S. HRG. 111–1245

PROTECTING AMERICA'S WATER TREATMENT FACILITIES

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

JULY 28, 2010

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ONE HUNDRED ELEVENTH CONGRESS
SECOND SESSION

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C O N T E N T S

PROTECTING AMERICA'S WATER TREATMENT FACILITIES

WEDNESDAY, JULY 28, 2010

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The full Committee met, pursuant to notice, at 2:40 p.m. in room 406, Dirksen Senate Office Building, Hon. Frank R. Lautenberg (Acting Chairman of the full Committee) presiding.

Present: Senators Lautenberg, Inhofe, Cardin, and Udall.

OPENING STATEMENT OF HON. FRANK R. LAUTENBERG, U.S. SENATOR FROM THE STATE OF NEW JERSEY

Senator LAUTENBERG. Thanks, everyone, for being here to examine the security at our Nation's water treatment facilities.

Five years ago a train crashed in South Carolina, causing a release of chlorine gas that killed 9 people and sent 58 others to hospitals. The fact is, chlorine gas is a deadly substance. And yet it is currently used at about 2,600 drinking water and wastewater treatment plants across the country. That makes these water facilities and the trains carrying chlorine to them attractive targets for terrorists. Yet, current law does not provide adequate regulatory authority or resources for securing water treatment plants and reducing their use of lethal chemicals.

Now this morning the Senate Homeland Security Committee reported out a bill that merely extends existing minimal protections against attacks on chemical facilities, not water facilities. And that leaves it up to this Committee to address what both the EPA and the Department of Homeland Security have called a serious gap in our country's defenses—the lack of protections against an attack on water treatment facilities.

Millions of Americans are at risk because so many drinking and wastewater treatment plants use chlorine gas and other lethal chemicals. In fact, an attack on one or more of the more than 700 facilities would put up to 100,000 people at risk. And based on information compiled by the EPA, just a single attack at one of the 15 highest risk plants could put more than 1 million Americans at risk. And we cannot forget the pilots who trained Mohammed Atta, the kingpin of the September 11th attacks, said that he had shown a keen interest in chemical plants and water reservoirs.

So, we have to do everything possible to keep Americans safe from future terrorist attacks. And that is why I have introduced the Senate Secure Water Facilities Act. This bill would require water treatment plants to assess vulnerability to attack and make

a plan to address these vulnerabilities and develop a system for responding to an emergency. It also requires plants to consider safer ways of doing business and in many circumstances implement those safer alternatives.

Now, we know that many facilities could adopt safer chemicals and processes because more than 500 drinking water and wastewater plants across the country already stopped using deadly substances and dangerous methods. These changes have made more than 40 million Americans safer.

Now, my bill encourages more of our country's water plants to join this effort. But it does not propose a one size fits all approach. It takes into account the situation on the ground at each plant and provides States with flexibility to make the right choices for their specific situations. It zeros in on plants where it is clear that switching to safer chemicals and safer methods is cost effective and completely feasible. And it helps facilities offset the costs of reducing these securities by providing Federal grants.

I first introduced chemical security legislation in 1999, before the September 11th attacks, and once again in 2005 with then-Senator Obama. The legislation that I have introduced this year reflects the principles of President Obama's administration. It has also been endorsed by a diverse array of more than 100 environmental, health, labor, and business groups.

Now, it has been almost 9 years since the September 11th attacks. And if we learned one thing on that fateful day it is this: we dare not become complacent, and we cannot let our guard down.

I look forward today to hearing from our witnesses about the state of security at water treatment facilities and how we can better protect Americans from a future terrorist attack.

Once again, I thank all of you for being here. And I am pleased to introduce, to call on my Ranking Member here, Senator Inhofe, for his opening statement.

OPENING STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Thank you, Mr. Chairman.

Let me clarify something first. I am not blaming anyone, but this hearing is not a hearing on your legislation. Is that correct?

Senator LAUTENBERG. That is true, sir.

Senator INHOFE. OK. That is fine because, you know when I had the notice of the hearing this is supposed to be a general oversight hearing for water security. That sounds good to me.

And I thank you for holding the oversight hearing on the water security and look forward to hearing from our witnesses about the steps that the EPA and the States have been taking since we passed the 2002 Bioterrorism Act. We both remember that well. I know that many of our facilities are much safer as a result of our actions here. But there is still more that can be done. I think we can agree on that.

As I noted in our December drinking water oversight hearing, there is one thing that everyone in this room can agree on, and that is having clean, safe, affordable water is a national priority. My message has always been that chemical security and water security are issues of security, not environmental protection.

Yet whenever we discuss these issues in this Committee, we focus on inherently safer technology, or IST. IST is an environmental and an engineering concept, not a security concept. Environmental activists have been promoting the concept of IST for years because it would allow them to eliminate the use of chemicals that they do not like.

IST dates back more than a decade when Greenpeace and other groups were seeking bans on chlorine, which was the chemical used to purify water that has been hailed by the CDC as one of the greatest public health achievements of the 20th century. Only after 9/11 did environmental groups decide to play upon the fears of the Nation and repackage IST as a panacea to all of our security problems.

I would like to share with you this excellent clarification of IST from Stephen Poorman. He was at the Homeland Security hearing on chemical security in March. And this is a quote from Stephen Poorman. He said " IST is premised on the belief that if a particular chemical process hazard can be reduced, the overall risk associated with that process will also be reduced. It is an elegant concept, but the reality is almost never that simple. A reduction of hazard will reduce overall risk if and only if that hazard is not displaced to another time or location or result in the creation of some new hazard." That was the end of the quote.

I think this is especially important to understand when it comes to water security. Both Homeland Security and the Government Affairs Committee and the EPW have heard again and again from multiple security and chemical experts that IST should not be federally mandated. And I encourage my colleagues to revisit these hearings, including the one that was on June 21, 2006, that was focused entirely on the effectiveness of IST.

I was pleased to see the Homeland Security Committee approve the reauthorization of the current CFATS Program without mandatory IST. Their willingness to find compromise and a bipartisan path for it is something I hope we can emulate in this Committee, such as we did with Senator Cardin's bill just last week.

The current security bill before this Committee, S. 3598, takes a vastly different, more controversial approach. I hope that we will take time and work in a bipartisan way to find a path forward on water security that would gain support from security experts and water utilities, not just environmental groups and unions, and have a chance of making a real difference in securing water facilities.

Senator Lautenberg, I know our staffs have been working together on other legislation. I hope we can do the same as we move down this path. No matter what we do, security for water facilities must focus first on ensuring that utilities can effectively meet the many requirements of the Safe Drinking Water Act and the Clean Water Act and protect the health and the environment.

The individual utilities know their water best, and by mandating IST the Federal Government would make it impossible for facilities to decide for themselves what the best course of action is to meet the health and environmental mandates of the Safe Drinking Water Act and the Clean Water Act. Nobody cares more about the security of their communities than the people who live there. We

need to empower them to make the best decisions, not assume—as we often do around here—that Washington knows best.

Finally, I know, Mr. Chairman, that you share my desire to get S. 1005, the Water Infrastructure Financing Act, to the floor. I still believe that the most effective way to improve our Nation's water facilities is by reauthorizing the State Revolving Loan Fund Programs, both drinking water and wastewater. We cannot expect our communities to continue to provide safe and clean water if they do not have the resources to meet those needs.

I have three documents I want to enter as a part of the record. They would be a letter from the Association of Metropolitan Water Agencies, a second letter from the American Water Works Association, then a letter from 25 different organizations expressing opposition to federally mandated IST. I ask unanimous consent these be made a part of the record.

Senator LAUTENBERG. Without objection. Certainly.

[The referenced information follows:]

July 27, 2010

The Honorable Barbara Boxer
Chairman
The Honorable James Inhofe
Ranking Member
Committee on Environment and Public Works
United States Senate
Washington, D.C. 20510

RE: Hearing on "Protecting America's Water Treatment Facilities"

Dear Chairman Boxer and Ranking Member Inhofe,

As the Environment and Public Works Committee holds an important hearing on the security of the nation's drinking water and wastewater facilities, the Association of Metropolitan Water Agencies (AMWA) believes it is important for the Committee to understand the factors that drinking water systems must consider when selecting chemicals to use during the water disinfection process. The Association would also like to offer some thoughts on S. 3598, the "Secure Water Facilities Act."

As part of the drinking water treatment process, EPA regulations require water utilities to use chlorine (often in the form of liquefied gas or sodium hypochlorite) to kill harmful bacteria and viruses. When deciding which form of chlorine to use, individual utilities must consider not only how to best protect the communities they serve from manmade threats, but also climate, plant location, cost, ambient water quality, available technology, safety, and compliance with the Safe Drinking Water Act (SDWA). Because of these multiple factors, any suggestion that all drinking water utilities could properly disinfect their water supplies with a particular form of chlorine is simply false.

Nevertheless, many water systems currently use processes that may meet one's definition of a so-called "inherently safer technology" ("IST"). According to an informal survey of large drinking water utilities conducted by AMWA in 2008, about sixty-five percent of survey respondents had considered adopting an alternate disinfectant to gaseous chlorine within the previous five years, and about forty-six percent actually began using an alternate at one or more water treatment facilities. This clearly shows that drinking water systems are willing to implement "ISTs" when they are able to do so without compromising public health or safety.

However, not all water systems can adopt "IST." For example, in 2008 an official from a drinking water utility in California testified before the House Energy and Commerce Committee that, if his utility were to replace gaseous chlorine with sodium hypochlorite as its primary disinfectant, it would require seventy separate five-thousand gallon shipments of sodium hypochlorite each week. Similarly, the

utility would have to hold the equivalent of 280 of these five-thousand gallon tanks on-site at the water treatment facility to maintain a 30-day backup supply necessary to continue water disinfection in the event of a supply chain disruption. The utility testified that the risks inherent with coordinating these shipments through local neighborhoods, protecting dozens of trucks against sabotage or attack, and ensuring that sodium hypochlorite supplies were used before their quality degraded outweighed the benefits of replacing gaseous chlorine. So while drinking water systems frequently consider "IST," Congress should not believe it is a panacea that is feasible or advisable for every water system in every situation.

Water Security Legislative Background

As you know, following the 9/11 terrorist attacks Congress passed the Public Health Protection and Bioterrorism Preparedness and Response Act of 2002. This law added a new Section 1433 to SDWA, which required all drinking water utilities serving more than 3,300 people to prepare vulnerability assessments and emergency response plans to identify weaknesses in their security posture and prepare for security-related incidents. EPA officials have testified before Congress that all of the nation's largest drinking water systems have successfully complied with this requirement.

In 2006, in light of these existing security requirements, subsequent unilateral measures taken by drinking water utilities (such as security enhancements, increased training, and chemical reduction and substitution when feasible), and the inherent differences between water systems and chemical facilities, Congress exempted the water sector from duplicative regulation through the DHS Chemical Facility Anti-Terrorism Standards (CFATS) program. Today, however, the Obama Administration believes that this exemption represents a regulatory "security gap" for the water sector, and has encouraged Congress to streamline a new EPA-based water and wastewater security program with the requirements of CFATS.

As the Senate made plans to proceed with water security legislation, AMWA was pleased to have the opportunity to work with Sen. Frank Lautenberg as he formulated S. 3598. As introduced, the bill is similar to Titles II and III of H.R. 2868, chemical and water facility security legislation that the House of Representatives approved last year. Importantly, S. 3598 includes no statutory requirement that a water utility implement an "IST" if any state or federal entity finds it to be feasible.

However, unlike the process of formulating H.R. 2868 in the House – where the Energy and Commerce Committee had an opportunity to reshape CFATS legislation first approved by the Homeland Security Committee to meet the needs of the water sector – S. 3598 was introduced before the Senate Homeland Security and Governmental Affairs Committee approved a bill to define the scope of new CFATS regulations. In fact, the Senate Homeland Security Committee is scheduled to meet to markup CFATS legislation on the same day as the Environment and Public Works Committee's hearing on water security. Therefore, until there is an opportunity to carefully review any legislation approved by that panel it will remain unclear whether Sen. Lautenberg's bill represents an accurate reflection of the new CFATS rules that the full Senate may consider, or a measure that would impose much more onerous security regulations on public water and wastewater systems than might be placed on private chemical manufacturers – thereby failing to achieve the Administration's goal of reasonably streamlining the physical security requirements that apply to water, wastewater, and chemical facilities. Moreover, the fiscal year 2011 Homeland Security appropriations bill approved just two weeks ago by the Homeland Security Appropriations Subcommittee included a one-year extension of the current CFATS – further inviting confusion as to which security framework the water and wastewater security legislation should seek to replicate.

