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Chairman Tom Davis and the Committee on Government Reform
U.S. House of Representatives
2157 Rayburn House Office Building
Washington, D.C. 20515

March 2, 2004

Re: Written Testimony March 5, 2004

I am a Professor of Civil Engineering at Virginia Tech and have devoted much of my career to lead and copper corrosion issues for which I am internationally recognized. I was awarded a Presidential Faculty Fellowship by the White House and the National Science Foundation in 1996 for this work. I am the current President of the Association of Environmental Engineering and Science Professors. Over the last four years, I have worked intensively on corrosion issues experienced by consumers and utilities using Potomac River water. These efforts include research work with the Washington Suburban Sanitation Commission (WSSC) on copper pitting and Fairfax, VA on a desk top study to pre-empt possible problems with lead leaching in drinking water. My research team at Virginia Tech has conducted hundreds of corrosion experiments using real or simulated versions of Potomac River water.

More specific to the current issue in question, I worked for Cadmus as sub-contractor to the United States Environmental Protection Agency (US EPA) in efforts to understand the problem of excessive lead in the drinking water of the District of Columbia Water and Sewer Authority (DC WASA) customers. I have personally collected water samples in the homes of DC WASA customers in an attempt to understand the problem of copper pitting in their homes, and in the process, I discovered a very serious problem with lead contamination that is the focus of today's discussion. I designed the sampling plan DC WASA executed through mid-December 2003, which first unambiguously illustrated the very serious nature of the existing lead problem to both DC WASA and EPA. I also designed many of the experiments that are now in progress at DC WASA to improve understanding of the problem, and I recommended mitigation strategies that they could employ to mitigate the problem. Indeed, to my knowledge, I was the only expert who gave significant advice to the US EPA and WASA on the lead problem through at least mid-December of 2004.

I have very strong concerns regarding the way in which the US EPA has handled the present crisis. I have expressed most of these concerns directly to the US EPA in detailed letters I sent to George Rizzo and Cynthia Dougherty on February 8th and February 10th. I am willing to share these letters with anyone interested in learning the full extent of my concerns or developing a detailed timeline of events. In this letter I will focus on two opinions that I have developed. The first is that US EPA actions are not adequately protecting consumers' from excessive levels of

lead in drinking water. The second is that the US EPA has failed to heed warnings that water treatment changes are adversely impacting home plumbing systems. That failure has led to adverse impacts on public health and private property that we are only beginning to appreciate. These opinions are my own and I do not speak for any other entity.

1. US EPA REGULATIONS ARE NOT ADEQUATELY PROTECTING CONSUMERS

I base this opinion on four points. First, I discuss how the Lead and Copper Rule has been given a lower status versus other regulations. Second, I discuss some obvious gaps in monitoring programs for lead. Third, I will review what I believe are EPA's relatively weak steps to make sure that the public was adequately notified regarding exposure to excessive levels of lead in drinking water. Fourth, I describe a serious potential problem with "lead free" brass devices, and the possible danger these devices pose to consumer health.

1.a. Lead and Copper Rule is Given Lower Priority

There is a popular misconception that the EPA sets a maximum allowable amount of lead in consumers' drinking water. In reality, there is no maximum allowable concentration of lead in drinking water. The EPA standard of 15 ppb for lead is known as an "action level." If 10% of samples collected from homes thought to be highest risk contain more than 15 ppb lead, additional "action" is required. In simple terms, the utility has to show that it has taken steps to minimize lead leaching without compromising other regulations which have real maximum contaminant levels (MCLs). For example, if a system could reduce 90%'ile lead to below 15 ppb by raising pH to 9, but taking that action would cause it to violate an MCL such as that for disinfection by-products (DBPs), the system can ask for and be granted permission to continue exceeding the lead action limit indefinitely. Some systems in the US have never regularly achieved the lead action limit.

A great deal of though has gone into the existing regulatory scheme, and while I do not personally agree with the lower priority given to lead by the EPA versus DBP's, a great deal of thought should go into possible changes. However, I do note that the designation of an "action level" for lead, without any requirement to achieve a certain minimal level of lead in drinking water that is consumed, is one key reason why the speed of the DC WASA and the US EPA response has not met expectations of many consumers.

1.b. Obvious Gaps in Monitoring

Prior to summer of 2003, only two types of samples were collected in the homes of DC WASA residences. The first sample is known as "first draw," which is the first liter of water to come out of the faucet when opened (Figure 1). According to the conventional wisdom, the first draw sample usually is often believed to be the "worst case" sample, and therefore it is used as the main determinant of compliance with the US EPA Lead and Copper Rule. The second sample was collected after 5 minutes of flushing. After 5 minutes, enough water has been drawn through the pipe such that the sampled water probably originated in the main, without having prolonged contact with the smaller "service" pipes that transport the water between the home and the water main. Since there is relatively little lead material in the main, the water sampled after 5 minutes can be expected to have low levels of lead.

It has always bothered me that samples were not routinely collected in between these two points. It is this water, in fact, that would be consumed if it were flushed for a short period of time as per written recommendations given to the public when the lead action limit is exceeded. As an example of these recommendations, I note that many other cities with relatively high lead at the consumers' tap also recommend 15-30 seconds of flushing before consuming water as a means of minimizing exposure to lead (Figure 2). I further note that it is the water between the two collected samples (first draw and 5 minutes) that has contacted the three sources of lead that I deem most worrisome in the present situation. The first two problematic sources of lead are well known: pure lead pipes and lead solder legally installed before such materials were banned. The third source, brass in-line devices, are less appreciated as a potential lead hazard and will be discussed in a later section. The main point, however, is that the water consumed when following the flushing recommendations is not the same water that is sampled during monitoring. In fact, at DC WASA prior to about summer 2003, the utility likely had no idea as to the levels of lead in the water between the first draw and the sample collected after 5 minutes of flushing. The EPA probably did not know either.

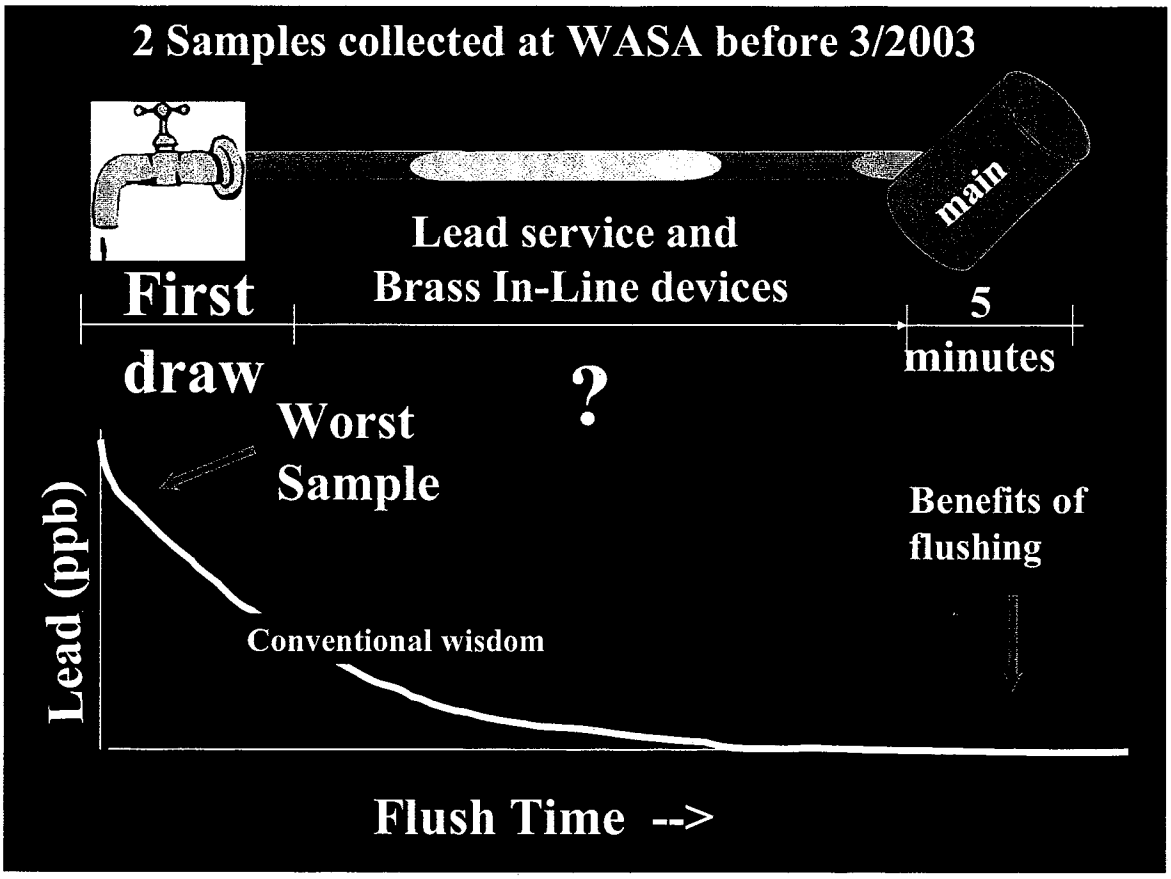


Figure 1. Illustration of two key samples collected at DC WASA prior to about summer of 2003.

