Chloramine Issues by State/Region

R1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont & 10 Tribal Nations)

- Health
  - Champlain region, VT – over 130 citizens claim effects (rashes, etc.) due to chloramines
  - Citizens’ group formed is allied with the one in San Francisco

- Usage
  - VT considered a chloramine ban for the system or the whole state; not sure if this is still on the table for discussion
  - VT DEC is planning a meeting to discuss usage of chloramines (how to use it safely, what are the health effects, etc.); is on hold as the commissioner just resigned (8/20/2007)
  - CT – one small consecutive water supply system purchases chloraminated water from a large public water supply (wholesaler) in Massachusetts; decision is utility choice; no need seen to make switches yet (apr07)
  - RI – no systems use chloramines; state would want piloting to consider simultaneous compliance issues but otherwise consider it a utility decision; two systems are contemplating a switch as of Apr 2007

R2 (New Jersey, New York, Puerto Rico, US Virgin Islands and 7 Tribal Nations)

- Health
  - Poughkeepsie – some reports of skin rashes (NY Health Dept is helping to respond)

- Usage
  - In NY, two systems use chloramines; some other systems looked at chloramines and decided against using it; the state doesn’t push or discourage chloramine use
  - NJ – three systems representing over 25% of the state’s population use chloramines; NJ receives dry skin and irritation complaints from time to time but didn’t notice that they were more for chloramines than for other disinfectants (apr07)

R3 (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia)

- Health
  - No reported health issues by Regional office as of April 19, 2007
  - Chloramine and lead was an issue in the past for DC (2004)

- Usage
  - DC uses chloramines (apr07)
When asked about usage, one system had an ammonia feed problem (apr07)

PA reported from 1995 to 2007, the number of systems using chloramines rose from 20 to 28 (Sept 07)

EPA R3 estimates 47 PWSs use chloramines as a secondary disinfectant, over 5 million people in three states (Sept 07)

Camp Hill, PA (operated by the Pennsylvania American Water System we believe) would like to implement a switch from chlorine to chloramine but has public opposition
  - Public citizen collected signatures, legally filed an injunction and will provide scientific backing for health reasons why the chloramine switch should not happen (Aug 2007)
  - System is delaying to gain public support for switch and then hopes to do the conversion (Aug 2007)

DE was reported to not allow usage of chloramines in a VT news article; when asked about this by ASWDA, they did not respond (apr07)

WV - no systems use chloramines and it would be a utility decision, not the state (apr07)

**R4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and 6 Tribes)**

- Health
  - Lead poisoning in Greenville, NC

- Usage
  - AL, GA - discourage it, they rarely approve its use; TN - avoids it because of simultaneous compliance issues (ammonia handling, small systems can't handle it) (apr07)
  - TN - no systems use chloramines; the state encourages precursor removal versus switching to chloramines and is hesitant of the potential impacts of switching disinfectants with all the problems they've heard about with lead and TCR compliance and customer health complaints (apr07)

**R5 (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin and 35 Tribes)**

- Health
  - As of April 19, 2007, this Region is not aware of any complaints

- Usage
  - 124 systems using chloramines; in IL, they see a steady increase in chloramine use with implementation of Stage 1 (apr07)

**R6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes)**

- Health
  - No info

- Usage
o TX – biggest user (most use it in this state); OK actively discourages use; TX has guidance manual (apr07)

R7 (IOWA, KANSAS, MISSOURI, NEBRASKA, AND 9 TRIBAL NATIONS)
- Health
  o High blood pressure mentioned on April 19 call
- Usage
  o larger systems have been using it for decades, smaller may need to switch soon (April 2007); chloramines don’t mask some odors

R8 (COLORADO, MONTANA, NORTH DAKOTA, SOUTH DAKOTA, UTAH, WYOMING AND 27 TRIBAL NATIONS)
- Health
  o As of April 19, 2007, this Region is not aware of any complaints
- Usage
  o All states allow it; they see an increasing trend of chloramine use
  o MT was reported to not allow usage of chloramines in a VT news article; when asked about this by ASWDA, they responded that they allow chloramines and that a incorrect wording may have interpreted MT as prohibiting usage but it has been corrected; one system in their state uses chloramines; most systems are small (apr07)
  o UT – has not received a request from a utility to switch to chloramines in response to Stage 1; no utilities w/high DBPs; Stage 2 will be a different matter and they will deal with requests on a case-by-case basis but prefer removal of precursors versus switching to chloramines as an answer (apr07)

R9 (ARIZONA, CALIFORNIA, HAWAII, NEVADA, THE PACIFIC ISLANDS, AND TRIBAL NATIONS)
- Health
  o San Francisco – citizens’ group formed against chloramines and numerous complaints of skin and other problems
    ▪ EPA R9 meets with CCAC group to discuss their concerns on Sept 5, 2007
  o Maui, Hawaii – system using chloramine had skin rash problems
    ▪ In 2005, their health dept found the skin rashes were linked to a problem with high bacteria levels
    ▪ Comment: if the rashes have not continued, then this problem is resolved and is not linked at all with chloramines (bacteria levels were not due to chloramine switch)
- Usage
  o San Francisco area uses chloramines
  o Comment: do other systems as well?
NV was reported to not allow usage of chloramines in a VT news article; when asked about this by ASWDA, they did not respond (apr07)

**R10 (ALASKA, IDAHO, OREGON, WASHINGTON AND NATIVE TRIBES)**
- Health
  - No info
- Usage
  - No info
  - Idaho was reported to not allow usage of chloramines in a VT news article; when asked about this by ASWDA, the state DEQ responded that they allow use of chloramines (apr07)
Chloramine Usage Information

OGWDW/EPA HQ gathered information on the use of chloramines during the OGWDW Regional Monthly Teleconference call April 19, 2007. The purpose was to informally survey regions in order to have a more complete national picture of chloramination practices, any issues, and successes. Regions were provided the questions in advance. Answers given are below.

Following this is a May 24, 2007 memo from the Vermont Department of Environmental Conservation (VT DEC) on 10 states that were reference in an April 29, 2007 Free Press article saying they did not support use of chloramines. ASDWA assisted the VT DEC in collected responses from them.

Chloramine Use Survey – Gathered from Regional EPA Offices

(1) Please provide any noteworthy reports on what states in your Region are doing regarding the use of chloramines. (E.g., in R4, TN systems have decided not to use chloramines due to simultaneous compliance concerns.)

- R1: VT – over 100 citizens claim effects due to chloramines and this may cause a chloramine ban for the system or the whole state.
- R2: NY – 3 systems use chloramine. The state doesn’t push or discourage chloramine use.
- R3: Relatively few systems use chloramines (DC is one); one system had an ammonia feed problem; no health issues
- R4: AL, GA – discourage it, they rarely approve its use; TN – avoids it because of simultaneous compliance issues (ammonia handling, small systems can’t handle it)
- R5: 124 systems using chloramines
- R6: TX – biggest user (most use it in this state); OK actively discourages use; TX has guidance manual
- R7: larger systems have been using it for decades, smaller may need to switch soon
- R8: All states allow it
- R9: CA – the San Francisco area uses chloramines (and there is an active anti-chloramine citizens group there as well)

(2) Can you provide any information on any trends developing in states in your Region where either systems using chloramines have continued to treat with chloramines, or where systems have decided to discontinue the use of chloramines because of customer complaints or another reason.