For this reason, AMWA believes that it is premature for the Environment and Public Works Committee to consider water and wastewater facility security legislation before it has had an opportunity to analyze any final CFATS reauthorization bill approved by the Senate Homeland Security Committee. Similarly, until we fully understand what CFATS legislation is approved by the Homeland Security Committee, AMWA will take no position on S. 3598.

Nevertheless, in addition to preserving the ability of local water system experts to choose the most appropriate water disinfection method, AMWA has several other suggestions that it hopes the Committee will consider in shaping water security legislation:

Sensitive Information Protection

The Committee must continue the protection of utility vulnerability assessments against public disclosure under the Freedom of Information Act or similar state or local laws. Currently, Section 1433 of SDWA bars this disclosure and allows judges to impose a criminal penalty of up to one year in prison and a fine of $100,000 against individuals found to have unlawfully shared this sensitive information. These protections are critical because any information leak that puts a utility's security plans in the public domain would provide terrorists and criminals with a step-by-step guide of how to compromise a utility's security measures. Such an outcome could put millions of community residents at permanent risk, so it is crucial that Congress maintains these protections and penalties going forward.

Moreover, while S. 3598 would require EPA to conduct a rulemaking process to facilitate the sharing of some security information with outside groups such as first responders, the bill must not tie EPA's hands with preconditions that grant certain groups a statutory right to posses their own copies of sensitive utility security documents. Such entitlements would be inconsistent with our shared goal of ensuring the strongest protections for this sensitive information, and should be rejected by this Committee.

Avoiding Unreasonable Regulatory Burdens

Water security legislation must not require utilities to begin security planning from scratch when they already have robust security reviews and procedures in place. For example, any requirement that directs water systems to periodically update vulnerability assessments should make clear that utilities may follow recognized industry guidelines when completing this task. The water industry has developed widely used tools for the completion of VAs since enactment of the Bioterrorism Act in 2002, so new legislation should allow water systems to use these well-vetted processes when assessing their risks.

The new water legislation should also extend to water systems important legal protections that Congress may provide to chemical facilities as part of a new CFATS. For example, H.R. 2868 as passed by the House would prohibit individual citizens or organizations from suing chemical facilities for alleged non-compliance with requirements of the CFATS regulations. Instead, the bill included "citizen petition" provisions directing DHS to establish a process through which individuals can report alleged CFATS violations to the Department for investigation. Unfortunately, the House bill did not extend similar protections to water and wastewater facilities, resulting in an irrational situation where individuals may file lawsuits intended to influence chemical selection at public water systems, but not at private chemical facilities.

S. 3598 duplicates this mistake, which could be easily solved by specifying that existing citizen suit provisions in SDWA do not apply to a utility's choice of disinfectant chemicals. This would maintain the ability of

individuals to file suit against water systems that are out of compliance with a drinking water contaminant standard, consistent with the original intent of SDWA, but would not allow virtually unlimited lawsuits against any water utility that does not choose to implement an "IST." AMWA would be happy to work with the Committee to develop language that meets these objectives.

Finally, as approved by the House H.R. 2868 would require EPA to place water systems in one of four risk-based tiers, with facilities in higher tiers required to meet more strict security standards. EPA would tier facilities based on the potential consequences of an attack on the water facility or contamination of the water supply. Under these criteria, water systems that serve large populations (and therefore may hold larger amounts of treatment chemicals) would likely be assigned to higher-risk tiers, because of the more significant potential consequences of an attack. But these same large systems could possibly be reassigned to lower-risk tiers if they begin to use less hazardous chemicals that would result in fewer off-site consequences in the event of an incident.

However, S. 3598 as introduced eliminates this incentive for large water systems to use less hazardous chemicals because it requires EPA to take into account both the size of the population served by the water system and the treatment facility's proximity to population centers when initially assigning systems to a tier. A likely result is that, at a minimum, more than 400 drinking water systems across the country classified by EPA as "very large" (each serving more than 100,000 people) will automatically be defined as high-risk, no matter which disinfectant chemicals they use or what other security measures they have put in place. Moreover, a significant portion of the nation's nearly 4,000 drinking water systems serving between 10,000 and 100,000 people could also be pulled into the high-risk tier. This would further reduce the incentive for many water systems to take steps to be assigned to a lower tier and increase the workload of EPA and primacy state agencies that must ensure compliance with elevated requirements of the highest tiers. Again, AMWA would be happy to work with the Committee to solve this problem at the appropriate time.

Working Together for Practical Water Facility Security

I want to reiterate that AMWA's willingness to cooperate with the Committee to close the so-called "security gap" that the Administration believes is present in the regulation of water and wastewater systems. But this gap can only be closed with the full knowledge of the updated CFATS legislation that the Senate may consider for private chemical facilities. When the contents of this bill are clear, I hope we can all agree on a path forward that allows local water system experts to make drinking water disinfection decisions on a localized, case-by-case basis to most effectively protect public health.

Sincerely,

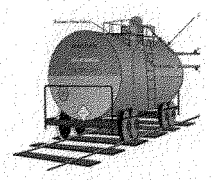
Diane VanDe Hei
Executive Director

cc: Environment and Public Works Committee Members

Drinking Water Treatment Chlorine Equivalents

One Week's Chlorine Needs for a Large Treatment Plant

Current Practice: Chlorine Gas



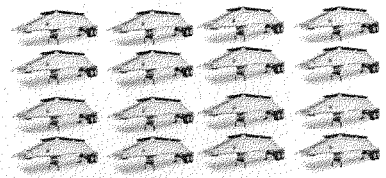
One 90-ton railcar

Alternatives presented for one week's chlorine supply for a large water treatment plant operating at 615 million gallons per day under typical conditions.

Alternative: Delivered Bleach (5.25%)

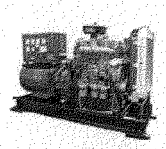
Seventy 5,000 gallon trailers

Alternative: On-Site Generated Bleach



Sixteen 20-ton salt trailers

2.7 million gal. softened water



2.4 megawatts electricity

24,000 gallons diesel fuel

Attachment to Congressional testimony of Metropolitan Water District of Southern California/Association of Metropolitan Water Agencies

American Water Works Association

The Authoritative Resource on Safe Water SM

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July 28, 2010

The Honorable Barbara Boxer
Chair
The Honorable James M. Inhofe
Ranking Member
Committee on Environment and Public Works
The Honorable Frank R. Lautenberg
Chair, Subcommittee on Superfund, Toxics and Environmental Health
U.S. Senate
Washington, D.C.

Dear Chairs and Ranking Member,

As the Senate Committee on Environment and Public Works addresses the issue of chemical security at our nation's drinking water utilities, the American Water Works Association (AWWA) would like to thank you for meeting with us in the development of this legislation, and to share our thoughts about ways in which the bill could be even further improved. We would appreciate this letter being included in the Committee's hearing record on this bill.

AWWA agrees that performing vulnerability assessments and updating them regularly is a critical component of water security. In that light, we have partnered with the American Society of Mechanical Engineers to develop a standard for vulnerability assessments for water utilities that received approval this summer from the American National Standards Institute. Copies of this standard have been provided to Senate staff.

We urge the committee, in considering chemical facility security legislation, to consider water utilities that use this standard, called ANSI/ASME-ITI/AWWA J100-10 Risk Analysis and Management for Critical Asset Protection (RAMCAP®) Standard for Risk and Resilience Management of Water and Wastewater Systems, to be in compliance with legal requirements for vulnerability assessments. Utilizing this standard would provide both regulators and the regulated community with clear-cut and sound direction in this aspect of security legislation. State regulators are strapped for resources, and this tool would assist them in that regard. Citation of this standard would also help utilities get an early start on compliance and provide them with clear-cut direction on how to conduct vulnerability assessments.

In the realm of methods to reduce the consequences of an intentional chemical release, we also urge the committee to cite in legislation the use of another tool we have developed, titled,

"Selecting Disinfectants in a Security-Conscious Environment." This tool objectively weighs the risks and benefits from different disinfection techniques, taking into account public health protection and security. Again, this would provide water utilities with early and clear-cut direction on how to assess different chemicals and processes needed to provide safe drinking water to the public, taking in account other public safety needs.

AWWA strongly believes the best approach to the issue of reducing the consequences of an intentional release is to require local officials to make an informed decision concerning disinfectant chemicals and processes after a full analysis. Drinking water utilities tailor their treatment and distribution processes according to regulatory obligations (such as the federal requirement to use chlorine in some form and to achieve certain levels of disinfection), to critical variations in source water characteristics (such as temperatures, pH, pathogens, etc.), and to other local factors (such as delivery options for disinfectant chemicals, the need to maintain reserve supplies in the event of supply interruption, spatial limitations at the plant site, local ambient temperatures that affect the "shelf life" of chemicals and the attendant chemical degradation and breakdown products, etc.). Another issue that may be of concern to the Committee is the "energy profile" of disinfection alternatives. For example, many alternatives require significantly greater electricity inputs, compared to gaseous chlorine, and would thus work contrary to efforts to reduce the utility's carbon footprint. All of these factors and others must be taken into account in selecting disinfectant processes.

Attached is a summary of some case studies we have compiled that describes how some drinking water utilities reached the decision to stay with gaseous chlorine, how some decided to convert to sodium hypochlorite, and how some decided to convert to on-site generated sodium hypochlorite systems.

We want to emphasize that many utilities can change disinfection processes without compromising the safety of the community drinking water supply. Indeed, many have already done so. But where that has been done, it has been done as an informed local decision after careful study and full consideration of many important local factors, such as those identified above. Local officials are in the best position to evaluate these factors and to weigh the risks, feasibility, and full range of consequences associated with the available disinfection processes. So while having the state approve this decision is better than having EPA do it, we think the decision is so dependent on local factors and so critical to water safety, that it is vastly better to require an informed local decision.

We applaud Senator Lautenberg's concern over chemical facility security as shown by his introduction of S.3598 and S.3599. We believe S. 3598, the Secure Water Facilities Act, could be improved in certain aspects:

Sensitive Information Must be Better Protected
Disclosure of sensitive information under S. 3598 would be approximately equivalent to a Class A misdemeanor, meaning those found guilty of such a crime would face not more than one year in prison and a fine up to $10,000. AWWA believes it would be more appropriate to consider such a disclosure as tampering with a water system, consistent with the provisions of 42 USC 300i-1, as amended by the 2002 Bioterrorism Act. This would mean that conviction would result in imprisonment for not more than 10 years and a civil penalty of not more than $1,000,000 for such tampering, or not more than $100,000 for attempting or threatening such actions. This would provide an appropriate level of deterrence to such dangerous disclosures.

Outsider Participation is Not Appropriate
We agree that supervisory and non-supervisory employees should be included in the development of vulnerability assessments and site security plans because of their hands-on, working knowledge of a facility's operation. However, we do not agree with specific inclusion in these processes of employee bargaining agents that may not themselves be employees of the utility. As mentioned earlier, very sensitive information is involved. Therefore, access to this information must be restricted to as few people as necessary, and only to those for whom there is a direct "need to know." Many entities, including AWWA, have significant expertise, tools and guidance in the area of security and preparedness, and make these accessible to utilities and their employees. However, we do not seek – and cannot support provisions – to mandate the participation of specific types of organizations and/or their representatives from outside the utility itself. If employee safety is a concern with regard to this issue, we note that water utilities already must comply with extensive regulations for employee safety and training under the Occupational Safety and Health Act and the Clean Air Act.

We thank the Committee for the opportunity to comment and we offer the expertise of our membership as the Committee's work continues. AWWA is an international non-profit, scientific and educational society dedicated to the improvement of drinking water quality and supply. Our 56,000 members include more than 4,600 utilities that supply roughly 80 percent of the American people with safe drinking water. Many of our utility members also provide sewer and sanitation services.