These easy steps can help you avoid possible exposure to lead from household plumbing:

- Use only fresh water from the cold water tap for drinking, cooking, or making baby formula. If a faucet has not been used for more than 6 hours, get fresh water from the main. Run the cold water faucet until the water is noticeably colder (usually about 15-30 seconds).
- If you need hot water for drinking or cooking, draw fresh water from the cold water tap and heat it.
- Use only lead-free solder when making plumbing repairs. It's the law: Oregon banned the use of lead-based solder in water systems in 1985.

Look for NSF certified faucets and plumbing products. Call NSF International's consumer hotline at 877-867-3435 or email for information about certified faucets and plumbing products.

Figure 2. Typical Consumer Notification Providing Guidance to Avoid Possible Exposure to Lead from Household Plumbing. http://www.portlandonline.com/water/index.cfm?c=29587

On March 16, 2003, I was collecting samples in many consumers' homes at DC WASA to learn more about the problem of pinhole leaks. Since I had been told (by Seema Bhat) that DC WASA was experiencing problems with relatively high first draw samples, I decided to collect a series of samples from the tap as a function of flushing time. The results were truly frightening (Figure 3). At one home I measured more than 1250 ppb lead on my field instrument. I say more than 1250, because the sample was still off scale after diluting by a factor of 10 with distilled water, and the highest legitimate measurement is 1250 ppb. I really do not know how high the lead in that sample actually was. My measurements at a second home were equally troubling (Figure 3). Field sampling is not as accurate as the testing that can be done in the lab, and is often subject to more interference. Thus, this result had to be viewed with considerable skepticism, and would require clear confirmation before it could be used to change policy or inform the public. However, I deemed this to be an important preliminary result worthy of notifying DC WASA employee Seema Bhat about, a requirement that I remember satisfying. I also immediately began to conduct experiments at Virginia Tech to try and identify causes for this likely problem and potential solutions. These experiments were almost completely unfunded and conducted as a public service to DC WASA consumers, who I anticipated would soon be in need of the answers.

I believe the implications of this particular monitoring gap are obvious. Specifically, samples collected after 0.5, 1, 3 and 5 minutes flushing had unacceptable levels of lead according to any reasonable public health standard. Following the normal EPA written recommendations on flushing at these homes would actually cause consumers to drink water containing very high levels of lead, and in fact, would have sometimes markedly ***worsened*** exposure relative to what they would have consumed without following the guidelines. Another important point is that I was told this home did not have a lead service lateral.

There are also many other monitoring gaps that are troubling, but space does not allow for a complete discussion of all such problems herein.

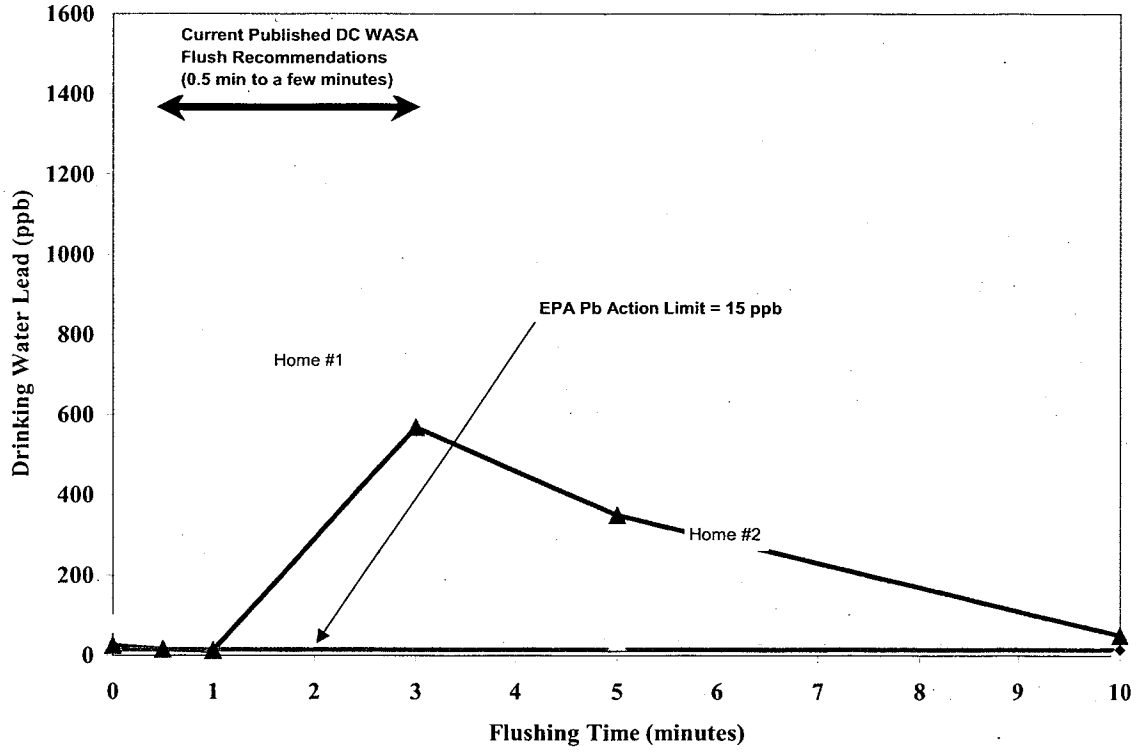


Figure 3. My sampling data collected from DC WASA homes 3/16/2004.

1.c. EPA's weak steps to make sure that consumers were given timely information

I have multiple criticisms of how the US EPA and DC WASA have handled this crisis since at least mid-December 2003. The action(s) that I find least excusable, and which I can best document, was the pressure that I had to apply before the consumers' were notified that written recommendations on flushing were not adequately protective of public health. Before going into the timeline of events that details my frustration, I want to make a clear point about public notification.

Society takes the issue of lead hazard warnings very seriously. In fact, a Washington DC area landlord was recently sentenced to jail for failing to warn tenants of known lead hazards in their apartments (Figure 4). I mention this fact to put my own strong and uncompromising actions into context. I have been forced to confront powerful entities and agencies that might normally consider sponsoring my own research. Some professional colleagues have told me that my career in drinking water treatment research is likely to end as the result of these confrontations, and for that reason, many of my professional colleagues urged me to drop this issue completely. However, my family and consumers that I work with urged me to see this issue through, and they did so in the strongest possible terms. I find this state of affairs disturbing. But I note at the outset that I did my best to do the right thing for the consumers', without regard to likely damage to my health, future research program or professional standing.

From
http://www.usdoj.gov/opa/pr/2002/March/02_enrd_140.htm

LANDLORD SENTENCED TO JAIL FOR LYING ABOUT LEAD PAINT HAZARDS

Case Is First Federal Prosecution For Violation Of Lead Hazard Warnings

WASHINGTON, D.C. - A Washington, D.C.-area landlord was sentenced today in U.S. District Court in Greenbelt, Md., to incarceration for two years for obstructing an investigation by the Department of Housing and Urban Development and making false statements to federal officials, in order to conceal his failure to notify tenants of the presence and hazards associated with lead-based paint. .....

"Lead poisoning perils have long been known, and laws exist to protect people – especially children – from being exposed to lead hazards," said Tom Sansonetti, Assistant Attorney General in charge of the Justice Department's Environment and Natural Resources Division. "This case exemplifies our commitment to enforce the federal lead disclosure requirements to protect the public and our children from these unnecessary health risks."

"***This case sends a message to landlords that they have a responsibility to warn their tenants of known lead hazards in their apartments***,"said Thomas M. DiBiagio, United States Attorney for the District of Maryland.

Figure 4. Society has taken failures to warn of possible lead hazards very seriously.

I am not sure if DC WASA received my warning about a serious problem with flushing back in March 2003 or not. On the one hand, they did change their sampling protocol to increase the likelihood of sampling water from the service lateral in summer 2003. On the other hand, in February 2004 I first learned the circumstances of Seema Bhat's termination, and that she was terminated in March 2003. It is possible that I left a voice mail that was never received. In any case, DC WASA we repeated no shows at meetings with me to discuss the lead problem and pinhole leak issues that their customers were experiencing. Thus, I was not surprised when I did not hear a word back from DC WASA.