- R2: NY – Some other systems looked at chloramines and decided against using it
- R4: no trends
- R5: IL – steady increase in chloramine use with implementation of Stage 1
- R8: increasing trend of chloramine use
(3) Are you aware of any information or have any states in your Region mentioned system complaints regarding adverse skin reactions, etc., due to the use of chloramines?
   - R1: Only in Champlain area – citizens group formed allied with the one in San Francisco
   - R2: Poughkeepsie – some reports of skin rashes (NY Health Dept is helping to respond)
   - R4: lead poisoning in NC
   - R5: not aware of any complaints
   - R7: chloramines don’t mask some odors
   - R8: not aware of any complaints
   - R9: San Francisco – citizens group formed against chloramines and numerous complaints of skin and other problems; Maui, Hawaii – system using chloramine had skin rash problems

(4) Please note any other comments regarding the use of chloramines not covered above.
   - R8: we should investigate potential negative impacts further – e.g., nitrification and increased bacteria can cause rashes
MEMORANDUM

To: Jim Fay, CWD General Manager
From: Jean M. Nicolai, Operations and Compliance Chief
Date: May 24, 2007
Subject: Your request to poll states

As you requested, I asked Jim Taft, ASDWA Executive Director to poll the 10 states referenced in the April 29, 2007 Free Press article you sent to me. Jim kindly forwarded the following questions to the Drinking Water Administrators in those states.

1. Is the article correct in indicating that water systems in your state are not using chloramines?
2. If true, is this situation the result of utility-by-utility decisions or is it due to the state drinking water program’s direction to its water systems?
3. If it’s true that chloramines are not being used in your state, how would you characterize the reasons for that choice?

In lieu of summarizing the states’ responses, I copied their emails below.

1. Connecticut

1) We only have one small consecutive water supply system that purchases chloraminated water from a large public water supply (wholesaler) in Massachusetts.
2) The rarity of chloramination is due to Utilities’ decision.
3) The reasons are very much based on needs & benefits. So far, utilities in CT do not see the need to switch to chloramine. Thanks,

Michael Hage, Section Supervisor Drinking Water Section Department of Public Health
Phone: 860-509-7333 Fax: 860-509-7359
Connecticut currently has no prohibition on chloramines; however, I would expect the approval process would require studies and the development of a detailed implementation plan. I'm not aware of any CT systems presently using chloramines.

Darrell Smith 860 509-7676

2. Delaware
   No response

3. Idaho
   The reference in the Vermont newspaper article to Idaho not allowing use of chloramines is baseless and incorrect. We allow use of chloramines. No one contacted us for this article, and I am curious who their source was for this erroneous information?

Hope this is helpful,

Lance Nielsen Safe Drinking Water Manager
Idaho Dept of Environmental Quality
1410 N. Hilton Boise, ID 83706 (208)373-0291 lance.nielsen@deq.idaho.gov

4. Montana
   1. Montana has one system (pop. 56,000) that uses chloramine and has been doing so for many years. Disinfection by-products were not an issue when they started.

   2. Montana does NOT prohibit chloramine use for disinfection. However, a few years back wording in our rules could have been interpreted to do so, but it was unintentional and has since been corrected.

   3. I am not aware of the actual decision factors that have made nearly all systems in Montana that disinfect to use chlorine over chloramine, but given their relatively small size, I would guess that it is cost and convenience.

Jon Dilliard, MT DEQ PWSB 406-444-2409

5. Nevada
   No response

6. New Jersey
   Although we only have 3 systems in NJ that use chloramines they represent a large % of the population. 1. NJ American - Elizabethtown (90 % surface water 10 % groundwater) started in the early 1980s with chloramination of their surface water sources, and continued the treatment when designing a new ozone deep bed GAC filter facility in the 1990s. Their THM levels are now consistently below 20 ppb. 2. United Water - Hackensack began chloramine addition in the late 1980s. Together
these 2 systems serve 1.5 million population or about 20 to 25% of the states population on public water. 3. The other system, Brick MUA, serves about 60,000 and stared in the 1990s. They are also a surface water supply.

All systems have continued the use of chloramines, we know of no discussions about discontinuing their use. In fact we believe one large system (PVWC) would strongly consider their use if they did not currently have uncovered finished water reservoirs.

We from time to time receive complaints about dry skin and skin irritation issues. They tend to be from systems with surface water sources more than ground water sources. I don't think we have noticed any pattern that the systems with chloramines have received any more that other systems. Although we do not track this information.

Good Luck, Barker.

7. Rhode Island (from June Swallow)
   1) There are no systems presently using chloramines in Rhode Island.

   2) There has not been a state direction to avoid chloramines but we have indicated that thorough piloting, with emphasis on potential lead issues, would be required prior to a state approval to use chloramines. It is a system by system decision. There are presently two systems considering the use of chloramines.

   3) There is one system that considered using chloramines but chose not to. Their reason was that it did not appear that chloramines would have resolved their DBP issue (HAA5 was also high).

8. Tennessee
   Tennessee has no PWSs using chloramines.

   Tennessee requires a free chlorine residual in all parts of the distribution system. Other oxidants would be considered provided evidence is provided that problems caused by chloramines are addressed. If a system wants to use chloramines lead and copper, nitrification, adequacy of contact time and TCR issues would have to be addressed. The state of Florida has indicated to us that chloramines worsened their TCR compliance rates. We have also heard of customer complaint problems caused by chloramines in California and don't want the same kind of problems California is having.

   Tennessee has a system that is considering chloramines, but chloramines will not be approved unless its impact is understood and plans made to control the negative impact of chloramines.
We haven't told anyone they can't consider chloramines as a disinfectant. We believe control of DBP precursors is the better approach to meeting the DBP MCLs.

Robert L. Foster, Jr., Director TN Division of Water Supply
Robert.Foster@state.tn.us 615-532-0155

9. Utah
The Utah Division of Drinking Water has not received a request from any utility to use chloramines as a solution for high DBP's. Under Stage 1 we don't have any systems with high DBP's. However this will change with Stage 2 and LRAA's.

In the future we might receive requests and we would deal with them on a case by case basis. I would prefer removal/reduction of precursors as the preferred alternative, or even chlorine dioxide rather than chloramines, but these technologies might not be viable in all cases. So we'll deal with treatment proposals as they come.

Ken B

10. West Virginia

1. Is the article correct in indicating that water systems in your state are not using chloramines?

This was also a recent question from EPA Region III. We do not have any public water systems in WV using chloramines.

2. If true, is this situation the result of utility-by-utility decisions or is it due to the state drinking water program's direction to its water systems?

In WV, we have not provided any directives on the use of chloramines.

3. If it's true that chloramines are not being used in your state, how would you characterize the reasons for that choice?

This is a public water system decision and not driven by the state. We would expect to be advised prior to a water system changing any disinfection methods.
Public Water Systems Using Chloramines as a Disinfectant

QUESTION: Systems are switching from chlorine to chloramines to comply with EPA's disinfection byproduct (DBP) rules. Is this safe?