Sincerely,

Tom Curtis
Deputy Executive Director for Government Affairs

Disinfection Selection Case Studies Summary

Decision Drivers for Selection of Disinfection Methods

Drinking water utilities across the United State are evaluating their choices of disinfectants in light of contemporary security concerns and water quality management requirements. Some have decided to change the disinfectant or disinfection treatment method, but for many utilities, gaseous chlorine remains the only viable disinfection that provides sufficient public health protection.

AWWA collected disinfection selection case study information from the following six water utilities:

- Austin Water Utility, Austin, TX
- City of Boulder, CO
- Greater Cincinnati Water Works (GCWW), Cincinnati, OH
- Denver Water, Denver, CO
- Phoenix Water Services Division, Phoenix, AZ
- Santa Clara Valley Water District, San Jose, CA

Figure 1 shows the map of the United States with the geographical locations of all the case study utilities identified. As can be seen from the map, the case study utilities include representatives from a broad range of geographical regions.

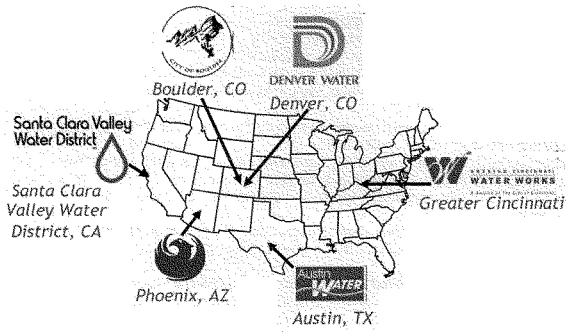
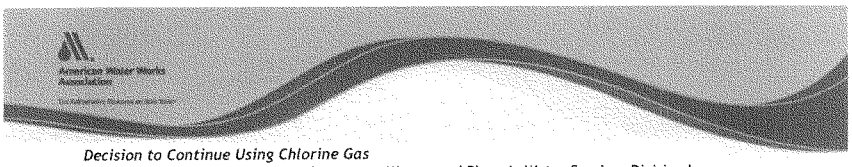


Figure 1: Map of the United States with the Case Study Utilities Identified



Decision to Continue Using Chlorine Gas

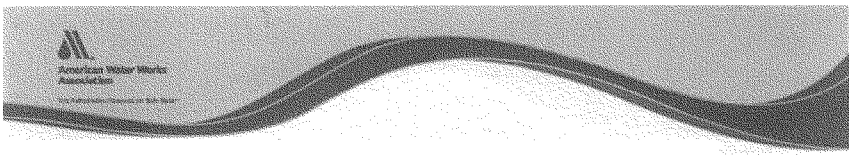
- Greater Cincinnati Water Works, Denver Water, and Phoenix Water Services Division have decided to continue using chlorine gas at their water treatment plants
- The common decision drivers for maintaining chlorine gas disinfection for all of these utilities included:
  - There are fewer water quality concerns when using chlorine gas disinfection compared to using hypochlorite-based methods, namely the stability of the disinfectant and formation of degradates such as perchlorate, chlorite, bromate etc.
  - Significantly lower life-cycle costs of chlorine gas systems over other disinfection methods
  - Higher system reliability of chlorine gas systems
  - Ease of operations and maintenance of chlorine gas systems
  - Utility personnel experience and familiarity with chlorine gas systems
- Phoenix plans to implement double containment of both 150-lb and 1-ton chlorine gas cylinders at all facilities in order to minimize the risk of chemical exposure to the public
- Denver has decided to delay chlorine infrastructure projects in the short term in order to better understand the development of new Federal and State regulations related to chemical security and the corresponding impacts at their water treatment plants

Decision to Convert to Bulk Sodium Hypochlorite

- The City of Boulder and Santa Clara Valley Water District have converted to bulk sodium hypochlorite at their water treatment plants
- The decision drivers for conversion to bulk sodium hypochlorite for the City of Boulder included:
  - Risk reduction compared to chlorine gas systems
  - Better system reliability compared to OSG systems
  - Less operational complexity compared to OSG systems
  - Lower initial capital costs, but similar life cycle costs compared to OSG systems
- The decision drivers for the conversion to bulk sodium hypochlorite for Santa Clara Valley Water District were:
  - Significant improvements were needed to the pre-existing chlorine gas systems for compliance with the Toxic Gas Ordinance
  - Construction costs for the chlorine gas system improvements were higher than construction costs of new bulk sodium hypochlorite systems
  - Lower safety risks, environmental issues, and political issues associated with bulk sodium hypochlorite
  - Bulk sodium hypochlorite allows simpler operational training requirements, reliability of chemical supply and less vulnerability to interruption

Decision to Convert to On-site Generated (OSG) Sodium Hypochlorite Systems

- Austin Water Utility has decided to implement OSG at their future planned WTP, and convert their existing WTPs from chlorine gas to OSG in future
- The decision drivers for the implementation of OSG for Austin Water Utility included:
  - Low risk of OSG systems
  - Public perception
  - Environmental sensitivity
  - Chemical cost stability of NSF solar salt
  - Costs associated with maintenance of scrubber equipment for chlorine gas, and costs associated with testing and certifying chlorine gas bulk storage tanks



Background

The Department of Homeland Security implemented the Chemical Facility Anti-Terrorism Standards (CFATS) in April, 2007. The law established a federal security program for facilities manufacturing, using, or storing potentially hazardous chemicals, including chlorine gas. Drinking water and wastewater utilities are currently exempt from this law, but a revision and extension of the broader chemical security program may end that exception.

American Water Works Association (AWWA) strongly believes that the choice of chemicals or processes for disinfection at water utilities should remain a local decision because the choice of disinfectants is based on local water chemistry, local environmental factors, targeted pathogens, plant worker safety, and similar factors. In 2009, AWWA published a Water Industry Technical Action Fund (WITAF) report entitled "Selecting Disinfectants in a Security-Conscious Environment" to help utilities make appropriate disinfection choices.

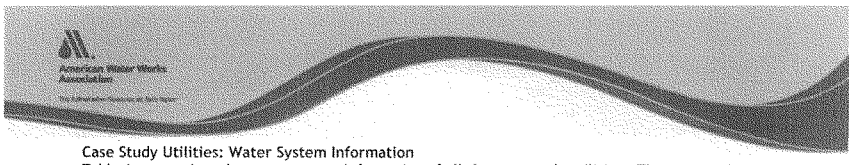
The objective of the current project is to develop case studies documenting water utilities' processes and outcomes for selecting disinfection processes. These case study summaries illustrate the unique, site-specific considerations that underlie achieving the goals and meeting the disinfection needs of each water system.

Case Study Overview

A concise yet comprehensive questionnaire was prepared for collecting relevant and consistent information from the participating case study drinking water utilities. The questionnaire was developed following the examples in AWWA's "Selecting Disinfectants in a Security-Conscious Environment" report, and had a broad but flexible framework to capture the nuances of each utility's disinfection selection process.

A list of water utilities for case studies was developed representing an appropriate cross-section of the water utility community by geographic location, size, and disinfection selection (e.g. gas chlorine versus bulk hypochlorite versus on-site generated hypochlorite). Appropriate decision makers at each of the selected utilities were contacted and information was collected for the completion of the questionnaires.

The information collected from each of the water utilities through the questionnaire has been distilled into the following 2-3 page summaries. In the preparation of the summaries, effort was made to present similar level of detail across all the case studies in documenting the key decision drivers that led to the selection of the disinfection method.



Case Study Utilities: Water System Information

Table 1 summarizes the water system information of all the case study utilities. The case study included drinking water utilities ranging in size from Boulder, Colorado, serving a population of 113,000, to very large water whole-sellers, such as Santa Clara Valley Water District, serving a population of 1.8 Million people. Some of the case study utilities use surface water as source water, while some others use both surface water and ground water. In addition to disinfection within distribution systems, two utilities (Cincinnati and Phoenix) disinfect water at various distribution system locations.

Water System Information	
Populations Served (Range)	110,000 to 1,800,000
Source Waters	
Surface Water Only	Four (Austin, Boulder, Denver, and Santa Clara)
Groundwater Only	None
Surface Water + Groundwater	Two (Cincinnati, Phoenix)
Water Treatment Plants (WTPs)	
Surface Water Treatment	All
Groundwater Treatment	Two (Cincinnati, Phoenix)
Remote Disinfection Facilities	Two (Cincinnati, Phoenix)

Case Study Utilities: Disinfection Methods

The case study utilities were selected such that they included representatives using all different forms of chlorine disinfection methods - chlorine gas, bulk sodium hypochlorite, on-site generated sodium hypochlorite (OSG), and calcium hypochlorite tablet feeder. Table 2 summarizes the disinfection methods used by case study utilities at both their water treatment plants as well as remote disinfection facilities.

Disinfection Practices of Case Study Utilities				
	Current Disinfection Method			
Utility Name	Chlorine Gas	Bulk Sodium Hypochlorite	On-site Generated Sodium Hypochlorite (OSG)	Calcium Hypochlorite
Austin Water Utility	x		X (planned)	
City of Boulder		x		
Greater Cincinnati Water Works	x	x		
Denver Water	x			
Phoenix Water Services Division	x	x	x	x
Santa Clara Valley Water District		x		

July 28, 2010

The Honorable Barbara Boxer
Chairman
U.S. Senate Committee on Environment and Public Works
410 Dirksen Senate Office Building
Washington, DC 20510-6175

The Honorable James M. Inhofe
Ranking Member
U.S. Senate Committee on Environment and Public Works
456 Dirksen Senate Office Building
Washington, DC 20510-6175

Re: Opposition to Facility Security Legislation that Includes Inherently Safer Technology (IST) Provisions

Dear Senators Boxer and Inhofe:

As representatives of American agriculture, food processing, energy, forest products, manufacturing, chemistry, medicine, transportation, third party warehousing, building materials and other businesses and local city services that make up our national infrastructure, we write today to express our opposition to any facility security legislation that includes inherently safer technology (IST) provisions.

We caution against adding IST provisions to facility security legislation as debate on the issue continues and believe the federal government should not be making process decisions for chemical facilities. The government does not possess the sufficient expertise to implement such broad direct engineering and business decisions for our nation's diverse chemical facilities. IST provisions may result in simply transferring risk to other points along the supply chain instead of reducing risks as intended, while hampering security in the process. Furthermore, there is no objective manner in which to judge whether one process is inherently safer than another. IST is an engineering philosophy, not a specific technique. Since IST cannot be measured, it is generally not suitable for regulation.

IST mandates will also impose significant financial hardship on businesses across the country that are already facing challenges due to the current economic recession. In addition to the fact that mandated chemical switching may not reduce risk, some estimates indicate that the process changes imposed by such mandates could cost hundreds of millions of dollars per facility. Such additional operating expenses would be too much for many facilities to bear, particularly given the current financial environment, and would likely drive American jobs overseas, or adversely affect the ability of chemical products to downstream users.

Our organizations strongly support reauthorizing the current Chemical Facility Anti-Terrorism Standards (CFATS) without any additional provisions. This program is an important step to keeping our country safe from terrorist attacks. By not adding additional burdensome provisions, such as IST, U.S. Department of Homeland Security (DHS) will have the time it needs to fully implement the current program, which will significantly strengthen our national security without undermining our economy.

Thank you for considering our views on facility security. We stand ready and willing to work with Congress towards the implementation of sound, responsible, effective chemical facility security policy.

Sincerely,

Agricultural Retailers Association

American Coatings Association

American Forest and Paper Association

American Frozen Food Institute

American Gas Association

American Meat Institute

American Petroleum Institute

Association of Oil Pipe Lines

CropLife America

Institute of Makers of Explosives

International Association of Refrigerated Warehouses

International Warehouse Logistics Association

Interstate Natural Gas Association of America

National Agricultural Aviation Association

National Association of Chemical Distributors

National Association of Manufacturers

National Mining Association

National Oilseed Processors Association

National Pest Management Association

National Petrochemical and Refiners Association

Petroleum Equipment Suppliers Association

Petroleum Marketers Association of America

Society of Chemical Manufacturers and Affiliates

The Fertilizer Institute

U.S. Chamber of Commerce

cc: Members of U.S. Senate Committee on Environment and Public Works

Senator INHOFE. Thank you, Mr. Chairman.
[The prepared statement of Senator Inhofe follows:]

STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA

Thank you, Mr. Chairman, for holding this oversight hearing on water security. I look forward to hearing from our witnesses about the steps that EPA and the States have taken since we passed the 2002 Bioterrorism Act. I know that many of our facilities are much safer as a result of our actions here, but there is still more that can be done. As I noted in our December drinking water oversight hearing, there is one thing that everyone in this room can agree on—that having clean, safe, affordable water is a national priority.