At the first available opportunity, which was in November 2003, acting as a contractor to the US EPA, I presented and developed a sampling plan that DC WASA could follow to directly examine the effectiveness of flushing in mitigating consumer exposure to lead, as well as to help isolate the source(s) of the problem. I informed WASA's brand new water quality person of the serious pinhole leak problem at WASA, my years of effort trying to get something done about it, and the work I was doing on behalf of property owners. He was fully aware of my work for property owners, which had turned adversarial to DC WASA. I showed him a highly pitted tube taken from the system to illustrate the magnitude of the problem (i.e., Figure 7). I had a very good feeling that this new person (Rich Giani) was going to make excellent progress. He had a sense of urgency about both the pitting and lead problem that had been lacking at DC WASA previously. The first result from my sampling program was sent to me from DC WASA on December 16th (Figure 5). This first sample confirmed my key concern. The peak in lead release was occurring after about 1 minute. Since the analytical methodology was not subject to the same possible errors as my field testing, there could no longer be a doubt about the nature of the problem. However, it was necessary to await more samples to be certain.

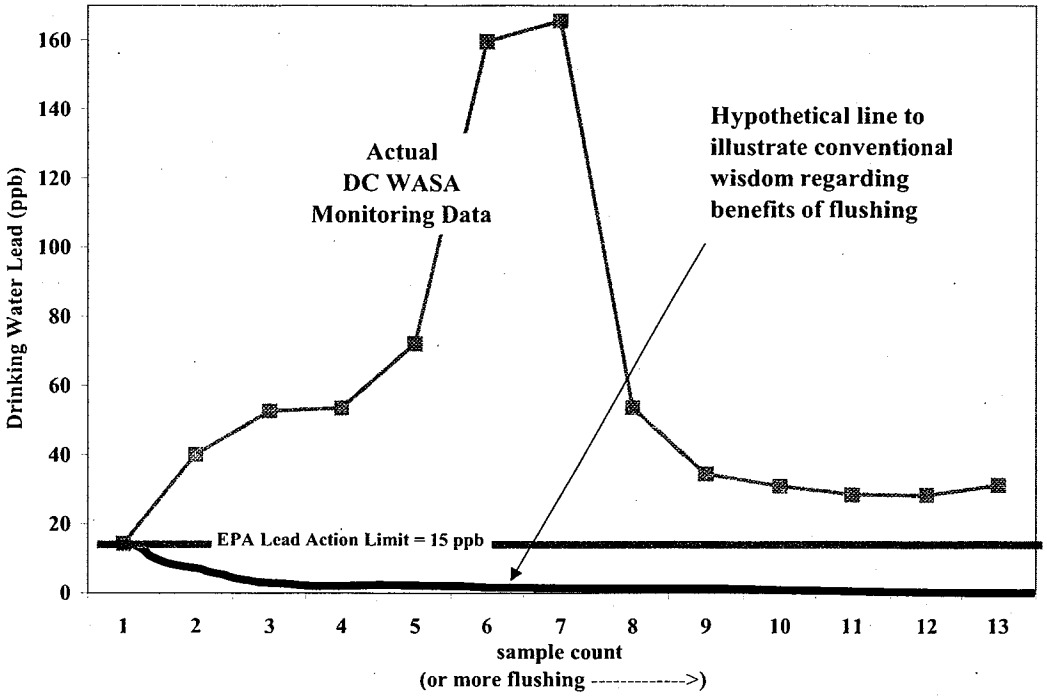


Figure 5. Data sent to me from DC WASA on December 16th from my flushing program. Sample 4 and 5 are at about 1 minute of flushing assuming 2 gpm.

From November until January I conducted considerable unfunded effort on behalf of DC WASA and EPA in relation to the lead issue. I developed a research plan of approximately $110,000 scope for work at Virginia Tech, provided DC WASA with experimental plans, and I freely revealed results of many preliminary experiments we had been conducting to move things along. I hired student researchers at Rich's request to "hit the ground running" for what I was told would be a high priority workload. I was a little perplexed why the data had stopped coming from DC WASA after December 16th, but it was the holidays, and I had no reason to doubt the initiative of Rich Giani.

On or about 1/2/2004, I received a disturbing phone call from Rich Giani delivering an ultimatum. A WASA attorney apparently told Rich Gianni to tell me.....either stop helping property owners in WASA system on copper pitting problem...or you will not be funded to execute the experiments on lead leaching that you yourself designed and had been counting on. I immediately said that I would not abandon property owners regardless of resultant economic hardship and my weeks of unpaid effort for DC WASA. Rich also discussed the sampling data (Figure 5), and his astonishment that the lead never returned to safe levels even after minutes of flushing. I told him the result had confirmed my worst expectation, and reminded him that the flushing advice was likely a problem. Rich expressed his regret that I could not continue to work with DC WASA, since I was obviously the best person for the work, and removing me would set back efforts by weeks if not months. We briefly discussed possible ways around the problem. I then called Brad Taylor (attorney of property owner in WASA system) to see what could be done. Brad did not see a direct conflict of interest, and offered to make any data gathered on my

forthcoming lead work for WASA out of bounds for pending court case on copper pitting, allowing me to continue work on both problems. I left a message for Rich relaying this fact. Rich had said he would call me back with a final decision. He never did.

When I was weighing the factors over in my mind before responding to their ultimatum, I had to consider the following over-riding objectives:

1) my ethical responsibility to property owners afflicted with pitting problems, since WASA and the Washington Aqueduct and EPA had been asked to help for years and they did not do so
2) my ethical responsibility to consumers of drinking water. Specifically, given my extensive research experience in DC and continuous unfunded research at Virginia Tech since May 2003, no other expert was better positioned to oversee the lead work in that system

In making my decision to tell WASA "no way" to the demand that I abandon my work on behalf of DC WASA consumers afflicted with pitting corrosion, a major consideration was that I would have still have oversight of the data collected from my in-home lead monitoring program through my sub-contract with the US EPA. At that point in time I had every reason to believe that I was still the EPA contractor, since I had numerous discussions with Cadmus about finalizing my draft report completed in October and many other tasks.

I first heard of the Washington Post article on lead February 2, 2004. I contacted George Rizzo (Environmental Scientist EPA Region III) by e-mail asking to update my status on the project, and offered to share my unfunded research results on lead with WASA regardless of what they had decided to do with their funding. George did not respond. On February 3, 2004 I first grew suspicious that my anticipated work with Cadmus as EPA sub-contractor was in doubt. I also began to grow more concerned about the flawed flushing advice. Specifically, under public pressure to finally notify the public, DC WASA and EPA were really getting the message out to flush 1 minute (Figure 6).

In my opinion, the public comments were also downplaying the extent of the threat as I understood it, implying that the Washington Post article was overblown, when in fact my own opinion was that no one fully appreciated just how bad things were (Figure 6). However, I had been cut off from all additional data from my monitoring program. I therefore did not have the facts necessary to make a final judgement that the advice to flush 1 minute was truly flawed. DC WASA and US EPA had that data. And they had just hired brand new experts that had to start over again just from scratch, in the midst of what I suspect will become known as one of the greatest public health fiasco's in recent US history. Given numerous statements in the papers and increasing commitment to the flawed 1 minute recommendation, it would be increasingly difficult for DC WASA and EPA to change their public notification, even if they understood that their advice was making lead exposure worse for many consumers.

Figure 6. A sampling of public quotes on flushing, the nature of the problem, and interesting perspectives on how the flushing advice came to be changed.

Are there steps I can take to reduce or eliminate lead in my water?
WASA suggests several steps:
• Flush the water system by allowing water to run for 30 seconds to one minute from taps that have not been used for six hours or more.
Washington Post 2/3/2004

Gerstel and WASA chief engineer Michael Marcotte repeatedly declined to answer questions about whether anyone should avoid consuming the water based upon health concerns. "It is fundamentally safe," said Gerstel.
News 7 2/3/2004

"....residents concerned about lead should flush their water, letting it run for a few minutes before drinking it..."
Johnnie Hemphill Jr 2/5/2004 Common Denominator

"....the good news is that of all environmental problems, this is one of the easiest to address."
Richard Mass 2/4/3004 Washington Post

"Please advise anyone concerned about the possibility of lead in their water supply to follow a simple two-step process. ....run some water through your home system. First, when you get up in the morning or anytime water has been sitting unused for six hours or more, flush the old water out of the system by using some water in the home for showering or bathing. Second, run water from the tap for about one minute before using for cooking or drinking."
Testimony of Glenn Gerstell to DC council 2/9/2004

"We don't want to sensationalize and alarm people, and at the same time we want to get the facts out" Glenn S. Gerstell 2/10/2004 News Channel 8

Mr. Johnson said the agency's low-key response was "out of an abundance of caution and not wanting to cause hysteria."
Jerry Johnson, WASA general manager 2/12/2004

Subsequent events were finally influenced by the fact I told EPA I was going to the DC Council on 2/10/2004.