ANSWER:
- Chloramines have been used safely by many communities for decades. Over 68 million people in the U.S. drink water disinfected with chloramines.
- EPA published a standard for chloramines in 1998 that is based on the best available science (Minimal Residual Disinfectant Level = 4 parts per million). Drinking water that meets this standard is associated with little to no risk with respect to chloramines.
- The disinfection byproducts rule did not require water systems to switch to chloramines in order to comply, although some have chosen to do so.
- EPA continues to look at new science that emerges on chloramines and will update the criteria document for chloramines to include review of new studies.

BACKGROUND:
- As EPA has lowered acceptable levels of disinfection byproducts in drinking water, systems have switched to chloramines for disinfection because it decreases the level of regulated disinfection byproducts and is a cheap, easy-to-use technology.
- As the use of chloramines has increased, two issues have emerged:
  1. A small number of citizen groups have raised issues about health effects such as skin and respiratory problems. Chloramine studies have not focused on these health endpoints. A long history of usage (since the 1930's) and the few existing studies do not indicate that these irritations are issues associated with chloramines at the level at which the public is exposed via drinking water.
  2. Simultaneous compliance issues have been raised because there is the potential for lead corrosion and nitrification during a switch to chloramines.
- Citizens groups have formed in Vermont, California, and Pennsylvania to protest their utility's switch to chloramines. Vermont Department of Health and Department of Environmental Conservation have hosted EPA Region 1 and HQ, CDC, state and local legislators, water systems, and interested public to discuss chloramines issues in Vermont in different meetings during September and October 2007. Region 1 will continue to coordinate with the Vermont Department of Environmental Conservation, the system (Champlain Water District), and the citizens group to further discussions relative to the issue. Additionally, Region 9 for California and Region 3 for Pennsylvania have
participated in meetings about chloramines in their regions and will continue to coordinate with all stakeholders.

ACCOMPLISHMENTS:

- In May 2007, EPA released the final *Simultaneous Compliance Guidance Manual*. This document provides guidance to States and water systems on how to evaluate the potential impacts of treatment changes upon drinking water quality. The guidance also recommends steps systems can take to avoid or minimize any negative impacts on water quality. As part of the finalization process, EPA evaluated comments received on a draft version that was released in August 2006.

- In June 2007, EPA released over the internet a question and answer document to further public understanding and assist water systems and States in communication about chloramines and potential risks. This fact sheet provides answers to commonly asked questions and addresses chloramine basics, disinfection byproducts, chloramine health, and resources to learn more.

- EPA is developing additional key chloramine risk communication messages for the Agency to use when communicating to States, utilities, the public, and press.
1. Understand that EPA wants water companies to reduce the chlorine byproducts by 2012, so lots of systems are switching to chloramine, a local citizen's group that has been formed, they cite they study by Richardson et. al., that some of the unregulated by-products from chloramine are more toxic than those of chlorine. Did the rule requiring water companies to further reduce chlorine byproducts come out in 2006? And is the deadline 2012?

To reduce levels of disinfection byproducts, EPA released the Stage 2 Disinfection/Disinfectants Byproducts Rule in January 2006. [Info at http://www.epa.gov/safewater/disinfection/stage2/index.html]. The compliance dates for the regulation vary by system size, but systems serving more than 50,000 have to begin complying with new monitoring requirements by 2012 (smaller systems get until 2013). EPA does not require systems to use chloramines to comply with disinfection byproduct regulations. The choice of drinking water treatment is influenced by many factors and will vary by water utility.

Disinfectants are an essential element of drinking water treatment because of the barrier they provide against waterborne disease-causing microorganisms. Disinfection byproducts (DBPs) form when disinfectants used to treat drinking water react with naturally occurring materials in the water (e.g., decomposing plant material).

EPA regulates two groups of disinfectant byproducts: Total trihalomethanes (TTHMs - chloroform, bromoform, bromodichloromethane, and dibromochloromethane) and haloacetic acids (HAA5s - monochloro-, dichloro-, trichloro-, monobromo-, dibromo-). These are widely occurring classes of DBPs formed during disinfection with chlorine and monochloramine. The amount of trihalomethanes and haloacetic acids in drinking water can change from day-to-day, depending on the season, water temperature, amount of disinfectant added, the amount of plant material in the water, and a variety of other factors.

One method systems can use to comply with new disinfectant byproduct regulations is to change the disinfectant used to protect water as it travels through the pipes from the treatment plant to the customer. Using chloramines reduces levels of regulated disinfection byproducts compared to the use of chlorine. To reduce disinfection byproducts, many systems will continue to use chlorine as their primary disinfectant but will switch to monochloramine as a secondary disinfectant to protect the water in the distribution system. Monochloramine has been used as a drinking water disinfectant for more than 90 years. Monochloramine is more stable than chlorine and provides long-lasting protection as it does not break down quickly in the distribution system. Because monochloramine is more stable, it is less likely to react with natural organic material in the water and results in lower levels of regulated disinfection byproducts.
EPA acknowledges that there are other types of disinfection byproducts in disinfected water – some of which are known and some of which are still unidentified. TTHMs and HAAs typically occur at higher levels than other known and unknown disinfectant byproducts. The presence of TTHMs and HAA5 is representative of the occurrence of many other chlorinated disinfectant byproducts; thus, a reduction in TTHMs and HAA5 generally indicates a reduction of other types of disinfectant byproducts from chlorination.

Allowing the use of monochloramine reduces the known risk posed by chlorinated disinfection byproducts. Congress has ordered EPA to act to protect human health from known threats, even when there is incomplete information. While EPA continues to research the byproducts formed by monochloramine, to date, this research supports the continuing use of monochloramine.

Like all disinfectant byproducts, the types and levels of byproducts formed when using monochloramine will vary for each utility and also from day-to-day. One of the most important factors regarding the types of disinfection byproducts formed is the composition of the natural organic matter in the water and this will vary greatly for each utility.

Our Office of Research and Development is completing an extensive study of DBPs that will be released during 2009. They are looking at the array of DBPs and the various combinations and levels that occur from different water sources and disinfection conditions.

2. **Is there any plan afoot to begin regulating chloramine byproducts?** Ellen says 2 by products were on a list (n-nitrosamines and hydrazine), asks us to confirm if in fact EPA is looking to regulate those chloramine byproducts? Will the agency move to do the same thing with chloramine as chlorine?" 

At this time there are no specific plans to begin regulating specific types of monochloramine byproducts. EPA routinely evaluates and identifies contaminants that may require regulation and publishes those contaminants on a drinking water Contaminant Candidate List (CCL) every 5 years. In February, we published a draft list of 104 contaminants for the third CCL. This draft list includes N-nitrosamines and hydrazine. The drinking water CCL is a list developed by EPA that identifies priority contaminants for regulatory decision making and information collection. The contaminants on the list are known or anticipated to occur in public water systems and may impact public health. However, they are currently unregulated by existing national primary drinking water regulations. Publishing the CCL does not impose any requirements on public water systems. EPA will evaluate information available for each contaminant on the CCL3 and make determinations regarding whether or not they merit regulation. EPA will use all available health effects and occurrence data in this evaluation. More information about the list is available at [www.epa.gov/safewater/ccl/ccl3.html](http://www.epa.gov/safewater/ccl/ccl3.html).
EPA also has an unregulated contaminant monitoring program to help collect occurrence data in order to help us determine if a contaminant should be regulated. The second round of monitoring for 25 contaminants is currently underway, with samples being collected between 2008 and 2010. As part of this monitoring round, occurrence information is being collected for 6 types of nitrosamines. More information on this program is available at http://www.epa.gov/safewater/ucmr/ucmr2/index.html.