My message has always been that chemical security and water security are issues of security, not environmental protection. Yet whenever we discuss these issues in this Committee we focus on "inherently safer technology," or IST. IST is an environmental and engineering concept, not a security concept. Environmental activists have been promoting the concept of IST for years because it would allow them to eliminate the use of chemicals they don't like. IST dates back more than a decade to when Greenpeace and other groups were seeking bans on chlorine—the chemical used to purify water that has been hailed by the CDC as one of the greatest public health achievements of the 20th century. Only after 9/11 did environmental groups decide to play upon the fears of the Nation and repackage IST as a panacea to all of our security problems.

I would like to share with you this excellent clarification of IST from Stephen Poorman at the Homeland Security hearing on chemical security in March. "[IST] is premised on the belief that, if a particular chemical process hazard can be reduced, the overall risk associated with that process will also be reduced . . . it is an elegant concept, but the reality is almost never that simple. A reduction in hazard will reduce overall risk if, and only if, that hazard is not displaced to another time or location, or result in the creation of some new hazard." I think this is especially important to understand when it comes to water security.

Both the Homeland Security and Government Affairs Committee and EPW have heard again and again from multiple security and chemical experts that IST should not be federally mandated, and I encourage my colleagues to revisit these hearings including the June 21, 2006, hearing that was focused entirely on the effectiveness of IST.

I was pleased to see the Homeland Security Committee this morning unanimously approve a reauthorization of the current CFATS program without mandatory IST. Their willingness to find compromise and a bipartisan path forward is something I hope we can emulate in this Committee. The current security bill before this Committee, S. 3598, takes a vastly different, more controversial approach. I hope that we will take time and work in a bipartisan way to find a path forward on water security that would gain support from security experts and water utilities, not just environmental groups and unions, and have a chance of making a real difference in securing water facilities. Senator Lautenberg, I know our staffs have worked together on other legislation, and I hope that we can work together to find a path forward here.

No matter what we do, security for water facilities must focus first on ensuring that utilities can effectively meet the many requirements of the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA) and protect the health and the environment. Individual utilities know their water best, and by mandating IST the Federal Government would make it impossible for facilities to decide for themselves what the best course of action is to meet the health and environmental mandates of the SDWA and CWA.

Nobody cares more about the security of their communities than the people who live there. We need to empower them to make the best decisions, not assume Washington knows best.

Finally, I know Chairman Boxer shares my desire to get S. 1005, the "Water Infrastructure Financing Act," on the floor. I still believe the most effective way to improve our Nation's water facilities is by reauthorizing the State Revolving Loan Fund programs, both for drinking and waste water. We cannot expect our communities to continue to provide safe and clean water if they do not have the resources to meet their infrastructure needs.

Senator LAUTENBERG. Thanks very much.
We are joined by Senator Cardin and Senator Udall.

Senator Cardin, take 5 minutes to make your statement.

OPENING STATEMENT OF HON. BENJAMIN L. CARDIN, U.S. SENATOR FROM THE STATE OF MARYLAND

Senator CARDIN. Well, Mr. Chairman, thank you very much for holding this hearing. I think this is an extremely important hearing.

I want to underscore the point that Senator Inhofe made, and that is that we depend upon clean and safe water for our way of life. And we have not paid sufficient attention to the water infrastructure in this Nation.

Now this Committee, on a very bipartisan basis, early this session passed legislation to reauthorize the State Revolving Fund. And I agree with Senator Inhofe that it is critically important that we get the reauthorization done. Many jurisdictions are depending upon the predictability of Federal funding in order to upgrade their water system.

The American Society of Civil Engineers has given America's water infrastructure a D−. So, we start off with an infrastructure that is badly out of date. In my own State of Maryland, I refer to, frequently, the water main breaks that we have had where River Road, not very far from here, turned into a river. And thank goodness no one was killed due to the fast response of the first responders. We have had major water main breaks in Baltimore where we flooded out communities. Dundalk, Maryland, not far from downtown Baltimore, was totally flooded by a water main break.

The point is that our aging infrastructure is beyond its useful life, and we need to give our local governments the tools they need by permanently reauthorizing these Revolving Funds to do that.

Today's hearing is dealing with another very important part of safe water. The House has passed the Chemical and Water Security Act which closed loopholes and provided additional funding to change to safer technologies. I applaud Senator Lautenberg's leadership in this area. He has introduced legislation that would close the loopholes and provide for the ability to change to safer technologies in our water treatment facility plants. And I think that it is extremely important that we consider such legislation.

Let me just point out that in Baltimore the Back River Wastewater Treatment Facility Plant has switched from the chlorine gas, the very dangerous technology, to liquid bleach, relieving nearly 1.5 million people in danger of chlorine gas exposure. The city would like to convert another facility to liquid bleach but does not have the resources to do it.

So, I think we need to work with our local governments, with our water managers, water treatment managers, to come up with a strategy that not only uses safer technologies, that we in Congress close the loopholes but that we work to dramatically improve the water infrastructure so that the reliability of clean and safe water that our constituents depend upon is a reality in this Nation.

Mr. Chairman, with your consent, I will put my entire statement in the record, and I will apologize early to the witnesses. I have a conflict, but I am very much interested in their testimony.

[The prepared statement of Senator Cardin follows:]

STATEMENT OF HON. BENJAMIN L. CARDIN,
U.S. SENATOR FROM THE STATE OF MARYLAND

Mr. Chairman, thank you for holding this hearing.

We rely on clean and safe water every day for our most basic household needs; so do our manufacturers and our farmers, our hospitals and our schools. The water infrastructure that treats and delivers clean drinking water, the infrastructure that carries away and treats our wastewater is critical to our health and to our security. That infrastructure is at a tipping point.

In many places—if not most places—it has long outlived its 50-year life span. The American Society of Civil Engineers has given America's water infrastructure a "D−" in its most recent report.

We have been made painfully aware of this failure in my home State of Maryland. There have been hundreds of water main breaks, large and small, across Maryland over the last year alone.

We've seen River Road in Bethesda turned into a literal river. In October 2009 a thousand basements in Dundalk, Maryland, were under water. On March 6, 2010, thousands more homes and businesses along a major thoroughfare in Baltimore County were left without water.

But the physical condition of the infrastructure is not its only challenge. Both because of the chemicals used to treat our water and because of the importance of this infrastructure to our health, water infrastructure and treatment facilities make inviting targets for terrorists.

There are steps we can take to address this vulnerability. For instance, many treatment works do not need to use such dangerous disinfectant processes and chemicals like chlorine gas. And in fact, since the terrorist attacks in 2001 many treatment plants have switched to safer disinfection alternatives like liquid bleach or ultraviolet light.

In my own State of Maryland dozens of treatment facilities have already converted from chlorine gas to safer alternatives. The Back River Wastewater Treatment Facility in Baltimore, for example, switched to liquid bleach, relieving nearly 1.5 million people from danger of chlorine gas exposure.

The city would like to convert another facility to liquid bleach but is struggling to find the resources to make those changes. That struggle is magnified by the demands of a decaying infrastructure system that requires significant investment to ensure the continued delivery of clean water.

Last year, as Chairman of the Water and Wildlife Subcommittee, I worked with Chairman Boxer and Ranking Members Inhofe and Crapo to introduce the Water Infrastructure Financing Act. That bill would help address the overwhelming needs of our Nation's drinking water and wastewater infrastructure. It significantly increases the authorizations for clean water and drinking water. It would also broaden the types of projects that are eligible for funding to include projects that increase water treatment facility security.

While funding eligibility is important, it is not enough to address the security concerns posed by water treatment facilities. We need better ground rules for when and where such changes are necessary.

When Congress passed the Chemical Security Act in 2006 several classes of facilities—including drinking water and wastewater facilities—were exempted from a chemical facility security program rules and requirements. That exemption is a serious gap in our security and must be fixed.

The Chemical and Water Security Act passed by the House of Representatives last November closed this loophole and provides additional funding to change to safer technologies. The Senate must act to do the same. Senator Lautenberg introduced legislation that would build on the House passed bill. I commend him for his efforts.

We know that an increased investment in infrastructure has benefits beyond the quality of our water and the safety of our communities, additional benefits that are particularly important in these economic times. With investment in water infrastructure we can create thousands of new, desperately needed jobs.

I look forward to hearing from our witnesses today on the scope of the security risks and gaps left by current laws and their ideas on current legislative proposals.

We have a lot of work ahead of us to address this serious issue. I look forward to a healthy and open minded debate and working together to making our water systems and Nation safer.

Senator LAUTENBERG. Thank you very much, Senator Cardin.

Senator Udall.

OPENING STATEMENT OF HON. TOM UDALL, U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator UDALL. Thank you, Mr. Chairman, and I want to echo what Senator Cardin said. This is a very important hearing. I will try to keep my opening statement short and put most of it in the record.

But I do want to comment on the look for safer alternatives. I think that that is very important, and especially when it comes to chlorine gas. It is a very toxic and dangerous chemical. We need to find better ways. And we have; this hearing will raise awareness that safer alternatives to chlorine gas exist, and they may be as effective as treating water and at a reasonable cost.

We have today a witness with us from Albuquerque, New Mexico, Mr. Carlos Perea of MIOX, a fast growing company in Albuquerque. MIOX uses a technology originally developed at Los Alamos National Laboratory to purify water using salt, water, and electric power. Utilities across the country have adopted this technology with great success.

However, many water utilities and their workers and communities are still vulnerable. When we consider legislation to improve security at these facilities, we must ensure that we focus on the root of the problem, the toxic chemicals themselves.

Any legislation should provide a mechanism for utilities to get informed about and consider the adoption of safer alternatives when feasible and affordable. We should not pick winners and losers, but instead create a technology-neutral process that will lead to reduced risk and more security.

I also may not be able to hear all of the witnesses, but I know that Mr. Perea will fully inform the panel. I would ask the Chairman's permission to put my full statement in the record and look forward to hearing from some of the witnesses.

Thank you, Mr. Chairman. Thank you for your leadership and dedication in this area, too, and I know the legislation that you have sponsored in many of these areas.

Thank you very much.

[The prepared statement of Senator Udall was not received at time of print.]

Senator LAUTENBERG. Thank you for being with us, even for this short time.

The record will be kept open so that any questions that you want to submit will be accepted, and we will look for a fast turnaround from those from whom we make an inquiry.

I want to say to Senator Inhofe that we—this oversight hearing is being done to get a better understanding of what the problems are.

Senator INHOFE. And I appreciate that, Mr. Chairman. I only wanted to say that when the notice came out we always predicate the witnesses we have on what we think the subject is going to be. That is why I wanted the clarification that it is not one on your particular legislation. That is good.

Senator LAUTENBERG. All right.

And now we would like to hear from Ms. Cynthia Dougherty, the Director of the Office of Ground Water and Drinking Water at

EPA. In that role she is in charge of EPA's program for securing the Nation's water facilities.

Ms. Dougherty, we welcome you and ask you to begin your testimony. We ask you to try to keep it to 5 minutes so we will have some time for questions.

Thank you.

STATEMENT OF CYNTHIA C. DOUGHERTY, DIRECTOR, OFFICE OF GROUND WATER AND DRINKING WATER, U.S. ENVIRONMENTAL PROTECTION AGENCY

Ms. DOUGHERTY. Thank you.

Good afternoon, Chairman Lautenberg, Ranking Member Inhofe, and Senator Udall. I am Cynthia Dougherty, the Director of the Office of Ground Water and Drinking Water at the U.S. Environmental Protection Agency. I welcome this opportunity to discuss EPA's efforts to promote security and resiliency in the water sector with an emphasis on our role in addressing chemical security.

I understand that this Committee and others in Congress are in the process of considering chemical security legislation. To inform these deliberations the Administration has developed a set of guiding principles.

First, the Administration supports permanent chemical facility authorities. Second, covered facilities that use substances of concern above threshold release levels should be required to assess inherently safer technology. Further, the appropriate regulatory agency should be authorized to require the highest risk facilities to implement IST under certain conditions and circumstances.