"If your house has a lead service line to the water main, you may have to flush the water for a longer time, perhaps one minute, before drinking." -- **D.C. Water and Sewer Authority, "An Information Guide on Lead in Drinking Water," September 2003.**
THE ABOVE STATEMENT from WASA now turns out to be incorrect, if the top WASA officials who briefed us yesterday stand by their new position. We learned from them that water should run from the tap for as long as 5 minutes before using it for drinking or cooking if the house and the water main are connected by a lead service line and the taps haven't been used for a number of hours. We note that change in WASA's instructions on this important piece of consumer advice because it illustrates the difficulty many District residents are having in getting straight answers on the recently disclosed problem of lead contamination in their water.
Washington Post 2/14/2004

Marcotte said yesterday that the 10-minute guideline is based on the "worst-case scenario" and is an attempt to err on the side of caution.
Washington Post 2/19/2003

We share your view that WASA could have done more," Donald Welsh, head of EPA's Philadelphia office, testified this week 2/27/2004 Washington Post

"When the dust settles ... it will be determined that we did the appropriate thing to identify an emerging problem and did what we needed to do to arrest that problem," Mr. Johnson said. ...In the latest controversy about lead in some of the city's older pipes, Mr. Johnson said it was actually WASA's voluntary attempts to go beyond its regulatory responsibilities created the confusion Washinton Times 3/2/2004

A chronology of some key e-mails are attached in Appendix 1. I first e-mailed one of the experts on February 5th attending the workshop (to be held on Monday, February 9th at WASA) to make sure that the new team would not have to start from scratch (Appendix 1a). On February 8, 2004, I e-mailed a detailed letter to George Rizzo, Cynthia Dougherty and Michael Schock expressing my concern related to EPA handling of lead and pitting issues. My first and foremost point was to remind them that the one minute flushing advice needed to be corrected, and that it was actually worsening consumer exposure to lead in many instances. In that letter I strongly urged that they look at the data from my experiment and, if warranted, publicly rescind the advice. I sent that letter on the 8th to be sure that US EPA and WASA could give that information to all their new experts at the very first meeting. I then received an e-mail from George Rizzo (Appendix 1.c.) that stated "Please be assured that WASA has not disregarded your recommendations and is in the process of revising its advice to customers about flushing their residences." He also expressed surprise that I was upset about no longer being the EPA contractor, since he thought I had voluntarily removed myself. That belief was false.

On February 9th, 2004, I received a phone call from George Rizzo apologizing for the fact I was never notified that I had been removed as the EPA contractor. George reported that a DC WASA attorney had contacted the US EPA sub-contractor, Cadmus, and indicated to them that I had a conflict of interest and could not review any further data on lead leaching that was being gathered in homes of DC WASA consumers. Cadmus (or someone) apparently gave George the impression that I had agreed there was a conflict of interest. Though that impression was false, George had already hired a new contractor. He said "sorry."

Although I was most certainly not happy with these events, I consoled myself with my contributions including: 1) first discovering the serious nature of the problem in March 2003, 2) proving to EPA and DC WASA just how bad the problem was through my sampling program that WASA had followed, 3) assisting DC WASA start-up on their pipe loop testing free of charge, and 4) my help in getting the new experts to the likely cause of the problem (chloramines) through my EPA report of October 2003. Henceforth, I resolved to let other experts handle things (Appendix 1.d), although I was greatly concerned that the new team was (and still is) months and months behind our research team at Virginia Tech in resolving the problem. I did not send the February 8th letter by mail to US EPA although it had already been sent by e-mail.

On the off chance that DC WASA did not publicly rescind the faulty flushing information at the public meeting on the 10th, I did prepare another letter to George Rizzo and Cynthia Dougherty at USEPA. A friend attended the public DC Council meeting. In the middle of the meeting, he phoned me that, incredibly, the 1 minute flushing recommendation had been repeated. In fact, all DC WASA residents would soon receive written notification reiterating the flawed 1 minute recommendation. I was sickened and shocked at the testimony and written notification. The testimony was also restating what I considered to be false assurances that the water was safe (Figure 6). I told my friend to approach a member of the council with a draft copy of my letter to USEPA, he did so, and the copy of that letter was then handed to the council members aide. I then told the US EPA in no uncertain terms what I thought of their oversight of WASA, especially given the assurances I had just been given (Appendix 1.e). I then made it clear that I was approaching the DC Council at that time and was sending the letter to US EPA.

The response of the US EPA is telling (Appendix 1.f). The US EPA said that they were led to believe that DC WASA would send out my flushing recommendations. I then told them what DC WASA had said since the US EPA did not know (Appendix 1.g). Rizzo responded that US EPA did not review the wording they were using, and that regardless of what WASA did, US EPA would post my recommendations on their region III website. I then openly questioned whether that was sufficient notification, since I myself had never even heard of the region III website (Appendix 1.j).

From 2/10 until 2/13 I did my utmost to make sure the DC council was informed of my concerns about the flawed flushing advice (Appendix 1.k). I knew that EPA was finally moving behind the scenes to get WASA to notify the public properly. The council was so busy, that I doubt my intensive efforts had much success. On February 14th, DC WASA finally admitted, in discussion with Washington Post editorial staff, that 1 minute flushing was inadequate (Figure 6). However, they then said that 3 to 5 minutes was recommended, which I also knew was flawed. And the written notifications that their customers were still opening was repeating the wrong 1 minute advice.

Thereafter, I was physically incapable of additional work within the system. I e-mailed all my documentation on the flushing to *Washington Post* reporters on 2/17. An updated flushing recommendation was then published in the Post on 2/19. Council member Carol Swartz asked me to send her a letter on 2/19, and I did so even though I was exhausted. I have attached the part of the letter discussing flushing, in which I once again expressed my recommendation to notify the public (Appendix 1.l). From that time onwards, correct information about flushing slowly leaked out, although even today many of the consumers drinking DC WASA water have not been informed.

Summary

In this section, I detailed some of the actions I took to make sure the public was properly notified. I hereby reiterate my main points and provide a summary. From March 2003 onwards, I had two very urgent concerns in relation to the lead issue at WASA. The first was the potentially flawed flushing advice. The second was the very, very high levels of lead that I had observed in my own sampling. My own data by itself was insufficient to "go public," but it was more than enough for me to begin an intensive research program on the subject with the utmost urgency at Virginia Tech.

The EPA and DC WASA did not initially properly notify the public as to the true nature of the problem. Through the middle of December 2003, I had no reason to believe that this failure was anything other than gaps in scientific understanding and well-intentioned (but wrong) guidance.

After the middle of December 2003, however, I believe that events indicate a much larger problem. Specifically, DC WASA has now publicly stated that results from the sampling plan, developed at my direction in November 2003, made them aware of a very serious problem at that time. To be honest with the public, the "serious problem" was most certainly there since at least March 2003 and probably well before that, but normal EPA sampling for lead did not catch it. It was only because I explicitly told DC WASA how to sample that the nature of the problem was revealed to them. I say this because DC WASA appears to be claiming that this "voluntary" action should somehow be applauded (Figure 6).

Let's examine the public statements of DC WASA on this issue. While I was agonizing over what the data from my sampling plan was showing after mid-December, and was being denied a chance to review the results, what action(s) did DC WASA and US EPA take with that data? I am very curious. Can the US EPA or DC WASA provide any evidence from before 2/5/2004, when I started my own intensive effort to make sure the public and new expert team were properly notified about the problem, that they ever intended to ever tell the public about the faulty guidance? Quite frankly, I currently suspect that without my intensive efforts, only some of which are detailed above, the USEPA and DC WASA would still be publicly stating that the water is completely safe to drink after 1 minute of flushing....even though their own data showed that one minute flushing often caused consumers to drink water with excessive amounts of lead. I truly hope that my current suspicion can be proven wrong.

In the likely event that there is not evidence from before February 5, 2004 that US EPA or DC WASA was planning changes to the flushing guidance, I can provide a rationale reason why they did not do so. It was because no one on the team up to that point had any real expertise on lead leaching issues other than myself, and as of mid-December or early January their attorney had advised them to cut all ties with me. Apparently this attorney felt that one expert could be exchanged for another, with no more resulting delay than changing a battery in a flashlight. Overall, I find no reasonable excuse for the collective conduct of the US EPA or DC WASA in handling this issue.

1.d. Problems with "lead free" brass

There is little doubt in my mind that the most serious problems in the DC WASA system are coming from pure lead pipes. But as I detail in my letter to the US EPA, if the information is correct regarding the lack of a lead service pipe in home 1 (Figure 3), what could be the source? My monitoring data strongly suggested it could be brass.