While the Plewa study is interesting, and warrants further study, we believe that the current body of scientific knowledge does not point to an increased risk from these disinfection byproducts (DBPs).

No conclusions can be made about the possible risk to humans posed by exposure to these byproducts in particular or by consumption of drinking water disinfected with chloramines. The iodoacetic acids appear to be more potent in the cell culture tests than other DBPs that have been studied in similar systems. However, this research is preliminary in that tests conducted in vitro (i.e., in cells) need to be confirmed in animals before conclusions can be made concerning human health risks. Additionally, little is known about what levels of iodoacetic acids may be found in drinking water systems or what conditions are needed for formation of these byproducts.

EPA is conducting additional studies to obtain quantitative information on the occurrence of the iodoacetic acids, particularly in chlorinated drinking water. Research is being planned to further evaluate the health effects in animals that may be associated with exposure to these and other DBPs of potential concern.

4. Broader question, critics saying EPA has not / studied very little chloramine so EPA should not be suggesting that folks switch without knowing much about it?

When setting the standard for monochloramine, EPA considered human health and animal data as well as other factors. Monochloramine has undergone a complete scientific review which is summarized in EPA's Criteria Document for Chloramines. EPA also considered the historical use of monochloramine. Large populations have been using monochloramine as a drinking water disinfectant for decades. Monochloramine has also been shown to an effective disinfectant based on decades of use in the U.S., Canada, and Britain.

EPA continues to research the byproducts formed by monochloramine. To date, this research supports the continuing use of monochloramine as a disinfectant. EPA must act to protect health even in the face of uncertainties. Allowing the use of monochloramine reduces the known risks posed by other types of chlorinated disinfection byproducts.
5. Is there a higher risk to infants and those with suppressed immune systems because chloramine is less effective with killing pathogens, so does EPA recommend any further precautions for these populations?

Monochloramine is an effective disinfectant but it takes longer than chlorine to kill or inactivate disease-causing organisms. This makes it impractical for many systems to use as a primary disinfectant because the treated water would require a long holding time at the water treatment plant before entering the distribution system to ensure disinfection. However, it is commonly used as a secondary disinfectant to protect treated water as it travels through pipes from the water treatment plant to customers. Monochloramine is more stable than chlorine and provides long-lasting protection. In addition, monochloramine has been shown to be more effective than chlorine at killing certain disease-causing organisms found in pipes such as those that cause Legionnaire’s diseases.

Regardless of the disinfectant used, some people may be more vulnerable to contaminants in drinking water than the general population. People with severely compromised immune systems, such as people with cancer undergoing chemotherapy, people who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people or their caregivers should seek advice about drinking water from their health care providers.
Lynn,

I've gone back and forth a couple times with our toxicologist here about the German papers you sent. I know you waited patiently for a response on this, so if you have further questions, I'll try to get you quicker replies.

Bottom line, the information in these papers does not affect EPA's chloramine MRDL of 4 ppm.

One shouldn't compare the result of a test (Eichelsdorfer et al. paper) that uses direct application of the test substance to the rabbit eye (Draize test) to a MRDL which is meant to be for drinking water and other purposes such as showering/bathing/cooking. These levels are not meant for directly placing these waters in the eye - as the Draize test does.

As for the Erdinger et al. paper, it concludes that the irritating potential of the water is due to the combined effects of a number of chlorinated disinfection byproducts created in the swimming pool water, not just chloramines or chlorine alone. So this second paper really acts to refute the first in a sense and gives further confidence to our stance that the chloramine MRDL is protective for drinking water purposes.

Rose

Rose Kyprianou
EPA/Office of Water/Ground Water and Drinking Water Standards and Risk Management Division
Phone: (202)-564-6325
Fax: (202)-564-3767
Office: 2209Q, Mail code: 4607M
Jennifer and Eric,

The attached is a draft of what I propose we send the ORD folks. I tried to be diplomatic!! -

I'd like to go ahead and make sure ORD is on board, especially to allocate money before spending end of Fiscal year travel.

I am suggesting September 20 for the meeting and in Cincinnati.

What is your preference?

By the way, Rose Heil, Pat Fair, Valerie Blank and Dan Olson are helping me organize it.

thanks,
Hiba

Meeting objectives.wpd
OW/ORD Meeting on Risk Communication for Chlorine and Chloramine Disinfection Issues

The date for the meeting is set for September 30, 2004. The all-day meeting will be in Cincinnati to address issues related to the above disinfectants. The main objective of the meeting is to develop EPA's scientific position on risk communication issues. I am attaching a detailed description of the objectives and of the topics that will be addressed during the meeting. A block of rooms has been reserved at the Vernon Manor Hotel under "EPA Disinfection Meeting" for the nights of the 29th and the 30th, for your convenience. The number is (513) 281-3300. They also will provide a shuttle service to the EPA and back.

An agenda for the meeting will follow.

Thank you for your support and I look forward to a constructive meeting. I'll follow up with everyone to discuss participation.

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From: Eric Burneson/DC/USEPA/US
To: Veronica Blette/DC/USEPA/US@EPA
Cc: Ephraim King/DC/USEPA/US@EPA, Jennifer Mclain/DC/USEPA/US@EPA
Date: 06/26/2004 11:52 AM
Subject: Re: Fw: Reporter's Question -

Can we get together for a few minutes on Monday to talk about this? This seems to be a continuing issue
on the west coast and I think we need to get information out.

http://www.sfexaminer.com/article/index.cfm/l/l061504op_peneditorial
http://www.sfexaminer.com/article/index.cfm/l/l061404n_chloramine
http://www.sfexaminer.com/article/index.cfm/l/l060404n_water
http://www.sfexaminer.com/article/index.cfm/l/l060104n_chloramine

----- Forwarded by Veronica Blette/DC/USEPA/US on 06/26/2004 11:07 AM -----
Stephanie Flaharty/DC/USEPA/US
06/25/2004 05:11 PM
To: Pamela Grant/DC/USEPA/US@EPA
cc: Veronica Blette/DC/USEPA/US@EPA
Subject: Re: Reporter's Question -

Hi Pam,

I just gave Christine Morente a call and found that she needs information regarding chloramine for a piece she's working on, which is due to go to press tomorrow. I explained that I am not an authority, but I did pass on the following:

At present, we do not have information on how many systems have switched from chlorine to chloramine--states do not switch, systems do the switching. I could not answer her question regarding rashes.

Veronica is out of the office for the evening, but I am copying her on this email to follow-up on Monday if necessary.

Steph

Pamela Grant/DC/USEPA/US

06/25/2004 04:53 PM
To: Cynthia Dougherty/DC/USEPA/US@EPA, Nandi Gelb/DC/USEPA/US@EPA, Stephanie Flaharty/DC/USEPA/US@EPA
cc: Pamela Grant/DC/USEPA/US@EPA
Subject: Re: Reporter's Question -

Please - Geoff Grubbsand Pam Barr say it is for you all to answer, Thanks
Pamela Wade Grant
Director of Communications
Office of the Assistant Administrator
U. S.; Environmental Protection Agency
1201 Constitution Avenue, NW, Room 3225
Washington DC 20460
Phone: 202-564-5777
Fax: 202-564-0194
E-mail: grant.pamela@epa.gov
That is a treatment/regulatory question and really needs to go to OGWDW. Try Cynthia Dougherty, Nanci Gelb or Ephraim King.