Third, the existing security gap for wastewater and drinking water facilities should be closed with EPA having the authority to regulate chemical security at such water facilities while recognizing their essential public health and environmental missions.

The water sector infrastructure is vulnerable to a wide range of threats and hazards. Serious health impacts could result from the introduction of contaminants into a drinking water system. And any denial of drinking water or wastewater services could have a major adverse effect on public health.

The economic impacts of a terrorist attack or natural disaster on drinking water or wastewater utilities could be significant for businesses and infrastructure in a community. Simply put, the loss of water services could undermine the viability of just about any community.

EPA has worked over the last several years to support the water sector in improving security and resiliency, and I am pleased to report that the sector has taken its charge seriously. EPA has been entrusted with important responsibilities for coordinating the protection of the water sector through congressional authorization under the Bioterrorism Act of 2002 and through Homeland Security Presidential Directives.

Promoting the security and preparedness of the Nation's water infrastructure remains a priority for the agency in a post-9/11 and post-Hurricane Katrina world. In working with the water sector we have emphasized a multi-layered approach to security consisting of prevention, detection, response, and recovery so that we can assist

water facilities in avoiding incidents, and should an incident occur, in quickly identifying and recovering from such events.

We have worked closely with the water sector to assess and reduce the risks associated with hazardous chemicals. To this end, EPA and industry associations—often in partnership—have developed tools, training, and technical assistance to help water utilities identify and mitigate those risks. For example, EPA has developed software tools that assist water systems with assessing vulnerabilities, including chemical storage and handling.

In conclusion, over the past several years we have made progress in ensuring the security of our Nation's drinking water and wastewater systems. We have produced a broad array of tools, training, and other assistance that the water sector uses to assess its vulnerabilities, reduce risk, and prepare for emergencies including chemical theft and release.

In developing these tools we have worked effectively with our partners within the sector and reached out to build new relationships beyond the sector to ensure that water utilities can be prepared to prevent, detect, respond to, and recover from intentional incidents and natural disasters.

We look forward to continuing to work with members of the Committee on legislation that ensures the security of drinking water and wastewater facilities while supporting their critical mission for public health and environmental protection.

Thank you again for the opportunity to testify about our role in water security. I would be happy to answer any questions you have.

[The prepared statement of Ms. Dougherty follows:]

TESTIMONY OF
CYNTHIA C. DOUGHERTY
DIRECTOR
OFFICE OF GROUND WATER AND DRINKING WATER
OFFICE OF WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

July 28, 2010

Introduction

Good morning Chairman Boxer, Ranking Member Inhofe, and Members of the Committee. I am Cynthia Dougherty, Director of the Office of Ground Water and Drinking Water at the United States Environmental Protection Agency (EPA). I welcome this opportunity to discuss EPA's efforts to promote security and resiliency in the Water Sector with an emphasis on our role in addressing chemical security.

It is important to note that the Administration has developed a set of guiding principles for the reauthorization of the Chemical Facility Anti-Terrorism Standards (CFATS) program and for addressing the chemical security of our nation's wastewater and drinking water treatment facilities. These principles are:

1. The Administration supports permanent chemical facility security authorities.
2. CFATS reauthorization presents an opportunity to promote the consideration and adoption of inherently safer technologies (IST) among high risk chemical facilities. We look forward to working with this Committee and others on this important matter.

3. CFATS reauthorization also presents an opportunity to close the existing security gap for wastewater and drinking water treatment facilities by addressing the statutory exemption of these facilities from CFATS. The Administration supports closing this gap.

S. 3598, *the Secure Water Facilities Act*, would close this gap. EPA supports the general structure and approach of this bill. In my remarks, I will offer some comments on this bill, as well as how EPA would coordinate with the Department of Homeland Security (DHS) in addressing chemical security at water and wastewater facilities.

EPA has worked over the last several years to support the Water Sector in improving security and resiliency, and I am pleased to report that the sector has taken its charge seriously. EPA has been entrusted with important responsibilities for coordinating the protection of the Water Sector through Congressional authorization under the *Public Health Security and Bioterrorism Preparedness and Response Act of 2002* (the Bioterrorism Act), and through Presidential mandates under Homeland Security Presidential Directives (HSPD) 7, 9 and 10. HSPD 22 (the domestic chemical defense) also applies to water protection.

Promoting the security and preparedness of the Nation's water infrastructure remains a priority of the Agency in a post-9/11 and post-hurricane Katrina world. A loss of water service can seriously jeopardize the public health, economic vitality, and general viability of a community. In working with the Water Sector, we have emphasized a multi-layered approach to security consisting of prevention, detection, response, and recovery so that we can assist water facilities in avoiding incidents and, should an incident occur, in quickly identifying and recovering from such events.

Risks to the Water Sector

Water Sector infrastructure is vulnerable to a range of threats and hazards, including improvised explosive devices, hazardous material releases, chemical, biological, or radiological contamination in drinking water distribution systems, cyber attacks, and natural disasters. The Water Sector is also vulnerable to disruptions to other infrastructure sectors, such as electric power, which can have cascading effects on the water supply as well as wastewater collection and treatment.

Drinking water contamination or the denial of drinking water and wastewater services can have far-reaching negative public health, economic, and psychological impacts. Serious health impacts could result from the introduction of contaminants into a drinking water system, which could pose a public health hazard from ingestion, inhalation, or absorption through the skin. Further, any denial of drinking water or wastewater service could pose significant health effects from the lack of potable water or the inability to treat wastewater. The loss of drinking water also would result in the loss of water for fire fighting purposes. The economic impacts of a terrorist attack or natural disaster on drinking water or wastewater utilities could be significant for businesses and infrastructure in a community or region. Simply put, the loss of water services would undermine the viability of just about any community.

Even if an attempt to contaminate a drinking water utility did not result in fatalities or large numbers of casualties, terrorists still could inflict harm by promoting fear and panic in the impacted community and in concerned communities across the Nation. Restoring public confidence after a contamination event, even with appropriate decontamination, could require significant effort. A prolonged water incident could affect the Federal, State, and local governments' ability to maintain order, deliver minimum essential public services, ensure public heath and safety, and carry out national security missions.

Implementation of Section 1433 of the Safe Drinking Water Act

Existing statutory requirements address chemical security at drinking water systems to a degree. Section 1433 of the Safe Drinking Water Act (added by the Bioterrorism Act of 2002) required each community water system providing drinking water to more than 3,300 persons to conduct a vulnerability assessment, certify its completion, and submit a copy of the assessment to EPA. These vulnerability assessments addressed security at water systems comprehensively, from water collection to treatment and distribution, and they specifically included the use, storage, or handling of chemicals. In addition, Section 1433 required each water system to prepare or revise an emergency response plan that incorporates the findings of the vulnerability assessment and to certify to EPA that the system has completed such a plan.

Since 2003, EPA has received 100% of the vulnerability assessments and emergency response plan certifications from large and medium community water systems serving more than 50,000 people. Over 99% of small community water systems serving between 3,300 and 50,000 people have submitted their vulnerability assessments and emergency response plan certifications. EPA reviewed the vulnerability assessments to ensure compliance with Bioterrorism Act, and where necessary provided technical assistance to individual drinking water systems to bring these systems into compliance. EPA also initiated some enforcement actions against non-compliant systems.

EPA's Role in Chemical Security for Drinking Water and Wastewater Utilities

EPA's current approach for addressing chemical security in the Water Sector involves a long-standing effort to promote the voluntary adoption of countermeasures by water facilities. Before I discuss some of these activities, however, I would like to take a step back to consider the broader implications of chemical security for the Water Sector. It is important for us to acknowledge in this discussion that the primary purpose of drinking water systems is the provision of safe drinking water, while that of wastewater systems is the protection of water bodies. In fact, the effective treatment of drinking water to control

infectious diseases like typhoid and cholera has been hailed by the U.S. Centers for Disease Control and Prevention as one of the greatest public health achievements of the twentieth century.

Therefore, authorizing language should allow for a consideration of this essential public health and environmental mission, particularly with respect to any provision which may require a facility to consider alternative water treatment processes. In other words, chemical security regulations when applied to the Water Sector should enable a reasoned balance of multiple, important factors so that we can achieve the joint policy goals of protecting public health and the environment while enhancing security. Such factors include: efficacy of treatment in meeting public health and environmental requirements, security concerns, reliability of treatment, source water characteristics, feasibility, and operator safety.

Tools and Technical Assistance

EPA has worked closely with the Water Sector to assess and reduce the risks associated with hazardous chemicals. To this end, EPA and industry associations, often in partnership, have developed tools, training and technical assistance to help water utilities identify and mitigate those risks. A few examples of our efforts are as follows:

1. We developed tools that assist water systems with assessing vulnerabilities, including chemical storage and handling. Examples of the tools include:
   - The *Vulnerability Self Assessment Tool (VSAT™)* – a recently updated software package that supports water and wastewater utility vulnerability assessments using a qualitative risk assessment methodology;
   - The *Security Vulnerability Self-Assessment Guide for Small Drinking Water Systems* – a manual specifically designed to help small water systems conduct vulnerability assessments; and

- The *Security Vulnerability Self-Assessment Guide for Very Small (<3,300) Systems*, which assists these systems in assessing their critical components and identifying security measures that should be implemented.

2. As required by the Bioterrorism Act of 2002, EPA created a document to "provide baseline information to community water systems...regarding which kinds of terrorist attacks or other intentional acts are the probable threats to: (A) substantially disrupt the ability of the system to provide a safe and reliable supply of drinking water; or (B) otherwise present significant public health concerns." The baseline threat document addressed vulnerabilities related to the use, transfer and storage of chemicals, including the evaluation of different disinfection options. EPA provided this document to drinking water facilities to assist them in conducting their vulnerability assessments.
3. The National Association of Clean Water Agencies (NACWA) has worked with the Department of Homeland Security (DHS) and EPA to create a Chlorine Gas Decision Tool for Water and Wastewater Utilities. The Tool is designed to provide utilities with a user-friendly, but thorough, means of evaluating alternatives to chlorine gas disinfection.
4. EPA created a series of Security Product Guides that assist water facilities with making enhancements to reduce risks and protect against man-made and naturally occurring events. These guides provide recommendations for improving physical security, such as the use of barriers, placement and security of aboveground equipment, selection of fencing materials, and the use of visual surveillance monitoring systems, all of which can help to secure hazardous chemicals used by water facilities.
5. EPA funded a cooperative agreement with the American Society of Civil Engineers, the American Water Works Association, and the Water Environmental Federation to develop Voluntary Physical

Security Standards for drinking water and wastewater systems. Completed in December 2006, these voluntary standards address storage of hazardous or toxic chemicals, including chlorine and ammonia gas.

6. Together with the National Oceanic and Atmospheric Administration, EPA developed ALOHA (Aerial Locations of Hazardous Atmospheres) and RMP*Comp – software tools that many water utilities and other facilities use to model the dispersion of hazardous substances. DHS uses RMP*Comp in its Chemical Facilities Anti-Terrorism Standards (CFATS) program.

Risk Management Plans

In addition to the above activities, EPA's Chemical Accident Prevention Provisions (40 CFR 68.1 - .220), developed under the authority of the Clean Air Act, Section 112(r), require utility processes containing certain levels of specific hazardous substances to implement an accident prevention program, conduct a hazard assessment, prepare and implement an emergency response plan, and submit to EPA a summary report known as a risk management plan (RMP). The RMP must describe the facility's accidental release prevention and emergency response policies, the regulated substances handled at the facility, the worst-case release scenario(s) and alternative release scenario(s), the 5-year accident history of the facility, the Emergency Response Plan, and planned changes to improve safety at the facility (see 40 CFR Part 68). Hazardous chemicals of most relevance to the Water Sector, including gaseous chlorine, ammonia, sulfur dioxide, and chlorine dioxide, trigger RMP regulatory requirements if they exceed certain threshold quantities.