Section 1417 a.1 of the Safe Drinking Water Act (SDWA) states that "no person may use ...any plumbing in a residential or nonresidential facility providing water for human consumption that is not lead free." Under the definition of the SDWA, "lead free" brass can contain up to 8 percent lead by weight. The US EPA therefore has no authority to ban lead in brass plumbing devices as they did for solders. However, a subsequent agreement states that in addition to having less than 8 percent lead by weight, devices can be required to pass voluntary performance standards. In essence, even though the lead free brass can actually have very high lead, if they pass the voluntary standard NSF International's (NSF) consensus Standard 61, the public can be assured that they will not leach excessive lead to drinking water in practice. Water meters, backflow preventers, corporation stops and other brass devices are known as in-line devices (Figure 1), and they are covered under NSF 61, Section 8. Consumers and utilities are referred to NSF 61 standards when they want to be sure that they are installing safe products (i.e., Figure 2).

As detailed in my February 10 letter to the US EPA, we have recently discovered that NSF 61, Section 8 provides very little real protection to consumers. Due to the way in which the test is conducted, products that leach high amounts of lead in practice could be certified as "safe," when in fact we have little assurance that they are safe. One important implication is that even

new homes might not be safe from lead spikes. While I am not sure the spike I saw in March 2003 (Figure 3) is from brass, we have recently observed similar spikes from NSF 61, Section 8 brass in our laboratory experiments. I am of the opinion that this brass is causing a long term problem with lead in some homes. Unlike the lead solders and lead pipes, brass would perform worst in newer homes, which are not typically sampled under provisions of the EPA Lead and Copper Rule. If these devices were causing a problem, we would not know it.

Congress should consider a ban on such high levels of lead in products used for consumer plumbing. The voluntary standard has not been sufficiently protective in my opinion. It is very perplexing that a product containing 8% lead by weight can be described as "lead free" in the SDWA. For more details, refer to my Feb. 10 letter to US EPA.

2. US EPA Failed to Anticipate and Prepare for a Crisis

In this section I make two points. The first is that attempts were made to alert the US EPA to the likelihood that changes they were requiring in water treatment would cause problems with home plumbing. The second is that lack of research on home plumbing corrosion has left us embarrassingly unprepared for intelligent responses in the current crisis.

2.a. The US EPA Was Told of Approaching Problems

Over the last 10 years, I have been warning the US EPA and the water industry that changes in drinking water treatment practice (such as enhanced coagulation and increasing use of chloramine) can be expected to have serious adverse consequences on home plumbing systems. Problems of pinhole leaks and chloramine attack on leaded brass are among the concerns I have expressed publicly. Others within the US EPA, including Mr. Michael Schock, have shared these concerns and supported my efforts. I have also supported his efforts. My plea for fundamental research funding to study these important problems has gone unheeded; consequently, we do not now have simple answers to even the most basic questions.

It is worth mentioning just a few of my efforts. Two problems are of concern in the current situation, each with severe public health and economic consequences. The as yet unmentioned problem at DC WASA is copper pitting corrosion. Homes served with water from the Washington Aqueduct have some of the most severe cases of hot water pitting corrosion that I have ever seen (Figure 7). In addition to severe economic damages caused to consumers, these leaks can cause growth of mold that is believed by many to be highly toxic. Homes afflicted with mold must often be sold "as is." Consumers who report leaks to their insurance companies oftentimes have their policies cancelled. I have personally met some residents who have lost their homes as a result of leaking pipes, and who believe that they have been permanently impaired by residual problems from the mold.

Alarmed by increasing levels of pinhole leak activity impacting their customers (also served Potomac water), WSSC sent a letter with a request for help to Christie Whitman (Appendix 2). Ms. Whitman directed the US EPA Office of Drinking Water to meet with myself and other individuals on April 18, 2003. Mr. George Rizzo had been instrumental in trying to convince the US EPA to anticipate some of these problems and he also attended. A few slides from my presentation that day are attached (Figure 8).

Figure 7. Copper pipe attacked with pinholes leaks from WASA system. Each clamp is covering an individual leak (Above). Picture of damages and mold growing in a DC home afflicted with pinholes (Below).

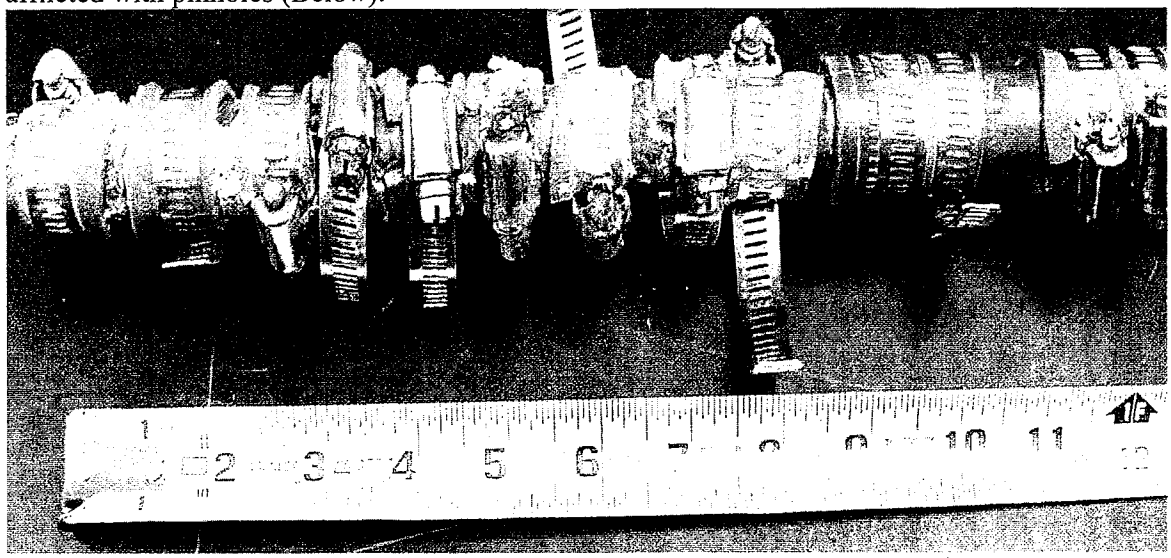
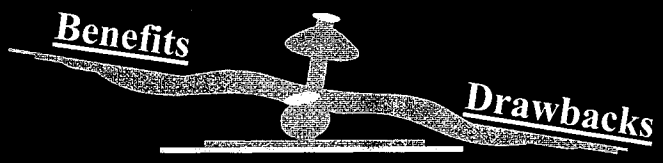


Figure 8. Some key slides from my presentation to EPA Office of Drinking Water.

EPA (and NOM Removal)



Potential to Save Lives

Leak damages probably billions of $ per year
Potential health consequences

EPA HAS TO HELP CONSUMERS!!!

What would it take to do better?

Learn how to stop Al/oxidant pitting problem
.....$0.5 million over 2.0 years
Stop other copper/brass plumbing failures resulting from regs
(chloramines, ozone and gas cavitation, lower disinf. residuals, membranes)
.....$6 million over 5 years
Web-site to educate consumers, utilities, plumbers
.....$0.1 million
Understand "auto repair" mechanism
.....$0.3 million

Total Cost: $7 million
Total practical research in last 10 years: ≈ $1 million

The cost of doing nothing

If nothing is done there is a likelihood of a major plumbing catastrophe costing homeowners tens of billions of dollars each year

Back of envelope basis:

$$\frac{0.01 \text{ leaks}}{\text{residence-yr}} \times (112 \text{ million residences}) \times \frac{\$2500}{\text{leak}} \times (0.70 \text{ using Cu}) = \frac{\$2 \text{ billion}}{\text{yr}}$$

- multiply by about 2x due to non-residential plumbing (schools, businesses)
- WSSC customers are experiencing 3-5X leaks of average large U.S. utility
--> this higher rate would change a ≈$4 billion/year problem into a $12-60 billion/year problem
- since it takes 2-20 years from the time initiation occurs to the time holes are actually eat their way through a pipe (dependent on the water), it could be a serious miscalculation to assume a day of reckoning is not already approaching.

Assuming proposed $7 million in research would allow us to reduce costs 25%, even at existing level of problem....payback could be ≈$1 billion per year

In that presentation, I made the following points. First, given what I was seeing in the DC WASA system, these corrosion problems were not just costly, they were also causing severe public health problems. I pleaded with the US EPA to help consumers (Figure 8). I mentioned not only mold and pitting, which was the focus of the discussion, but also the lead in DC which I strongly believed at that time was caused by the switch from chloramine. I proposed a research plan of $7 million dollars scope to investigate a few of the most urgent issues, and I ended the presentation with the following strong language (Figure 8):

"If nothing is done, there is a likelihood of a major plumbing catastrophe costing homeowners tens of billions of dollars each year.....it could be a serious miscalculation to assume a day of reckoning is not approaching."