Pamela S. Barr
Deputy Director
Office of Science and Technology MC4301T
Room 5231A EPA West
U.S. Environmental Protection Agency
1200 Pennsylvania Ave.
Washington, DC 20460

phone: 566-0430 fax: 566-0441
barr.pamela@epa.gov
Pamela Grant

Can you answer this??

Pamela Wade Grant
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Christine Morente, reporter with the San Mateo County Times in Calif., wants to know which states have switched from Chlorine to Chloramine. She says people in her area are complaining about rashes, etc. She also wants to know if we have heard of anyone else who is complaining about rashes.

Her number is 650-348-4333 She needs someone to call her by 5 p.m Pacific time.

Pamela Wade Grant
Director of Communications
Office of the Assistant Administrator
FYI, we prepared and posted a few documents about chloramine and NDMA on our web site last Thursday that you may find useful. See the links below. Let me know if you have any questions or comments. -Manouch

Chloramines Q&A
http://sfwater.org/detail.cfm/MSC_ID/52/MTO_ID/NULMC_MC_ID/5/C_ID/1867/holdSession/1

NDMA Fact sheet
http://sfwater.org/detail.cfm/MSC_ID/51/MTO_ID/64/MC_ID/10/C_ID/654

NDMA White paper
http://sfwater.org/detail.cfm/MSC_ID/52/MTO_ID/NULMC_MC_ID/5/C_ID/1865/holdSession/1
change whatever you think you should, in both the email and the summary.

***************

(writing as Jennifer)

Today, Fred Hauchman and I were interviewed by Ben Harter at Science News about DBPs and chloramine. Ben was following up on the article about chloramines and DBPs that was in Environmental Science and Technology on August 18 along with a paper highlighting potential cytotoxic and genotoxicity identified with iodoacetic acids - a DBP that can form in the presence of chloramine. Press office staff and Veronica were also at the call.

He is planning an article for next week, which will eventually be available at sciencenews.org. We asked that the interview be conducted on background and that he could contact us for use of any quotes in the article.

Overall, the call went well. We were able to explain the work that has been done to date and how we considered DBPs in developing the Stage 1 and 2 rules. We were able to explain the differences between chlorine and chloramine use and DBP formation. We were also able to point out issues associated with the ES&T paper that make it difficult to use in drawing global conclusions about possible risks associated with chloramine. He had several questions about our use of THMs and HAAs as indicators of the presence of DBPs.

I am attaching a summary of the call that Veronica put together in case you are interested. Let me know if you have any questions.

[attachment:chl_interview_with_science_news.wpd]
Interview with Ben Harter from Science News
(science news.org)

Date: September 2, 2004
Participants: Jennifer McLain, Fred Hauchman

After seeing the articles about chloramines and DBPs in Environmental Science and Technology, Ben wanted to discuss the implications of shifting away from chlorine to combined disinfectants or alternative disinfection technologies. Jennifer gave him a broad background on research related to disinfectants, disinfection byproducts and potential health effects - from the 1970's up to the present.

He asked about the quality of data on chloramine health effects - are the health risks known or is it just presumed to be safer, or do we just not know? JM discussed how this had been considered during the negotiations for the Stage 1 and Stage 2 rules and that as the rules were developed, they considered the risk balancing between disinfectants and what it would mean as systems made changes. She pointed out that we had already developed regulations for DBPs including Cl-dioxide, chlorite, chloramine, THM, HAA, etc. in the Stage 1 rule. Fred echoed JM and noted that many have been studying DBPs associated with various types of disinfectant methods, including ozone.

Fred noted that when a risk assessment is conducted, you need to understand the health effects in cell, animals and humans (if available). But that you also need to understand exposure - and that you need to think about how much focus to place on DBPs that can now be detected at very low levels. He did not want to dismiss the research in the ES&T study, but wanted to make sure that exposure was kept in mind.

Ben asked about the paper, and noted that it indicated that it applied to waters high in Br and I, which he presumed would not be common in the U.S. JM verified his understanding and noted that the system used in the paper was unusual. It had precursor levels that were higher than 95% of the systems in the country and used chloramine as the disinfectant throughout the system. She indicated that the chemistry shows that the possibility of IoDBP formation decreases if the water has contact with free Cl prior to contact with chloramine. Fred noted that DBPs are so reactive that, even if ingested, they might not be sustained in that form before reaching organs - that the high cyto- and genotoxicities in cell cultures may not translate to the body. The three then discussed some epi studies that had been done.

Ben asked if chloramines generally produce lower DBPs than Cl. JM indicated that this is generally true, first, because in most systems the water has already been in contact with Cl. Also, the reactions with chloramine are slower in the distribution system. If Cl is used as a secondary, then DBPs will form throughout the dist sys b/c the reactions are faster...but chloramine slows down the DBP formation reactions. Io-DBPs might form in the dist sys, but they’ll be at a lower concentration. JM reminded Ben that one control strategy of the rules is to remove precursors, so that you avoid the problem from the start. Ben asked how this was done and JM told him about coagulation (enhanced) and filtration to settle out precursors. In Stage 1 rule, have to meet removal targets for TOC.
Ben asked if Stage 1 also requires a specific disinfectant to be used or just Stage 2? JM explained that neither rule requires a specific disinfection regime. We don't tell them out to get there, we just give them the targets, present a range of options and tell them to choose.

Ben asked if systems would change their whole disinfection process to chloramine. JM told him this would only be workable if the facility allowed for very long contact times (b/c of the slower reactions). So then he asked why they should be used at all. JM patiently explained that they help to reduce DBPs...since the distribution system has to maintain a disinfection residual, a disinfectant has to be added before it enters - better to have a disinfectant like chloramine that slowly produces DBPs rather than one like chlorine, which rapidly forms them (or something to that effect).

Ben asked about the paper's assertion that a large # of DBPs are poorly characterized, esp w/ respect to toxicity. JM noted that there are hundreds of DBPs that have been known for a long time. Our strategy is to identify 2 groups (THM and HAA) as being representative of DBPs generally. If we can control those, will reduce others too. We selected THM and HAA b/c they are usually at a higher concentration and occur at a range of levels in different pH and other water quality parameters. Focus is on removing precursors.

Fred addressed the “what do we do now with this info” question. We want to consider exposure and are planning a study. We need to ensure that the analytical methods are suitable. So we want to do sampling to get occurrence info at a range of PWS to see if it’s likely that the public is being exposed. If there is exposure, want to consider the levels.

Ben asked what evidence there was to indicate that THM and HAA are reliable indicators for the full suite of DBPs. JM acknowledged that they are not perfect, but that the specific DBPS within each family represent a wide range of conditions. She said that occurrence studies have shown that they correlate to other DBPs.

Ben said that it seems like chloramine might produce an entirely different suite of DBPs that wouldn't be identified by THM and HAA. JM said she would look at that issue differently - that there might be different ratios associated with the DBPs forming under Cl vs. Cl-m, but that the universe is similar and would be captured by THM/HAA. She noted that they had sent this to SAB and that they agreed it would be the best route.