Secure Water Facilities Act

While the focus of my discussion will be on the chemical security provisions of the bill, it is important to underscore that the bill also addresses water security risks in general. The bill, for example, requires all drinking water facilities serving over 3,300 people and all wastewater facilities with a design capacity of more than 2.5 million gallons per day to update their vulnerability assessments and emergency response plans at least once every five years. Under the bill, these assessments and plans are not limited to chemical security, but cover the full array of potential water system vulnerabilities, from pipes and constructed conveyances to storage facilities and electronic systems. As such, the bill provides statutory authority for EPA to continue to promote the risk reduction goals of the 2002 Bioterrorism Act.

Considerations on the Bill

As we have stated to Congress before, we believe that there is a critical gap in the U.S. chemical security regulatory framework—namely, the exemption of drinking water and wastewater treatment facilities. We need to work with Congress to close this gap in order to secure substances of concern at these facilities and to protect the communities they serve. Drinking water and wastewater treatment facilities that meet CFATS thresholds for chemicals of interest should be regulated. We do, however, recognize the unique public health and environmental requirements and responsibilities of such facilities. For example, we understand that a "cease operations" order that might be appropriate for another facility under CFATS would have significant public health and environmental consequences when applied to a water facility.

The Administration has established the following policy principles in regards to regulating security at water sector facilities:

- EPA should be the lead agency for chemical security for both drinking water and wastewater systems, with DHS supporting EPA's efforts.
- To address chemical security in the water sector, EPA would utilize, with modifications as appropriate given statutory requirements and the uniqueness of the sector, DHS' existing risk assessment tools and performance standards for chemical facilities.
- DHS should be responsible for ensuring consistency of high-risk chemical facility security across all 18 critical infrastructure sectors.

The Administration supports, where possible, using safer technology, such as less toxic chemicals, to enhance the security of the nation's high-risk chemical facilities. However, we must recognize that risk management requires balancing threat, vulnerabilities, and consequences with the cost to mitigate risk. Similarly, the potential public health and environmental consequences of alternative chemicals must be considered with respect to the use of safer technology. In this context, the Administration has established the following policy principles in regards to IST at high-risk chemical facilities:

- The Administration supports consistency of IST approaches for facilities regardless of sector.
- The Administration believes that all high-risk chemical facilities, Tiers 1-4, should assess IST methods and report the assessment in the facilities' site security plans. Further, the appropriate regulatory entity should have the authority to require facilities posing the highest degree of risk (Tiers 1 and 2) to implement IST method(s) if such methods enhance overall security, are feasible, and, in the case of water sector facilities, consider public health and environmental requirements.
- For Tier 3 and 4 facilities, the appropriate regulatory entity should review the IST assessment contained in the site security plan. The entity should be authorized to provide recommendations on implementing IST, but it would not require facilities to implement the IST methods.

- The Administration believes that flexibility and staggered implementation would be required in implementing this new IST policy. DHS, in coordination with EPA, would develop an IST implementation plan for timing and phase-in at water facilities designated as high-risk chemical facilities. DHS would develop an IST implementation plan for high-risk chemical facilities in all other applicable sectors.

In addition to articulating these principles, I also would like to comment on several aspects of the bill that have significant relevance to its successful implementation. The first issue pertains to resources. Passage of the bill would impose new resource demands on both EPA and most of the states.

The second comment concerns the division of regulatory labor between EPA and the states. Consistent with S. 3598, EPA supports authority for the states to implement certain provisions, including a prominent role in IST determinations and auditing/inspections. This approach would leverage long established EPA-state relationships under the drinking water and wastewater programs, as well as the states' expertise and familiarity with individual water facilities.

Finally, the Administration supports maintaining the Department of Homeland Security's current Chemical-terrorism Vulnerability Information (CVI) regime for protecting sensitive information relating to chemical facility security. This regime is similar to, but distinct from, other sensitive but unclassified information protection programs.

CONCLUSION

Over the past several years, we have made progress in strengthening the security of our nation's drinking water and wastewater systems. We have produced a broad array of tools and assistance that the Water Sector is using to assess its vulnerabilities, reduce risk, and prepare for emergencies, including chemical theft and release. In developing these tools, we have worked effectively with our partners within the sector, and also reached out to build new relationships beyond the sector, to ensure that water utilities can be prepared to prevent, detect, respond and recover from intentional incidents and natural disasters.

We look forward to continuing to work with members of the Committee on legislation that strengthens the security of drinking water and wastewater facilities while supporting the critical mission of these facilities for public health protection.

Thank you again for the opportunity to testify about our role in water security. I would be happy to answer any questions you may have.

Hearing titled: "Protecting America's Water Treatment Facilities"
U.S. Senate
Committee on Environment and Public Works
July 28, 2010
Cynthia Dougherty's Responses to
Questions for the Record

Senator James M. Inhofe

1. Nobody cares more about the security of their communities than the people who live there, and nobody knows more about their water than the people who treat it. What is EPA doing to encourage water systems to make security a part of everyday decisions at water facilities?

Promoting the security of the nation's water infrastructure has been an important undertaking of the Agency in a post-September 11 world. Given the largely voluntary basis of the water security program, EPA and the water sector have strived to incorporate security concerns into common industry practices to ensure that security complements other critical activities and is a part of everyday decision making at water facilities. The fact that our notion of security has evolved since 9/11 from an exclusive focus on terrorism to an all-hazards approach has assisted with this integration effort. The 2005 hurricane season, the 2008 floods in the Midwest, and other events speak directly to the need to adopt an all-hazards approach—an approach which promises multiple benefits to utilities. Consequently, most of EPA's and our partners' programs take an all-hazards approach.

In our effort to instill an all-hazards approach within the water sector, EPA, often in partnership with the sector, has undertaken several projects within the water security program. One such priority effort involves defining and disseminating best security practices. A water sector working group in 2008 recommended 10 features which constitute a protective program[1]. EPA has developed numerous tools and nationwide training sessions so that water systems can integrate these features into business-as-usual planning.

As a result of EPA's and our partners' efforts, water system owners and operators have implemented numerous protective enhancements into their standard practices. These enhancements include: (1) improving control of access to utilities; (2) expanding physical barriers against vulnerabilities by installing equipment such as backflow prevention devices in pipes and locks on fire hydrants and manholes; (3) increasing control over access, delivery, and storage of chemicals; and (4) hardening cyber network control systems by installing virus-detection software and firewalls, and in some cases by taking control systems offline.

Water sector utilities have also increased their ability to respond to all hazards by: (1) planning for operator and customer protection against influenza pandemics; (2) establishing mutual aid and assistance through Water and Wastewater Agency Response Networks (WARNs); (3) participating in research and development (R&D) programs to improve protection capabilities; (4) improving outreach to the public health sector; (5) enhancing communications with both

[1] http://cfpub.epa.gov/safewater/watersecurity/features.cfm

customers and consumers; and (6) organizing the Water Information Sharing and Analysis Center (WaterISAC) for effective communication strategy for warnings and alerts.

We believe there is a critical gap in the U.S. chemical security regulatory framework—namely, drinking water and wastewater treatment facilities are exempt from regulation under the Chemical Facility Anti-terrorism Standards (CFATS). We need to work with Congress to close this gap in order to secure substances of concern at these facilities and to protect the communities they serve. Drinking water and wastewater treatment facilities that possess any substance of concern at or above threshold quantities[2] should be regulated. While many drinking water and wastewater facilities likely have adopted measures to address the security risks of substances of concern, the adequacy and consistency with which these facilities have implemented protective measures cannot be effectively gauged or ensured absent a regulatory program. In sum, to ensure adequacy and consistency in the protection of chemical facilities possessing certain substances of concern, there is a need to apply the requirements under Section 550 of the Department of Homeland Security Appropriations Act of 2007 and CFATS equally to the water sector, and it is the Administration's position that EPA have this regulatory responsibility.

2. I was intrigued by Mr. Grumbles' testimony regarding Arizona incorporating safety information into its "sanitary surveys." Are you aware of other states that have done this?

Although security is not explicitly defined as an element to be evaluated in a sanitary survey, EPA does have guidance to assist states that choose to incorporate security provisions into their sanitary survey activities. The "Learner's Guide to Security Considerations for Small Systems" was developed to identify and explain major security considerations for inspectors to evaluate. The guide provides suggested assessment criteria for many aspects of physical security for public water systems, including criteria to help determine whether the system ensures that chemicals used in the treatment process are properly protected and stored. Although not as thorough as reviews conducted for vulnerability assessments, the guide can enable users to do a preliminary evaluation of security concerns.

Sanitary surveys are conducted by states. Under National Primary Drinking Water Regulations, states are required to conduct sanitary surveys at each public water system at least every 3 to 5 years, depending on a system's type and size. EPA regulations define minimum required elements of sanitary surveys, but states can include any additional steps they choose. EPA does not have information regarding activities states may take beyond the minimum requirements.

3. As you begin preparing the next clean water and safe drinking water needs surveys, have there been any ways to encourage other states to incorporate safety information practices, similar to what Arizona has done, into their data gathering?

EPA's 2003 Drinking Water Infrastructure Needs Survey was the first assessment following the attacks of September 11, 2001, and the Agency included in the survey specific questions regarding infrastructure investment needs related to security. EPA included these questions in the 2007 Survey, and we plan to include them in our upcoming 2011 Survey.

[2] http://www.dhs.gov/xlibrary/assets/chemsec_appendixa-chemicalofinterestlist.pdf

Infrastructure projects in the 2007 Survey, that were specifically listed as security needs, accounted for $422.0 million for the 20-year period of 2007 to 2026. However, as discussed in the 2007 Report to Congress, the total cost that systems incur to protect their infrastructure is far greater than the needs reported in the Survey. The needs identified in the Survey are only for investments in infrastructure; they do not include operation and maintenance costs. Furthermore, infrastructure needs related to security are now typically incorporated into the construction costs of projects, rather than being considered separately. The majority of infrastructure investment needs related to security are, therefore, mostly "hidden" in the other infrastructure needs reported in our Survey. Even where security needs can be specifically identified, many systems chose not to break out those needs separately due to security concerns of reporting vulnerabilities.

EPA has not tracked security infrastructure costs separately from other infrastructure needs in the Clean Water Needs Survey. In general, EPA believes that most capital security costs are included in broader capital cost categories captured by this survey, such as secondary and advanced wastewater treatment plant infrastructure needs.

4. There was a lot of discussion about the "security gap" that exists between water facilities and regular chemical facilities. Please provide EPA's understanding of the nature of the "gap" and whether it is feasible to narrow or close the gap.

As noted, we believe there is a critical gap in the U.S. chemical security regulatory framework—namely, the exemption of drinking water and wastewater treatment facilities. We need to work with Congress to close this gap in order to secure substances of concern at these facilities and to protect the communities they serve. Drinking water and wastewater treatment facilities that possess any chemical at or above threshold quantities[3] should be regulated.

As you know, Section 550 of the 2007 Homeland Security Appropriations Act required the Department of Homeland Security (DHS) to issue regulations for the security of chemical facilities, including risk-based performance standards, vulnerability assessments, site security plans, and related requirements. However, this Act prohibits DHS from applying these regulations to drinking water and wastewater facilities.

EPA and DHS data indicate that a significant number of drinking water and wastewater treatment facilities use chemicals of interest above the threshold defined under the Chemical Facility Anti-Terrorism Standards (CFATS) regulations. Due to their statutory exemption, these facilities are not regulated under CFATS, while chemical facilities using the same quantities of the same chemicals would be regulated under CFATS. This discrepancy is the "security gap." While many drinking water and wastewater facilities likely have adopted measures to address the security risks of chemical of interest, the adequacy and consistency with which these facilities have implemented protective measures cannot be effectively gauged or ensured absent a regulatory program. That is, the need to ensure adequacy and consistency in the protection of chemicals of interest at certain chemical facilities, as codified in Section 550 of the 2007 Homeland Security Appropriations Act, applies equally to the water sector.

[3] http://www.dhs.gov/xlibrary/assets/chemsec_appendixa-chemicalofinterestlist.pdf

5. Last year EPA received $52.6 million for Homeland Security activities in FY10. What did EPA do to ensure greater water security with this money?

As the sector lead for water and wastewater infrastructure security, EPA works to assist the water sector in preventing, detecting, responding to, and recovering from incidents whether natural or manmade. Of the $52.6 million cited in the question, EPA received about $30 million for its water security program.