When I had brought forth my warnings about increasing likelihood of pinhole leaks back in 1994, I was told the US EPA would wait and see. In 2003 the US EPA had the same attitude, even though we had very strong (but not yet conclusive evidence) that the water chemistry was the cause of the problems. Nothing at all came of the April meeting. Part of this is due to the fact that lead and other corrosion problems are given lower status at US EPA by definition. Historically, all such problems and costs have been borne by consumers, even though they have no control over the corrosivity of the water that is causng the problem by eating away at their plumbing.

In a recent experiments at Virginia Tech, after years of getting closer, we have now succeeded in conclusively demonstrating that pinhole leaks are exacerbated by changes in treatment. My concerns are no longer a theory, but they are a scientific fact. Likewise, we have now proven that chloramines can trigger lead release from brass and lead (Figure 9). Furthermore, in the DC WASA system, I now believe that the two problems are caused by the same factors. That is, our research that discovered the causes of pitting also partly explain why chloramine has caused such a serious problem with lead leaching.

Chuck Murray from WSSC was also at the April meeting with the US EPA at their national headquarters. He gave very clear notice that the US EPA regulations were really offering utilities little choice but to switch to chloramines. He asked the EPA, in light of the DC results, whether it would not be a good idea to slow things down and get an handle on these corrosion problems, instead of leaping ahead into the unknown without understanding what we were getting into. He further mentioned that WSSC is, against its own preferences, preparing to use chloramines despite years of experience and success with free chlorine. His comments had no effect. I think the Government Reform Committee would be stunned to learn of the number of cities switching to chloramines from free chlorine in recent months.

The time has come for the US EPA to explicitly consider weigh these known adverse consequences against possible "benefits" of regulations such as those governing disinfection by-productions (Figure 8). I note that the suspected benefits of such regulations, based on sound science, are not yet proven beyond a reasonable doubt. In contrast, the adverse consequences that I have been warning of years are now are proven beyond a reasonable doubt to my satisfaction. With the gaps in monitoring, we would not know if there was a serious problem with lead leaching or toxic mold in those systems even if it were occuring. Utilities are not currently required to monitor for such problems at the time the changes are made, nor are they required to use a rigorous protocol like I developed to collect the data in Figure 3 and Figure 5.

2.a. The US EPA is embarrassingly unprepared to deal with these issues

Scientific understanding follows investments in research funding. The reality is that our scientific understanding of these problems is not sufficient to support intelligent decision-making. Researchers such as myself have been forced to study these problems largely as a hobby in recent years. For instance, more than one half of my 13 years research on copper pitting corrosion and nearly all my work on chloramine attack on lead has been funded by donations to the Virginia Tech Foundation. Another quarter of that research was funded from my own pocket, and the experiments were done in a room in my own house. The National Science Foundation, WSSC and the Copper Development Association have recently been very supportive with funding, and our recent breakthrough understanding on pitting corrosion is largely attributed to that investment. I have never received any funding for corrosion research from the US EPA. All of my efforts at DC WASA have also been completely uncompensated, including 6 months of my own effort, funding of two graduate students doing the research on chloramines, and expenses for supplies. Needless to say, I am proud of what my team has accomplished through today under very adverse circumstances.

I have already described the serious lead problem that was uncovered only through my own sampling initiative in homes of DC WASA consumers. Is that not a troubling state of affairs? I mentioned our recent discovery that new brass products, previously thought to be safe, have been shown to cause problems with lead even in new homes. But there is an even longer list of questions that we have not even started to address.

For example, we have recently discovered that, in the presence of chloramines, dosing of orthophosphate may trigger higher lead release from some types of brass. I mention this because orthophosphate is a likely solution to be tested in parts of the DC WASA system. Also, I am working with residents and a utility in Maui, Hawaii, where an EPA recommendation to dose phosphates to the water actually increased lead release. The experience of Maui (which uses chloramines) may provide yet another point of data confirming our laboratory results.

I point out that EPA is not even sure of the simplest things, such as the whether the required partial replacement of lead service laterals is actually beneficial or not. According to our experimental results in November 2003, the lead in water at DC WASA is being driven by a galvanic (battery) reaction between copper:lead or copper:brass. Replacing old lead with fresh copper, and connecting the fresh copper to the consumers lead pipe, would therefore be expected to make lead release much worse that it was before. Personally, I am appalled that we do not even know if the expensive partial lead service line replacement program is beneficial. In simple terms, DC WASA might very well spend $351 million to finish the job of partial lead service line replacement, leaving behind a much worse problem for consumers that if they had done nothing at all. In my letter on this subject written February 19th to the new expert team that is starting at DC WASA, I stated the following about our results at Virginia Tech:

"We have proven ..that not only does chloramine worsen galvanic corrosion between brass/copper or lead/copper, but it also increases the amount of lead leached to the water when

the metals are coupled. Our findings…raise a host of problems as I mentioned yesterday. Specifically, replacing a half a lead service with copper is going to dramatically worsen the galvanic corrosion between copper and lead. Such partial replacements should be stopped immediately....."

I will point out that a term has even been coined to explain the finding that lead in drinking water is often much higher after meeting the letter of the law and replacing part of the service lateral. It is called "the partial replacement phenomena." Incredibly, because the law says to replace lead services, they will continue to do so even though their own data often shows they are making the problem worse. Some of the lead levels reported to me (second hand) in homes after such partial replacements are truly stunning, and are as high as 48,000 ppb if my source is accurate. Does the law require that we suspend common sense?

Let us be honest about what is happening here. We are learning hard lessons about corrosion control in full scale testing of real systems, while consumers are drinking the water and getting continual reassurance that everything is under control. In my opinion the situation is not under control by any rational measure.

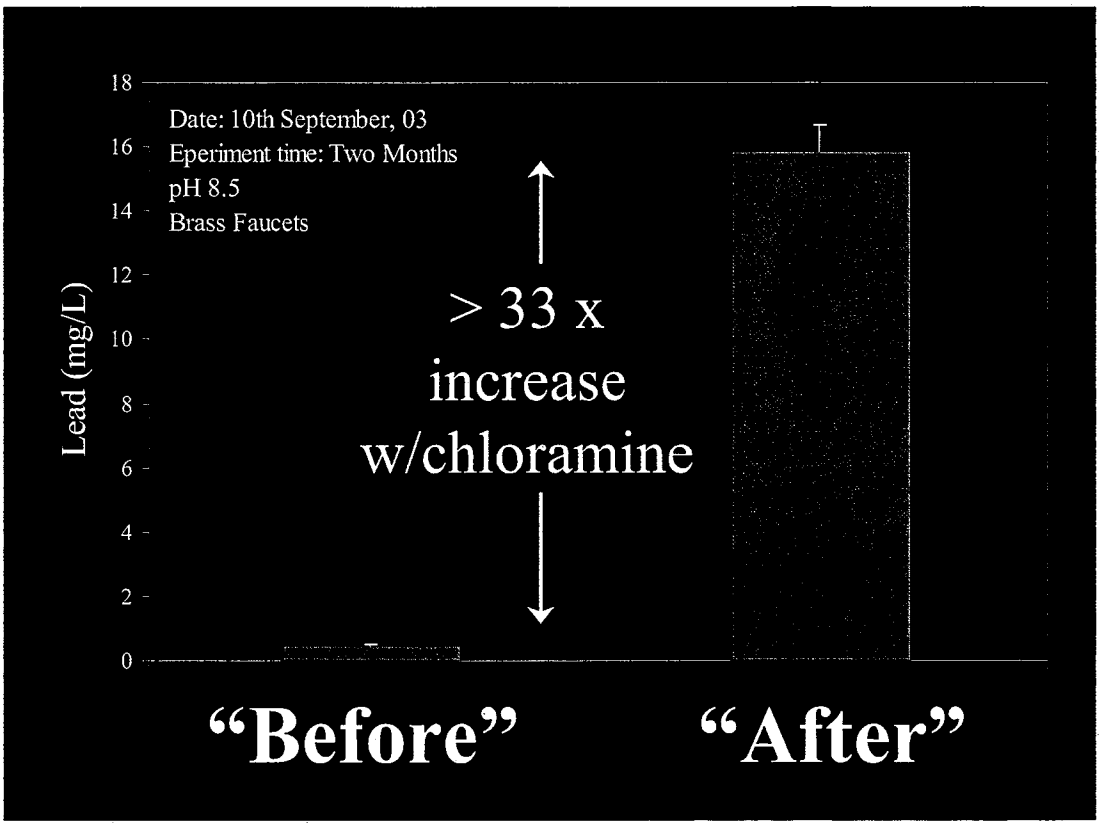
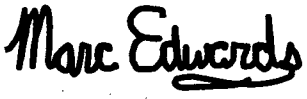


Figure 9. Experimental data proving the adverse consequences of chloramines on lead leaching from certain types of brass. "Before" is simulated WASA water with free chlorine. "After" is the same water with chloramine.