Finally, Ben asked if there are new studies looking at DBPs from chlorine or other disinfectant strategies. Both JM and FH pointed out that there are a wide range of studies ongoing.
Sarah,

Good letter. I've made some edits to shorten it a bit and make a wee less technical. After you've considered Tom's comments and have another version, we can talk to Jennifer and Cynthia about how to manage the many letters coming in. thanks....

Veronica Blette
Special Assistant to the Director
Office of Ground Water and Drinking Water
phone: 202-564-4094

Sarah Bahrman/DC/USEPA/US

Sarah Bahrman/DC/USEPA/US
01/05/2005 02:47 PM

To: Thomas Grubbs/DC/USEPA/US@EPA, Veronica Blette/DC/USEPA/US@EPA
cc: Sarah Bahrman/DC/USEPA/US
Subject: Response to Chloramine Letters
Veronica and Tom-

Here's the first draft of a response to the letters we've been getting from CA. I spoke with Dave Spath at CA DOH just before the holidays and he sent me out an example of their response to a more specific complaint (skin rashes). This draft is consistent with DOH's response and also addresses all issues raised in letters we have received so far. I think it could serve as a template for all responses, personalizing just the first paragraph.

Please let me know what you think and what changes you suggest when you get a chance. I put three things in red that I wanted your opinion on:
1) CA DOH did not mention that a CA health panel is going to investigate the matter this month (as requested by several local city board of supervisors). I think we should include it but wanted you get your opinions as well.
2) I wanted to provide a contact person incase they still have questions, but wasn't sure who to put? If you think this is a good idea, any suggestions for the contact person?
3) Since the letters are addressed to Cynthia, is the response signed by her?

Thanks!
Sarah

CLM_Letter_Response_010505.doc

----- Forwarded by Thomas Grubbs/DC/USEPA/US on 02/18/2009 01:52 PM -----  
Paper on chloramines implementation

Elin Warn to: Jimmy Chen, Michael Finn, Thomas Grubbs 01/05/2005 05:32 PM

I saw this at WQTC and thought it was an interesting account of chloramines implementation (especially conclusions reached in the summary). I don't know if this would find a place in the simultaneous compliance guidance manual, but I thought I'd point it out.

Chloramines_the good the bad the ugly.pdf

Elin Warn
OGWDW - Office of Water
US Environmental Protection Agency
1200 Pennsylvania Ave., NW
Room 2209N - Mail Code 4607M
Washington, DC 20460
202-564-1807

----- Forwarded by Jeanne Briskin/DC/USEPA/US on 10/28/2009 10:34 AM -----

From: Thomas Grubbs/DC/USEPA/US
Greetings To All

Thank you again for all your work and attention to the matter in front of us: alleged impacts from chloramines at a VT water utility. We are troubled by the events playing out and appreciate your help in working to put down on paper the agency's current position.

To define our collective next steps, thought it might be helpful for all of us if I outlined some of the highlighted discussion topics and outcomes. Please consider the following:

TO DOs

- OGWDW to lead a general discussion at the next DW Branch Chief Call about any known problems or emerging policies regarding use of chloramines; OGWDW to follow up with ASDWA as appropriate.
- R1 to work with state of VT to get a better handle on how the legislative testimony is going;
- HQs to summarize health studies evaluated during the derivation of the EPA health goals/standards and to describe what our efforts will be in the future in the area of health studies. Particular emphasis will be placed on studies relating to inhalation and dermal exposure.
- R1 to send out additional background information on POU treatment that was evaluated by NSF. Based on this background, Section IV may need to be amended. It would be good to know how effective in reducing levels and a range of cost. See attached letter to teh editor from the citizen group which mentions home treatment costs.
- Set up another call once the health effects studies summary is in - to discuss how this may impact language changes throughout the Q&A.

COMMENTS ON THE Q&A

Suggestion - Please see the attached documents, particularly the first one "Half Truths and Misrepresentations ...". This will give you a very concise summary of the knowledge base, positions and conclusions reached by the citizens group. I believe that it will be very helpful context when we look towards finalizing the Q&A. It tells you what we're up against. For example, page three mentions that "EPA has continually said that there are no studies on the skin and respiratory effects ... on people." and Page 2 - "... there are studies on animals that do show reactions to chloramine."

General Comments

- Based on the information provided in the summary of health studies, amend Section III. Health
Information to reflect what we knew in 1994, what we can conclude and what we will continue to study. General statement on whether water is safe may need to be amended to address specific pathways.

Similarly, relook at the balance on the language regarding DBPs formed by chloramines. May need to beef up the information to be clear about what we know and don't know (e.g. NDMA).

Be prepared to follow up with name of studies when generally discussing what the studies point out. See last Q in Section III. While these studies may not need to be provided in the Q&A, we will need to back up any statement in discussions with the citizens.

Specific Comments

~ Page 1 - Third Q, while there are no requirements that any system use chloramines - we may need to mention that it is BAT for some systems and explain the significance of that statement (the citizens group and the state have already asked us about this. we may need another question (Karen McGuire has already researched this angle and can provide some information.

~ Page 2 - Second Q - Can we really say that it is safe for bathing, cooking, ..... This answer may need to be changed depending upon what actual studies we have looked at. And I'm sure that it may not be safe at all levels.

~ Page 3 - Top Paragraph - add more language on how many systems and perhaps population that we knew were on chloramines in 1990?? and include language that there are likely many more.

~ Page 5 - See earlier comments on need to examine health studies that have been evaluated and clarify each statement as to what we can say and what we don't know yet. In particular - what studies were looked at to back up last answer in Section III "Studies do not point to these irritations being associated with chloramine.....".

That's it for Now

Thanks again for all your hard work - Let me know if you have any questions relative to the above, Please contact me or Lynn Gilleland at any point to discuss further.

Take Care

jane.
To: Jeanne Briskin/DC/USEPA/US@EPA
Date: 02/18/2009 02:04 PM
Subject: CHLORAMINE FOIA
   Fw: health info on chloramines

----- Forwarded by Thomas Grubbs/DC/USEPA/US on 02/18/2009 02:03 PM -----

Mike Barsotti <mikeb@cwd-h2o.org>

Mike Barsotti
<mikeb@cwd-h2o.org>
09/26/2006 02:33 PM

To Thomas Grubbs/DC/USEPA/US@EPA
cc Jim Fay <jimf@cwd-h2o.org>, Dick Pratt <dickp@cwd-h2o.org>
Subject RE: health info on chloramines
Tom, In my ongoing research concerning monochloramines, the following quote came up: "...Furthermore, over a period of a day or so, without any modification of pH or Cl:N ratio, monochloramine will degrade slowly to dichloramine to a ratio of 43 percent NH2Cl to 57% NHCl2...

This is on p. 6-2 of the Alternative Disinfectants and Oxidants Guidance Manual, USEPA, Office of Water, EPA-815-R-99-014, 1999.

While there is a two-page list of references after this particular chapter on chloramines, there is no indication where this particular factoid came from.

This quote seems to go against the other literature I have examined which indicates that very small and extremely unstable/short-lived concentrations of dichloramine form over time as chloraminated water decays in a distribution system. Is there anyway that EPA can support or discredit, or indicate the source of this quote from the guidance manual?