EPA has used this funding to fulfill the Agency's responsibilities and commitments under the National Infrastructure Protection Plan (NIPP)[4], as defined within the Water Sector Specific Plan[5]. Efforts to protect the nation's critical water infrastructure include water sector-specific agency responsibilities, such as providing tools and training to the water sector, and continued support for the Water Security Initiative (WSI) pilot programs and the Water Laboratory Alliance.

This year, EPA fully funded the final two of five total pilots in the WSI program. Results from these pilots will be used to develop a voluntary national outreach program to encourage adoption of effective contamination warning systems. EPA has already developed guidance materials based on lessons learned from this project, which we have disseminated to the water sector on an aggressive schedule.

In 2010, EPA's Water Laboratory Alliance (WLA) completed integration of the 11 Regional Laboratory Response Plans into a single National Plan, a critical step towards establishing a laboratory network necessary to support the sort of sampling and analysis envisioned under the WSI program. In addition, EPA continued to support the regional laboratory networks by providing access to supplemental analytical capacity and coordinating and standardizing data reporting systems and analytical methods.

An important role of EPA's water security program is to ensure that water sector utilities have tools and information to prevent, detect, respond to, and recover from terrorist attacks, other intentional acts, and natural disasters. In FY2010, EPA supported preventive and preparedness work in collaboration with states' homeland security and water sector officials and DHS. Among other things, activities in this arena included:

- Providing technical assistance to water utilities through webinars, tabletop exercises, and training. Over the last four years, we have reached more than 10,000 utilities. Recently, we have focused our training on the Incident Command System (ICS) to promote the integration of water utilities into the response structure.

- Working on an update to a risk assessment software program, the Vulnerability Self-Assessment Tool, which enables utilities to identify and prioritize the risks associated with an array of natural and manmade hazards.

[4] http://www.dhs.gov/files/programs/editorial_0827.shtm
[5] http://www.epa.gov/safewater/watersecurity/pubs/plan_security_watersectorspecificplan.pdf

- Working in partnership with the American Water Works Association to support the establishment of mutual aid agreements among utilities to expedite the rapid deployment of emergency support to improve recovery times.

6. I am very concerned about the subjectivity of many of the assumptions inherent in IST — specifically the presumption that if you are using a "less hazardous chemical" to treat your drinking water, the overall risk is reduced. This assumption sets utilities up to potentially shift risk from the utility to another source, such as increased delivery trucks carrying concentrated bleach. Can EPA ensure that utilities making moves to different chemicals are not simply shifting risk from one area of the community to another or from one risk, such as chemical explosion to another, such as risk of increased health concerns?

These are important concerns. EPA, in coordination with DHS and States, can work to ensure that chemical security regulations when applied to the Water Sector achieve the joint policy goals of protecting public health and the environment while enhancing security.

Currently, States must approve changes in disinfection practices by water utilities to ensure that adequate public health protection is maintained. H.R. 2868 and S. 3598 would require a covered water system, when assessing methods to reduce the consequences of a chemical release from an intentional act, to consider the security, public health, and environmental mission of the system. EPA believes that this inclusion of public health as a consideration in the assessment, along with the continued state role in approving disinfection changes, will help protect public health.

Further, EPA, DHS, and States can work in partnership to ensure that implementation of IST[6] at a water utility would not increase the potential risks of an intentional act or accident occurring outside the utility. An analysis of the potential for increased risk offsite would be an appropriate factor for consideration if a regulatory agency were in a position to require a utility to implement IST. S. 3598 includes this type of analysis and would require EPA to account for offsite risk shifting as part of the process of determining whether to require methods to reduce consequences.

7. How will EPA ensure this risk shifting does not happen?

As stated above, H.R. 2868 and S. 3598 would require consideration of the public health and environmental mission of a water system, in addition to security, in an assessment of methods to reduce consequences. Accordingly, this assessment should address effectiveness, reliability, cost, disinfection by-products, O&M requirements, safety, and other factors. EPA believes that a rigorous assessment of these factors, in conjunction with the continuing role of States in approving disinfection changes to make sure that public health protection is maintained, can ensure that the implementation of methods to reduce consequences does not increase public health risk.

[6] Chemical and water security bills in the 111th Congress have used the term "methods to reduce consequences of a chemical release from an intentional act" rather than "inherently safer technology" (IST). We understand the terms to be synonyms. More details are provided in the response to question 8.

Under S. 3598, if a state makes a determination to require a covered water or wastewater system to implement a method to reduce the consequences of a chemical release from an intentional act, the system may appeal the determination. As part of the appeal, the system may request a determination of whether implementation of the method to reduce consequences would significantly increase the potential consequences of an intentional act occurring outside the system. EPA, in consultation with DHS, would quantify whether there would be a significant increase in offsite consequences.

If a determination is made that implementation of a method to reduce consequences would result in a significant increase in the potential consequences of an intentional act occurring outside the system, the state must consider this determination when making a final decision on whether to require the system to implement the method to reduce consequences.

EPA believes that incorporating an analysis of potential increases in offsite consequences into the process of determining whether to require a system to implement a method to reduce consequences, as S. 3598 does, can be effective in mitigating risk shifting.

8. At the hearing, I asked you to define the term "inherently safer technology." You said that EPA had not defined "inherently safer technology" but that you agreed with the definitions in Sen. Lautenberg's bill and the House-passed Chemical Security bill. Neither of those bills uses the terms "inherently safer technology." Please explain what definition or sections you were agreeing with at our hearing and what sections you think define "inherently safer technology".

My testimony referred to the definition of the term "method to reduce the consequences of a chemical release from an intentional act" as used in S. 3598, Title I, section 1433(k)(1) and Title II, section 321(k)(1) and in H.R. 2868, Title II, section 1433(g)(1) and Title III, section 222(b)(3). These bills use this term rather than "inherently safer technology".

All sections cited above define this term as follows:

"*a measure at a covered water system [or treatment works] that reduces or eliminates the potential consequences of a release of a substance of concern from an intentional act, such as— (i) the elimination of or a reduction in the amount [or quantity] of a substance of concern possessed or planned to be possessed by a water system [or treatment works] through the use of alternate substances, formulations, or processes; (ii) the modification of pressures, temperatures, or concentrations of a substance of concern; and (iii) the reduction or elimination of onsite handling of a substance of concern through the improvement of inventory control or chemical use efficiency.*"

The actual methods to reduce consequences that a facility could consider would, of course, be case specific.

9. I am aware of several concerns that stem from onsite generation of and use of hypochlorite disinfection. I understand excess hydrogen gas is one byproduct of the onsite generation process. Also, hypochlorite solutions can contain impurities such as bromate, chlorate,

chlorite and even perchlorate. Is EPA doing any studies or working with research institutions on dealing with the potential problems created by hypochlorite use or generation?

EPA continues to work with research foundations, water utility associations, and standards setting bodies to address concerns with the use of hypochlorite and other disinfectants, including the formation of disinfection byproducts.

All disinfection processes have advantages and disadvantages, many of which are site-specific in magnitude. Consequently, EPA believes that disinfectant selection by a utility should be site-specific, and that no single disinfectant is appropriate for all utilities.

Onsite generation of hypochlorite does produce hydrogen gas as a byproduct, albeit at low levels that are typically vented to the atmosphere and are not considered a problem.

Hypochlorite solutions may contain bromate if bromide is present in the salt used to manufacture it. For water systems that purchase bulk hypochlorite solutions, ANSI/NSF Standard 60 certifies that if the hypochlorite application does not exceed a specified maximum usage level, then the bromate level from hypochlorite in the treated water will not exceed one half of the maximum contaminant level for bromate. For hypochlorite generated onsite, water systems may need to purchase salt with low bromide levels. However, a quantitative correlation between the amount of bromide present in salt used for on-site generation and resulting bromate formation in hypochlorite has not been established.

Sodium hypochlorite degrades over time. Generally, higher concentrations of hypochlorite and higher storage temperatures result in more rapid degradation, as well as increased levels of chlorate as a degradation byproduct. Hypochlorite degradation is usually more of a concern with the purchase of bulk hypochlorite solutions, which are more concentrated and stored longer than hypochlorite generated onsite.

For utilities that routinely use their sodium hypochlorite within 45 days of manufacture, the level of perchlorate is likely to be negligible, unless there is some contamination of the original ingredients. To minimize the perchlorate risk, sodium hypochlorite should be stored in the dark, at cool temperatures, diluted if possible, and used within a few weeks of manufacture. ANSI/NSF Standard 60 is expected to be revised in the near future to set a limit for perchlorate in bulk hypochlorite solutions. Perchlorate has not been identified as a contaminant in the onsite generation of hypochlorite, where the lower concentration of hypochlorite and shorter storage time would mitigate perchlorate formation.

10. Does EPA have any guidance for facilities that use onsite generation to help mitigate the problems of these and other impurities?

EPA has not published guidance for water systems that specifically addresses the use of onsite generation of hypochlorite. However, the American Water Works Association has published a decision-making guide for disinfectant selection by utilities that addresses onsite generation of hypochlorite. Further, EPA and other water sector organizations have published guidance on the use of hypochlorite generally, which is relevant to the onsite generation of hypochlorite.

11. Change in disinfection products can result in leeching of lead in water lines, such as what happened in Washington, DC several years ago. How can we ensure that systems that are considering switching disinfection products ensure that the water lines are not going to have similar problems?

EPA published revisions to the lead and copper rule in the October 10, 2007 *Federal Register*. Among the revisions in this final rule was a requirement that systems notify the State and receive approval prior to any long-term treatment change. The final rule language lists examples of long-term treatment changes, such as switching secondary disinfectants. In addition, EPA also published "Simultaneous Compliance Guidance Manual for the Long Term 2 and Stage 2 Disinfection Byproduct Rules in March 2007." This guidance document provides information for systems to evaluate the potential impact of switching secondary disinfectants on their corrosion control process.

12. Does EPA have any data on how much security upgrades to water treatment facilities cost? If so, please share that with this committee.

EPA has compiled data on the cost of physical security upgrades to water treatment facilities through a number of sources, including EPA's Security Product Guides, EPA's Water Security Initiative pilots, and the Drinking Water Infrastructure Needs Survey. Security upgrade costs vary widely depending on the type and magnitude of enhancements, and can encompass a very wide range of equipment. In response to this question, EPA could provide more specific cost data for security upgrades depending on what specific sorts of upgrades were of interest.

13. Does EPA have any data on how much it costs to switch treatment technologies? If so, please share with this committee?

EPA has analyzed the costs of implementing a wide range of treatment technologies to enhance disinfection processes, such as membranes, UV, ozone, chlorine dioxide, total organic carbon removal, and others. These costs vary widely depending on system size and site specific circumstances. EPA would be glad to provide more specific cost data upon request.

However, EPA has not done a cost analysis of switching disinfection practices specifically in the context of IST (or methods to reduce consequences). For example, EPA has not analyzed the cost of switching from gas chlorine to hypochlorite (either purchasing a bulk solution or onsite generation).

14. As you stated in our hearing, EPA does not keep a record of how much a vulnerability assessment costs a treatment works to complete. In light of this, how can you be confident $300,000,000 would be enough to ensure all large water systems could update them on a regular basis and successfully manage oversight and enforcement at EPA and at the state level?

EPA has not done an analysis of the projected costs of compliance with proposed legislation. Such an analysis would be done as part of the development of a regulation pursuant to enactment

of the legislation. Further, the costs would depend on specifics of the regulation, such as criteria for assigning systems to risk tiers and options for meeting risk-based performance standards. Consequently, EPA does not have a position on whether $300,000,000 would be sufficient to cover all costs of compliance with proposed legislation.

Senator LAUTENBERG. Thank you, Ms. Dougherty.

I want to just review a couple of things. In your testimony, you said that current chemical security laws do not adequately address the risk of attack on water facilities. I do not know whether you have had a chance to look at the Secure Water Facilities Act, which we think is much more effective in closing the gap and addressing these risks.

Are these areas of coverage taking care of the problems that seem to be—that have remained open over a period of time? Can we address these risks in the form that we are proposing here?

Ms. DOUGHERTY. Yes. I think your legislation would close that gap, which is a priority for this Administration.

Senator LAUTENBERG. Some have argued that companies—and not regulatory agencies—should decide whether a facility should use safer technology. Which might be a better approach, a voluntary or regulatory approach to protect the public from the consequences of an attack?