In closing, this is a problem of great urgency and importance. Government reform is most certainly needed. I do not believe that the US EPA has the capability to change its culture from within, even in the midst of an embarrassing crisis, since they have invested so much into DBP regulations to admit that a mistake might have been made. The US EPA must be forced to change externally. I also urge that additional funding be given to the National Science Foundation so that researchers can answer the practical questions that consumers have. Without such an initiative we are destined to repeat the mistakes of the current crisis, learning of problems years after they have started, as opposed to anticipating and preventing such problems in the first place through application of sound science.

Sincerely yours,



Marc Edwards
Professor of Civil and Environmental Engineering
Virginia Tech

Appendix 1. Some e-mails detailing chronology of events regarding some of my efforts to make sure public was notified on flawed flushing advice.

a. From e-mail from Marc Edwards to Mike Schock, and EPA Scientist attending first expert meeting on 2/5/2004

The reason I sent this data, is in the unlikely event that WASA does not share it with you, you will know that flushing is not going to be protective of public health.

b. Response from Mike Schock

05:10 PM 2/5/2004 -0500
thanks. I think I'll eventually get it. It looks like I'll be flying to DC for an emergency meeting on Monday morning. I was on a call with Rich Giani who discussed a pretty complete research plan, most of which he credited to you,

c. E-mail from Marc Edwards to George Rizzo. 2/8/2004 2:55 am

George and Mike,
Attached is a letter that will be mailed Monday by Fed Ex to Cynthia.
I will also send both of you a copy of this via normal mail.
Please forward this to Cynthia.
Perhaps she would appreciate advance notification of its arrival.
I do not have her e-mail address.
Marc Edwards
Professor
Virginia Tech

c. E-mail response from George

Date: Sun, 08 Feb 2004 17:42:57 -0500
From: Rizzo.George@epamail.epa.gov
Subject: Re:
To: Marc Edwards <edwardsm@vt.edu>
X-Mailer: Lotus Notes Release 5.0.9a January 7, 2002
X-MIMETrack: Serialize by Router on EPAHUB11/USEPA/US(Release 6.0.2CF1|June 9, 2003) at 02/08/2004 05:42:59 PM
X-Junkmail-Status: score=6/50, host=zidane.cc.vt.edu

Marc,
I received your message today because I was in the office. I forwarded your message to Cynthia but I would like to ask you not to formally send the letter until we have a chance to speak. I will be in DC tomorrow at a meeting at the Washington Aqueduct concerning the lead issues in DC. Mike Schock will also be there. I will call you as soon as I can tomorrow. My cell phone number is 215-514-8674 in case you don't hear

from me. Please be assured that WASA has not disregarded your recommendations and is in the process of revising its advice to customers about flushing their residences.
Also, I did not ignore your last e-mail from February 2, 2004. I have been very busy since the news stories were published last weekend and did not have a chance to answer your e-mail and several more. Also, I thought that you had agreed with Cadmus that there might be a potential conflict of interest if you continued as their sub-contractor while consulting for plaintiffs in a lawsuit against WASA.
Thanks.
George

d. Response to Rizzo

Date: Mon, 09 Feb 2004 13:40:27 -0500
To: Rizzo.George@epamail.epa.gov
From: Marc Edwards <edwardsm@vt.edu>
Subject: Re:

After further considering your e-mail below and my first response(s), I'll note the following.

I was much relieved to hear that WASA is revising its advice to customers.
I am certain that you have a highly qualified team working on this, and that they will keep the public health interest foremost in their mind.
If EPA has determined that I have an actual conflict of interest, I do not agree with that determination, but I will not object further at this time.

At present, I am satisfied that Cynthia, you and Mike have read my concerns, and I am glad that I had a chance to bring you up to date regarding my activities. Consequently, given your affirmative response in relation to the forthcoming revision of WASA advice on flushing, I do not intend to mail the letter today as I had originally planned.

If EPA or WASA wants to learn of our experimental results on chloramine impacts in relation to lead leaching at DC, if asked, then I would find a way to share those results with the team.

Best wishes on your future work on this issue.
I understand that you have quite a task before you.

Marc

e. E-mail to Rizzo after DC WASA officials reiterated 1 minute flushing recommendation to the DC Council

Date: Tue, 10 Feb 2004 17:38:03 -0500
To: rizzo.George@epamail.epa.gov
From: Marc Edwards <edwardsm@vt.edu>

George,

According to a report I got from someone attending the meeting today, DC WASA is still recommending 1 minute flushing to achieve acceptable levels of lead in the drinking water.

Who is advising them? Who is advising you? ***This is totally, and I mean totally, unacceptable in terms of protecting public health.*** I am dumbfounded at this given the data I have seen, and given the reassurance I had from you just yesterday that a revised flushing recommendation would be forthcoming.

Have you seen the data from my monitoring experiments that DC WASA collected? It shows lead rising up to at least 5X first draw levels in this recommended timeframe. Do you understand that their advice is increasing lead exposure dramatically in some cases versus first draw?

Please alert Cynthia that my letter has been mailed UPS next day.
EPA has totally abandoned their regulatory responsibilities in protecting health of consumers in the DC area.

Also tell Cynthia that I intend to speak with some members of the DC council.

Perhaps everyone is right...that not letting this rest, and refusing to play along will be the end of my academic and scientific career...in all likelihood it is my final deathnell for potential funding agencies in the drinking water "research" community. But the drinking water community that I signed onto would never allow a breach like this to occur. I have tried and tried and tried to work within the system, but as I said previously, I am now convinced that the system is completely broken.

What is happening here is wrong by every rationale measure. I cannot believe you did nothing after my earlier letter by e-mail.

Marc Edwards

f. E-mail back from George Rizzo

Date: Wed, 11 Feb 2004 09:16:31 -0500
From: Rizzo.George@epamail.epa.gov
Subject: Re:

Marc,
I didn't see your e-mail until this morning. EPA's understanding with WASA is that they have revised their advice to customers regarding flushing their taps to take into account the problem with the lead service lines. They will be sending out letters with this advice to their customers today. I'm assuming that you were referring to the DC Council meeting held yesterday. Region III did not attend this meeting because they had to be at a Congressional meeting yesterday, so I haven't heard what WASA stated at the Council meeting. As soon as I receive a copy of the letter, I'll forward it to you.
George

g. Response to Rizzo

Date: Wed, 11 Feb 2004 11:32:22 -0500
To: Rizzo.George@epamail.epa.gov
From: Marc Edwards <edwardsm@vt.edu>
Subject: Re:

According to my source in attendance, they passed around a sheet saying 1 minute flush was sufficient to ensure safe water.
According to my source, there was nothing on the written sheet saying that there was a problem with flushing.

A woman asked the question (I am paraphrasing what I was told second hand) "Why is lead in my second draw higher than my first draw."
My source said Marcotte then answered something like...you are probably detecting lead from water that sat stagnant in the service lateral. In those cases you should be flushing 3 to 5 minutes.

The written advice passed around, and which I was told would be sent to WASA customers, according to the person who was in attendance and who read it to me over the phone at 3:45 pm, did not say that there was a potential problem with flushing. If his message was correct, in my opinion, it falsely reassured the council that there is not a problem with the existing flushing recommendation.

At that point I felt I had no choice but to send you and Cynthia the letter.

It is my understanding that many people do not even know if they have a lead service line. Therefore, how on earth can they know whether to flush for 30 seconds, 1 minute, 3 minutes or 5 minutes to ensure they drink water with safe levels of lead? Is the lead returning to safe levels even after extended flushing? The data I have seen so far says the answer is no.

Marc

h. Rizzo to Edwards

Date: Wed, 11 Feb 2004 15:23:40 -0500
From: Rizzo.George@epamail.epa.gov
Subject: Re:
To: Marc Edwards <edwardsm@vt.edu>
Cc: Schock.Michael@epamail.epa.gov

Marc,
I have not been directly involved in reviewing the language that WASA proposed for providing advice to consumers. It is my understanding that for residents of homes with lead service lines, the advice for consumers would be that the lead levels are significantly reduced after heavy household water usage. Therefore, they recommend that after water has been used for bathing, etc. in the morning, residents could draw containers of water for consumption throughout the rest of the day and evening. This process would then be repeated the next day. WASA determined this recommendation after conducting several lead profiles at DC residences. We are trying to determine what WASA has sent, or will send, to consumers. I believe that Region III will post this recommendation on our web site regardless of what WASA does.