By the way, activist groups, are using this quote to discredit chloramines disinfection. Thanks, Mike

-----Original Message-----
From: Grubbs.Thomas@epamail.epa.gov [mailto:Grubbs.Thomas@epamail.epa.gov]
Sent: Thursday, July 13, 2006 2:35 PM
To: Mike Barsotti
Subject: Fw: health info on chloramines

Mike - From my newlywed colleague Rose.

Tom
Tom Grubbs, PE
Environmental Engineer
Office of Ground Water and Drinking Water
202-564-5262
----- Forwarded by Thomas Grubbs/DC/USBPA/US on 07/13/2006 02:32 PM
-----

Tom,

Here is some health effect info on chloramines...

The San Francisco Dept of Health recently followed up on some complaints after treatment switch to chloramines. They did not find any relationship between the skin problems reported with the chloramine treatment in their survey study.
http://www.ehjournal.net/content/5/1/18

Here are three epidemiology studies that look at water that has been chloraminated:


Royle Kyprianou (Heil)
Office of Water/Ground Water and Drinking Water Standards and Risk Management Division
Phone: (202)-564-6325
Fax: (202)-564-3767
Office: 2209Q, Mail code: 4607M

------ Forwarded by Thomas Grubbs/DC/USEPA/US on 02/18/2009 02:07 PM ------

health info on chloramines

Rose Heit to: Thomas Grubbs

07/07/2006 01:56 PM

Tom,

Here is some health effect info on chloramines...

The San Francisco Dept of Health recently followed up on some complaints after treatment switch to chloramines. They did not find any relationship between the skin problems reported with the chloramine treatment in their survey study. http://www.ehjournal.net/content/5/1/18

Here are three epidemiology studies that look at water that has been chloraminated:


Rose Kyprianou (Heil)
Office of Water/Ground Water and Drinking Water Standards and Risk Management Division
Phone: (202)-564-6325
Fax: (202)-564-3767
Office: 2209Q, Mail code: 4607M
I'm forwarding an article link for a survey study that June Weintraub (with the City and County of San Francisco Department of Public Health) did in response to the skin and rash complaints that were received in that area. We had previously seen newspaper articles about some of the complaints with respect to chloramine addition. There was also a citizen group that was formed surrounding this issue. The study conclusions were that no relationship is suspected between the skin problems and the switch to chloramines and that they do not suggest any follow up.

weintraub et al. 2006 skin and clm.pdf

Rose (Heil) Kyprianou
Office of Water/Ground Water and Drinking Water
Standards and Risk Management Division
Phone: (202)-564-6325
Fax: (202)-564-3767
Office: 2209Q, Mail code: 4607M
Dear Rose,
FYI:

http://www.ehjournal.net/content/5/1/18

Regards,
June

--------------------------------------
June M. Weintraub, ScD
Epidemiologist, Environmental Health Section
City and County of San Francisco Department of Public Health
1390 Market St, Ste 910
San Francisco CA 94102
phone: 415-252-3973, fax: 415-252-3964
e-mail: June.Weintraub@sfdph.org

----- Forwarded by Jeannie Briskin/DC/USEPA/US on 10/28/2009 10:34 AM -----

From: Thomas Grubbs/DC/USEPA/US
To: Jeannie Briskin/DC/USEPA/US@EPA
Date: 02/18/2009 02:12 PM
Subject: CHLORAMINE FOIA
       Fw: chloramine - dermal, inhalation & ocular effects

----- Forwarded by Thomas Grubbs/DC/USEPA/US on 02/18/2009 02:12 PM -----

Re: Fw: chloramine - dermal, inhalation & ocular effects

Stig Regli to: Rose Kyprianou

Cc: Erik Winchester, Hiba Shukairy, Jane Downing, Karen Mcguire, Kevin Reilly, Lynn
    Gilleland, Maureen McClleland, Thomas Grubbs, Veronica Blette, Yu-Ting Guilaran

We will need to revise this language to make clear that the dermal/inhalation effects occurred at much
higher levels than those found in drinking water. I spoke with Ambika this morning and she agrees that
such a modification would be appropriate.

Stig Regli
mail
OGWDW (4607m), USEPA
1200 Pennsylvania Avenue NW
Washington DC 20460
202-564-5270
regl.stig@epa.gov
physical location
2209P - East Building
1201 Constitution Ave NW
Washington DC 20460
FYI -- please see below. Ambika has compiled a summary of any studies focusing on dermal, inhalation and ocular effects from our current documents. Please consider this internal, it does not provide public context for comparison to levels of chloramines consumed in drinking water. We are also taking steps to update the chloramine criteria document with any new studies and revise the health Q&A accordingly in the interim.
Response to #4

Human health and animal data were considered, as well as other factors for setting the standard for monochloramine. Monochloramine has undergone a complete scientific review and approval process and is summarized in EPA's Criteria Document for Chloramines. EPA also considered the historical use of monochloramine. Large populations have been using monochloramine as a drinking water disinfectant for decades. Monochloramine has also been shown to be an effective disinfectant based on decades of use in the U.S., Canada, and Britain.

EPA continues to research the byproducts formed by monochloramine. To date, this research supports the continuing use of monochloramine. EPA must act to protect health even in the face of uncertainties. Allowing the use of monochloramine, addresses the known risks posed by chlorinated disinfection byproducts.
Hi Stig

I have some comments on the letter that they drafted to commissioner Pelosi.

Commissioner Laura Pelosi/K.doc

Hi Stig
Thanks for the heads up regarding the letter...

03/10/2009 11:29:50 AM

Stig Regli
It looks like we are being given a heads up on w...

03/09/2009 04:01:14 PM
Thanks, Jane. We haven't heard anything along these lines, as yet. By the way, this (The letter from your RA) is a great letter.--Vicky

Victoria P. Binetti
Associate Director for Drinking Water and Source Water Protection (3WP20)
Water Protection Division
U.S. Environmental Protection Agency, Region III

Phone: (215) 814-5757
Fax: (215) 814-2318

and this is the letter that Jane Downing drafted regarding chloramines, I think this is what we were talking about
March 7, 2008

Commissioner Laura Pelosi
Department of Environmental Conservation
103 South Main Street, 1 South
Waterbury, VT 05671-0401

Dear Commissioner Pelosi:

As you know, the United States Environmental Protection Agency (EPA) has been working with your agency and other stakeholders to discuss the use of secondary disinfectants at public water supply systems in Vermont. This topic is important to EPA due to the critical nature of the disinfection barrier in protecting against water-borne microbial contaminants that, in the past, were responsible for epidemics such as cholera and cryptosporidiosis. EPA is also aware that a citizen group has expressed concerns about potential adverse health effects relating to exposure to monochloramines, a secondary disinfectant used to protect water in the distribution system. Recently, we received a copy of draft language introduced by the Vermont Senate Committee on Health and Welfare which proposes a permitting and public process for certain water system operational changes and bans the use of chloramines for two years. This letter provides our perspective on this issue and expresses our concerns about this possible new legislation.

Disinfection is one of the most important public health advances made in the last century. Typhoid and cholera epidemics in the country are no longer a water-borne threat to public health due to requirements for disinfection barriers in public water supply systems. These requirements include the need for a primary disinfectant at the point of treatment to control pathogens, and a secondary disinfectant to maintain a protective residual within the distribution system. Federal drinking water guidance mentions only three forms of secondary disinfection: chlorine, chlorine dioxide, and chloramines. However, the guidance further explains that for chlorine dioxide there are significant limitations on maintaining a residual in the distribution system that make it impractical for use as a secondary disinfectant. The decision of which secondary disinfectant should be used by a given public water supply system is approved by the state, after balancing system-specific advantages and disadvantages of each disinfectant.

