encephalitis, things like that are reportable to the Department of Health.

As far as chronic diseases, like I said earlier, they are not reportable. And since chloramine attacks the cells, the genes -- changes the DNH -- not DNH, DNA. Being genotoxic, it changes the structure of the DNA. Therefore, I believe that chloramine increases the destruction of these chronic diseases. And that's what I said earlier. I believe the communities -- and this would be hard to document -- but the communities that are using chloramine are sicker communities for chronic diseases than those that do not.

CHAIRMAN McILVAINE SMITH: Right. Like Brie Hoblin because her's was sort of -- the testifier from Vermont, when she said that her health was deteriorating but it wasn't

transmittable, so it wasn't a reportable instance. Well, that's very enlightening, actually. I wish that my other members were here, but I'm going to highlight that in yellow when send them the transcript because I think that's interesting.

HEALTH OFFICER RAKOW: Now, in the research, there's so much going on with the scientific community, when they're all trying to figure out how to get the NDMAs out. The NDMA is a by-product of chloramination and they're trying to decide how to get it out of their systems. This is a book, it says, "Chloramination can form toxic nitrosamine by-products. Learn what to do about it with Strategies for Minimizing Nitrosamine Formation During Disinfection." "Nitrosamines are among the most toxic and carcinogenic chemical compounds known.

CHAIRMAN McILVAINE SMITH: So it's back to that nanofiltration then to try and get rid of those.

HEALTH OFFICER RAKOW: And I can't understand for the life of me, since I am a scientific minded person -- let's go back to the automobile industry. I don't think anyone came here today in a Model T Ford. Why are we defending a 90-year-old process when we have advanced far beyond that into 24th century technologies.

In the hospital 90 years ago, we had only x-rays to look inside the body. Now we have ultrasounds, MRIs, CAT scans, we have advanced beyond the plain old x-ray. When I got

out of medical school, only the sulfa drugs were starting to become effective. We didn't have any other antibiotics. Now we have third-generation antibiotics. We have transitioned beyond what was 65 years ago.

CHAIRMAN McILVAINE SMITH: And so the technologies today, we could be using them instead of, as you said, discussing and defending the use of ways to treat our water because they are other ways to treat our water now.

HEALTH OFFICER RAKOW: Exactly. And it's only 20 percent of the country is using it or maybe it's between 20 or 30 percent. What is the other 70 or 80 percent using?

CHAIRMAN McILVAINE SMITH: Chlorine. Well, I thank you so very much. I know we've run over and I thank you for your patience because I know you were one of the early birds along with me. And I thank you for being here and I thank all of you for being here today.

And this committee will take up another hearing for sure to make sure that we do have EPA and DEP and the Department of Health to testify and hopefully by then some of our water companies will come and testify as well. So thank you and good day.

(The hearing concluded at 12:45 p.m.)

I hereby certify that the proceedings and evidence are contained fully and accurately in the notes taken by me on the within proceedings and that this is a correct transcript of the same.

Kelsey J. Dugo
Notary Public

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