George

i. **Edwards to Rizzo**
Date: Wed, 11 Feb 2004 14:39:53 -0500
To: Schock.Michael@epamail.epa.gov, rizzo.George@epamail.epa.gov
From: Marc Edwards <edwardsm@vt.edu>
Subject: Re:

On Fox news last night, sources tell me that WASA said "after 1 minute flushing" the water is completely safe.

According to the person I had attend the meeting, the take home message that the council got is "1 minute flushing." Marcotte apparently responded maybe 3-5 minute flushing to make it completely safe in response to the woman that raised the concern that 2nd draw is higher than first draw.

The page handed out at the council meeting says:

"Please advise anyone concerned about the possibility of lead in their water supply to follow a simple two-step process.....First, when you get up in the morning or anytime water has been sitting unused for six hours or more, flush the old water out of the system by using some water in the home for showering or bathing. Second, run water from the tap for about one minute before using for cooking or drinking."

The data I just sent you shows that less than 6 hours is still a problem, or at least that it most certainly was a problem for 1 home back in March, 2003, and most likely was a problem for many homes in DC. Does WASA now have data proving that less than 6 hours is not a problem? In addition, why is the statement addressed to only "....anyone concerned about the possibility of lead in their water." Who on earth should not be concerned? Why wasn't an explicit message being sent to everybody?

Marc

j. Edwards to Rizzo.

Date: Wed, 11 Feb 2004 15:35:33 -0500
To: Rizzo.George@epamail.epa.gov
From: Marc Edwards <edwardsm@vt.edu>
Subject: Re:

But what on earth will prompt consumers to go to the region III web-site?
What has more reach....Fox News, the mailing that WASA is sending out....or the EPA regional web-site?

Where is the region III web-site...I have never even seen it.

Marc

k. Last e-mail to DC Council to try and get public notification.

Date: Fri, 13 Feb 2004 09:44:03 -0500
To: "Maier, Adam (COUNCIL)" <amaier@dccouncil.us>
From: Marc Edwards <edwardsm@vt.edu>
Subject: RE:

I can meet anytime before Feb. 19th.
I am in Maui from Feb. 20 until March 4th...partly working with residents and a utility who have a serious lead problem that might be caused by..surprise....chloramine/phosphate addition to their water. Also...my first vacation in two years.

I could speak with anyone, anytime by phone if desired except for some of the time I am in Hawaii...although I must say that I am starting to wonder if I have full control of my mental abilities given the stress of the past few months.

Adam...I am desperately concerned that the advice on flushing should be publicly changed to what was agreed to with the EPA, and that the public be informed in a manner that is not watered down. In my personal visits to the homes of these people, I can tell you that those bearing the brunt of this are the proud working poor of Washington DC. They are too busy to read the notices sent out in the water bill, much less read between the lines of the garbled messages that have been given to the public regarding benefits of 1 minute flushing to date. 1 minute flushing is not making the water safe, and in many cases, it is making the problem much worse. I was literally sickened when WASA management went before the Council and re-iterated the 1 minute flush recommendation after everything I had done to bring a serious problem to their attention and to the attention of the USEPA.

Short of calling the Post and letting them quote me "Don't drink the water," I have done everything I possibly could.
I will not go to the Post and say that.
If I did that, people will lose faith in the entire system, including DC government, which is truly the last hope for reasonable action.

Marc

I. Part of Letter to Council Member Carol Swartz

February 19, 2004

Dear Ms. Schwartz,

Thank you for efforts to force a rational solution to the problem of excessive lead in drinking water of DC WASA consumers. I am told that you now have a copy of my letters mailed February 7th and February 10th to representatives of the United States Environmental Protection Agency (USEPA). Those letters detail my frustration and concern regarding the way in which this situation has been handled. I exhausted every opportunity to work within the system before approaching your representatives and the *Washington Post* starting February 9th, 2004.

In addition to comments in my letter to the USEPA, I am providing additional advice that your committee may wish to consider at this time.

1) Public notification that this is not a "normal" problem with lead in drinking water.

The early advice to flush for 0.5-1 minute before collecting water to be used for cooking or drinking was provided with the best of intentions. However, samples that I personally collected from DC WASA homes, and samples that DC WASA later collected at my direction in December 2003, proved that there is a problem with that advice. Recent advice to flush 10 minutes before collecting water to be used for drinking or cooking throughout the day, or to treat water with a device known to remove lead, is consistent with my current understanding of the situation. This advice is now expressed in today's *Washington Post* and on the EPA Region III web-site.

Unfortunately, the written public notification sent out by DC WASA and testimony given to the Committee on Public Works and the Environment (both February 9th) repeated the 1 minute flushing recommendation. That spurred me to a round the clock effort, without regard to either my personal health or possible damage to my professional standing, to make sure that consumers' were provided information that will allow them to avoid exposure to excessive lead in their drinking water. In my opinion, posting the new flushing recommendation on the EPA Region III web-site and the article in today's *Washington Post* does not adequately inform the public of this important new advice.

Appendix 2. Copy of letter to Christie Whitman from WSSC requesting help

The Honorable Christie Whitman
Administrator
United States Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Dear Administrator Whitman:

It has been a privilege to partner with the United States Environmental Protection Agency (EPA) on several public events to highlight your efforts to ensure the health of citizens across the country and safeguard the nation's water supplies. A new issue, which was initially perceived to be an isolated local event, is quickly escalating into a national problem impacting citizens and water utilities across the nation -- presenting another opportunity for us to partner. Let me take this opportunity to update you on the problem of copper pipe pinhole leaks.

Since summer 2000, the Washington Suburban Sanitary Commission (WSSC) has been aggressively working to determine the cause of copper pipe pinhole leaks impacting families from throughout our service area of Montgomery and Prince George's Counties, Maryland. To date, more than 4,500 customers have reported these leaks to us by completing our pinhole leak questionnaire (available on our website at www.wsscwater.com). These leaks can cause considerable damage resulting in costly repairs, mold problems, increased insurance rates, and, in some cases, customers having their insurance policies cancelled.

Working closely with the Copper Development Association, master plumbers, local officials and nationally recognized water quality and/or copper corrosion experts including Dr. Marc Edwards of Virginia Tech, we've been able to discount many factors as the primary causes of pinhole leaks in our service area. Unfortunately, despite our best efforts, we will probably never know the exact cause of pinhole leaks impacting WSSC customers.

However, recent research conducted by Dr. Edwards indicates that EPA requirements related to corrosion control (Lead and Copper Rule) and the removal of natural organic matter (NOM), coupled with best industry practices, may promote copper pipe pinhole leaks. As you may know, corrosion experts now believe that some of the chemicals making up the NOM act as corrosion inhibitors and protect metal piping.

Similar kinds of copper pipe pinhole leaks are occurring elsewhere in Maryland – areas not served by WSSC – and across the nation. In fact, Dr. Edwards has indicated that he receives calls every day from utilities and consumers across the country. He estimates he has heard of a different impacted system every three days for the last few weeks and he strongly suspects the problem is getting worse nationally.

In light of Dr. Edwards' latest research indicating federal water chemistry regulations may play a role in this problem, we strongly encourage EPA's involvement in this national issue. Mr. George Rizzo from your Region 3 Office attended our recent taskforce meeting at which Dr. Edwards presented his latest work and indicated he would consider the information discussed at that session. However, we feel a strong sense of urgency to meet with appropriate staff members from your Washington, D.C. office to brief them on this groundbreaking work.

Please contact me at (301) 206-8777 with any questions or comments you may have. Additionally, we would greatly appreciate your suggestion of appropriate officials with whom we should meet to discuss EPA's interest in this national issue. Thank you for your time, consideration and your continued support of our mission to provide safe water to our customers and return clean water to our environment.

Sincerely,

John R. Griffin
General Manager

cc: The Honorable Douglas M. Duncan
The Honorable Jack Johnson
The Honorable Barbara A. Mikulski
The Honorable Constance A. Morella
The Honorable Paul S. Sarbanes
The Honorable Chris Van Hollen
The Honorable Albert R. Wynn
Montgomery County Delegation Members
Prince George's County Delegation Members
Montgomery County Councilmembers
Prince George's County Councilmembers

bcc: Sherry Conway Appel
Commissioners
Austin Freeman
Ken Geremia
Monica Johnson
Andrew G. Kireta, Jr.
Joel Kramer
David Lake
Keith Levchenko
Dale L. Powell
Billy Silk
Paivi Spoon
Senior Leadership Team