While disinfectants are critical in protecting us from water-borne diseases, every disinfectant reacts with naturally-occurring materials found in the source water to form byproducts which may pose health risks. That is why Congress, under the 1996 Safe Drinking Water Act Amendments, required EPA to promulgate regulations which balance the risks between the microbial pathogens and disinfectant byproducts.
To address serious concerns with potential health effects from exposure to chlorine- and chlorine dioxide-generated disinfectant byproducts (DBPs), EPA, based on available information, issued two regulations which reduced the allowable DBP concentrations in drinking water. In particular, DBPs related to chlorine use have been shown to cause cancer and reproductive effects in lab animals and suggested bladder cancer and reproductive effects in humans. These DBPs, called trihalomethanes and haloacetic acids, are designated as potential human carcinogens. Studies conducted on chlorite, a DBP formed by the use of chlorine dioxide, showed adverse reproductive or developmental effects in lab animals. EPA continues to study the occurrence and potential health effects of many other DBPs, including those related to the use of monochloramines, and will issue additional regulations if the data indicate that there is an opportunity for significant public health risk reduction.

Many public water supply systems currently use monochloramines as their secondary disinfectant due to its relative ease of operation, low cost, long lasting protective residual in the distribution system, and the associated reduction in the generation of regulated DBPs which are known to pose a potential threat to public health, including increased cancer risk. Because of its treatment efficacy in maintaining a protective microbial barrier in the distribution system while lowering the concentration of regulated DBPs, monochloramines are widely used in the water sector. In New England, there are 110 public water supply systems that are currently using monochloramines. Across the country, the use of monochloramines dates back almost 90 years and covers hundreds of public water supply systems. With the exception of San Francisco, the Agency has not heard of complaints of skin rashes and other complaints that people believe are due to monochloramine exposure via drinking water, such as those expressed by the Vermont citizen group.

As stated above, EPA will continue to examine any new scientific health effects information and DBP occurrence data regarding monochloramines, as it becomes available. EPA continues to believe that, on balance, the option to use monochloramines represents a feasible and prudent public health protection measure.

The draft language proposes to require any public water supply system to obtain a permit prior to adding a new chemical, altering a point-of-disinfection, or replacing equipment necessary for the application of a disinfection chemical. In addition, the State would need to hold a public hearing before issuing a permit.

On face value, the exchange of a chemical feed pump or a change in the chemical supplier for any routine chemical at any public water supply system may trip the requirement for a permit and a public hearing. Most systems operate on a pay as you go basis, with chemical supplies lasting for only a few weeks. The processes proposed in the draft legislation may have the unintended consequence of delaying the purchase or use of critical chemicals or equipment needed for safe drinking water.

It is particularly important for the State to have the flexibility to require changes to system operations in times of public health threats or other emergencies. For example, a
ground water system may need to immediately activate backup emergency disinfection procedures if the presence of *E. coli* or fecal coliform is detected in tap water. In broader emergencies, such as a pandemic or a flood, chemical deliveries may need to come from mutual aid programs. EPA suggests the State consider the need for provisions which would allow the State and water supplier to deal with real-time public health emergencies.

EPA promulgated the Ground Water Rule which will soon impact more 1200 ground water systems in Vermont. Under these new federal and state requirements, EPA estimates that 72% of these systems currently without disinfection will be required to follow up on monitoring hits of fecal contaminants. Due to the public health risk posed by fecal contaminants in drinking water, these corrective action steps, which may include disinfection, must be timely. EPA suggests that the State examine how to ensure that any proposed permitting and public process would not delay timely actions to address a critical public health threat.

EPA recognizes the importance of timely notification to the State by water utilities regarding changes in disinfection procedures. That is why recent federal drinking water rules, which States must follow, require the following:

"Prior to changing the disinfection practices, a system must notify the State of changes to their disinfection practices such as: changes to the point of disinfection; changes to the disinfectant used in the treatment plant; and changes to the disinfection process."

40CFR§141.78

The above notification was established in case the State would like to require additional disinfection modifications. EPA respectfully suggests that the State use the above disinfection notification procedures and criteria already outlined in the Long Term 2 Enhanced Surface Water Treatment Rule and required of water systems, to avoid a duplicative and confusing process for the water utilities and the public.

It is our understanding that there are about 15 public water supply systems in Vermont that are currently in violation of the Stage 1 Disinfection Byproducts Rule. In addition, the Champlain Water District currently uses monochloramines due to its concerns with elevated disinfection byproducts and its expected noncompliance with new drinking water rules. All of these systems would be significantly impacted if the chloramine ban became effective. It is expected that compliance schedules dealing with the current 15 noncompliant systems will likely be extended while these systems search for other treatment options, some of which may be cost-prohibitive and infeasible. Meanwhile, until a final solution can be put in place, citizens within these service populations may be exposed to elevated DBP levels above recommended allowable levels. If the Champlain Water District, in the short-term, goes back to the use of chlorine as a secondary disinfectant to provide the needed residual microbial protection, then, it is expected that the 68,000 service population would receive drinking water with increased chlorine-generated DBPs. As previously stated, such regulated DBPs have been shown to cause cancer and reproductive effects in lab animals and suggested bladder cancer and reproductive effects in humans.
In view of the Agency’s concerns relating to the potential adverse health effects of exposure to certain DBPs such as trihalomethanes and haloacetic acids, EPA moved ahead with the DBP regulations, including designating chloramines as a best available technology for large consecutive systems. EPA is very concerned that the chloramine ban would take away a prudent and feasible public health option for water utilities and their service populations who are currently exposed to elevated disinfection byproducts in their tap water. While systems are taking the necessary steps to reduce the current regulated DBP levels, EPA will continue to look at all scientific health and occurrence data on all disinfectants, including monochloramines, and will pursue additional regulations if there is an opportunity for significant public health risk reduction.

As you know, in September 2007, EPA staff and representatives from the Center for Disease Control (CDC) met with members of the Vermont People Concerned about Chloramine (PCAC). We heard testimony from a number of individuals about their medical ailments and listened to their concerns about potential adverse health effects related to exposure to chloramines in drinking water. EPA empathizes with these individuals. The CDC trip report did not find a cause of the medical symptoms described during the visit and the ability to design any expanded definitive study is uncertain. EPA acknowledges that there may be sensitive individuals within any community who may react to any number of environmental exposures. We therefore encourage the State to continue to recommend that concerned individuals seek medical consultation.

We look forward to continuing to work closely with you and your staff on this important public health issue. There is a lot at stake for all stakeholders. Please continue to keep us apprised of continuing developments. If you have questions about this letter or anything else concerning this matter, don’t hesitate to call me or have your staff call Jane Downing, Chief of the Drinking Water Branch, at 617-918-1571.

Sincerely,

Robert W. Varney
Regional Administrator

cc. Sharon Moffatt, Commissioner VT DOH
    Gary Schultz, VT DEC
    Ira Leighton, EPA
    Stephen Perkins, EPA