Ms. DOUGHERTY. The Administration supports the approach in your bill which would provide the Government the authority to require safer alternatives for the highest risk facilities, balancing security, public health, and their environmental mission. And for the drinking water and wastewater facilities, that would be done really at the State level.

Senator LAUTENBERG. As I noted, over 500 water facilities in 47 States have already replaced extremely hazardous substances with safer and more secure chemicals in their processes. We have heard from the opponents that moving to a safer technology does not necessarily make sense for all facilities, and we are not proposing a one size fits all. The standards that we proposed, we believe can provide the latitude as well as the coverage that we need.

Do you think that the approach that we have taken is one that can take care of our needs without imposing heavier burdens on those who do not have this kind of a responsibility but have other ways of dealing with it?

Ms. DOUGHERTY. I think the approach in your bill provides factors for water systems and if necessary the State to assess that allows for an understanding of the uniqueness of each system and would allow for them to look at safer alternatives while still making sure that they meet that public health or environmental protection requirement.

Senator LAUTENBERG. Yes, we have tried to make certain that we work to cure the problem that we know is rampant in terms of a lack of the security for these facilities and how important it is that we try to cover these bases. And we know that there are lots of enemies out there that see the targets, water supply systems, as the kind of target that brings enormous damage.

Now, if the facility is required to switch to a safer alternative we want to make sure that there is no risk shifting where a plant simply moves the risk to another facility. Could EPA work with the Department of Homeland Security to reduce overall risk and prevent the risk from being shifted offsite?

Ms. DOUGHERTY. Yes, EPA could, in consultation with the Department of Homeland Security, look to make sure that there is no offsite risk shifting in a decision that is made.

Senator LAUTENBERG. Thank you, Ms. Dougherty.

Senator Inhofe.

Senator INHOFE. Thank you, Mr. Chairman.

Ms. Dougherty, let me start off with the vulnerability assessments. Do you see a benefit in routinely updating these assessments?

Ms. DOUGHERTY. One of the things that we have done over the past several years with the water sector is look at what the future should be for an active and effective security program at a water—a wastewater system. And one of the things that we together identified in doing that was that vulnerability assessments need to be updated over time so that the system understands what they need to be protecting against.

Senator INHOFE. And how often do you think they should be updated?

Ms. DOUGHERTY. Three to 5 years, probably.

Senator INHOFE. OK.

Ms. DOUGHERTY. Or if something major changes in terms of the system, in terms of how, what treatment they are using or what else might be happening around that system.

Senator INHOFE. OK. Does the EPA keep a record as to the cost of these assessments?

Ms. DOUGHERTY. We have not done that. No.

Senator INHOFE. Do current vulnerability assessments require systems to examine how they handle chemicals onsite and look at how systems can handle their chemicals more safely?

Ms. DOUGHERTY. Yes. When the original Bioterrorism Bill was passed in 2002 there was a requirement for systems to do one-time vulnerability assessments, and those assessments included chemical safety and handling.

Senator INHOFE. And do you believe that if the inherently safer technology were to be mandated, do you have—does EPA and the agencies have the resources to carry out that mandate?

Ms. DOUGHERTY. I would say that when you look at the bills that are under consideration there are authorizations for EPA and the States to carry out the requirements, and those authorizations would be sufficient for us to do it. But we do not have the resources today.

Senator INHOFE. Just to help me out a little bit and for the record, define inherently safer technology.

Ms. DOUGHERTY. Well, I think in—we have not defined inherently safer technology specifically, but it is defined in both the House Bill that has been passed as well as Senator Lautenberg's bill, and we think that definition is fine, and it is not so prescriptive and provides the ability of systems to look at a number of different factors.

Senator INHOFE. Well, I do want to look at that because I see, well, first of all, Senator Lautenberg and I both want to accomplish the same thing. I said that in my opening statement, and I mean it. But there are some problems here. One, that term has been so vague. In the past we have looked at that, and the fear the people have is that it is not well enough defined so that people have a concern that they would be, they put their own worst case definition on it, which is just human nature.

And the other problem is just a basic difference is, and I think that certainly Senator Lautenberg mentioned it in his question to you or reaffirm his position and that is, in asking the question is the bureaucracy in better shape than the companies themselves to do this. And I think that this is another reason why there is often disagreement on IST.

I can remember, gosh, it was about 3 or 4 years ago, we went through this for a long period of time trying to do this, and those are the two problems that I had at that time. I was really watching this closely as the time goes by.

Ms. DOUGHERTY. Yes, I would just add that the way that the bills are set up and the way that we would envision this happening is that the systems would do the assessment of the methods to reduce a release of a chemical of concern and that I would expect, given the experience that we have had with the water sector over time, that the systems would do a fine job of doing that and most likely reach the conclusions that they need to reach of themselves.

But it is important to have a Government layer in terms of oversight and consistency related to national security decisions. And these are national security decisions when you are looking at what to do about the chemicals of concern here.

So, it would be important to make sure that there is still a Government check and a Government review and approval or decision to require IST for those highest risk contaminants.

Senator INHOFE. But when you say the systems would be responsible for making this assessment and determining what needs to be done about it, and you do not see that this could be, you think that—you already said that resources would be adequate in the event that this system——

Ms. DOUGHERTY. If it was appropriated, yes.

Senator INHOFE. If appropriated, yes. Because what I do not want to do is be looking at another unfunded mandate.

Ms. DOUGHERTY. Yes, I agree.

Senator INHOFE. You know, those of us who served some time at the local government level, I used to say when I was Mayor of Tulsa that our problems were not prostitution and crime in the street and all that; the problems were unfunded mandates. And that is what we are going to try to avoid.

Thank you, Mr. Chairman.

Senator LAUTENBERG. Thank you very much.

Senator Udall.

Senator UDALL. Thank you, Mr. Chairman.

Ms. Dougherty, your testimony discussed how EPA has been working with water utilities since 2002 and before on security. But most of the discussion relates to physical security. What efforts has EPA taken to educate both large and small drinking water utilities about the options for safer alternatives to chlorine gas water treatment, and what has been the impact of those efforts?

Ms. DOUGHERTY. We have done some work over the last several years with the water sector to develop schools and training that help them assess and mitigate the risk from hazardous chemicals. So, the risk assessment tools that we have developed to address vulnerabilities include chemical storage and handling, and we have developed a software tool which models the dispersion and health

effects of hazardous substances which DHS actually uses in its CFATS Program.

We also have partnered with the National Association of Clean Water Agencies and DHS to create a chlorine gas decision tool to help utilities evaluate their disinfection methods in light of security and public health concerns. And we have worked with the Water Sector Coordinating Council over time with DHS to talk about emerging threats related to hazardous chemicals and make sure that information is available to people.

Senator UDALL. Now, on the second panel, Mr. Carlos Perea is testifying about a technology developed in New Mexico that is an alternative to chlorine gas and concentrated liquid chlorine. Their process generates a diluted chlorine solution onsite for water purification, and it is my understanding that several other businesses offer competing technologies as well.

Does the EPA consider this a viable alternative that eliminates the security risks caused by chlorine gas stored under high pressure?

Ms. DOUGHERTY. It can be if the circumstances are right for the system to use it. And the particular approach that you are talking about has been approved for providing disinfection under our rules in terms of disinfection.

Senator UDALL. Great.

Yesterday, our Committee received a letter from the American Metropolitan Water Association which raised some concerns for legislation that pushes utilities to adopt safer alternatives. Have you had an opportunity to see that letter, and if so do you have any response to the concerns they raised?

Ms. DOUGHERTY. I just know that it got waved at me.

Senator UDALL. OK.

Ms. DOUGHERTY. I would have to look at it.

Senator UDALL. OK. Well, we will give you an opportunity in the subsequent questions that are submitted to respond to them.

Then your testimony notes that EPA supports the general structure and approach of Senator Lautenberg's legislation and the Secure Water Facilities Act which would require water utilities to consider the viability of safer alternatives at their facilities. Could you provide some more detail into how EPA would participate in that process, especially in terms of educating and informing utilities about the alternatives available to them?

Ms. DOUGHERTY. I think we would work with the sector in terms of making sure that we have identified the different alternatives that exist and provide information in terms of approaches that they could take in terms of looking at those different alternatives.

Senator UDALL. Great. And thank you. We look forward to your answer on the letter.

Thank you.

Ms. DOUGHERTY. Thank you.

Senator UDALL. Thank you, Mr. Chairman.

Senator LAUTENBERG. Thank you very much, Ms. Dougherty. We will keep the record open for approximately 10 days and ask that if any inquiries come in that your response is prompt.

Ms. DOUGHERTY. Certainly.

Senator LAUTENBERG. Thank you very much.

Ms. DOUGHERTY. Thank you so much.

Senator LAUTENBERG. And now I would like to call Mr. Ben Grumbles, who is the Director of the Arizona Department of Environmental Quality, Mr. Paul Orum of the Blue Green Chemical Security Coalition and an independent consultant to the Center for American Progress, Mr. Carlos Perea, President and Chief Executive Officer of the MIOX Corporation, and Mr. Darius Sivin, International Representative of the United Automobile, Aerospace and Agricultural Implement Workers of America.

We thank each one of your for being here, and Mr. Grumbles, if you would please start your testimony.

STATEMENT OF BENJAMIN H. GRUMBLES, DIRECTOR, ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

Mr. GRUMBLES. Thank you very much, Mr. Chairman.

Senator Lautenberg, Senator Inhofe, Senator Udall, it is a real honor to be before the Committee, to be back before the Committee. I was a former Assistant Administrator for Water at EPA and now am delighted to be the Director of Arizona's Department of Environmental Quality.

And on behalf of Governor Brewer, I want to thank you for giving us and the citizens of Arizona a chance to provide some practical insights and thoughts about the goal we all share of ensuring water is cleaner, safer, and more secure.

I want to highlight some of our experiences over the years, particularly at the national level but at the State level as well, in the post-9/11 era I had the opportunity to see a lot of great work being done, funding through Congress, support through Congress and EPA, vulnerability assessments, increased tools, and technical assistance and training. And I think the Nation—as I am sure you would agree—has made significant progress. We are safer but not safe enough.

I want to thank you for having this hearing that brings together water and wastewater interests together in the same room to talk about a common goal and to raise real issues, practical considerations, and how to get to that goal together and as quickly as possible.

I wanted to share with you that one of the key messages I think from an Arizona perspective, and water and wastewater utilities, and also I know other utilities across the country, is that bipartisan, bicameral efforts to strengthen our Nation's water security should not get wrapped around the axle of inherently safer technology.

Now, Mr. Chairman, I laud your efforts to force the discussion on considering safer technologies. I think it is very important, however, to keep in mind that how we get there is the key question. We all support the concept, but asking how it is going to be implemented and by whom is the key one.

I think it is important to recognize that inherently safer is not always inherently smarter, particularly coming from the West now, an arid area. The heat, the climatic considerations, the realization that in every watershed the chemistry of the water is a little bit different, means that it is at the local level that the best decisionmaking is made.

So, one of the key points I wanted to emphasize is that the city of Phoenix did a study in 2003 asking this key question about what disinfectant to use. I know the American Water Works Association has done some good work looking at different cities across the country, weighing the costs and the benefits to ensure that the Safe Drinking Water Act requirements are being met, that public health is being protected, and that it is being done safely.

The city of Phoenix determined that it made sense to change some of its practices on the use of gaseous chlorine including to embrace double containment—having a can within a can—and to reconsider railcar delivery and storage in a move toward smaller, manageable quantities.

There were significant considerations against moving away from gaseous chlorine, including considerations about the cost, but not just the cost, because that is not the driver when you are talking about environmental and public health statutes. The drivers include looking at the life cycle analysis, the ability for chlorine residuals to remain in the system, looking at the potential, that if you moved to hypochlorite there might be in certain environments the production of a dangerous by-product such as perchlorate or bromate formed that must now be managed. These are all worth reviewing and all worth keeping in mind as you continue to consider legislation.

Mr. Chairman, I would like to just emphasize three things. One is please keep in mind that inherently safer technology—that the choice of what disinfectant methodology to use—should be primarily a local decision.

The second one is that the role of the States is critically important. I truly understand the role, the need for a strong presence from EPA and DHS when it comes to coordination, national standards but neighborhood solutions. States are in a better position not to take over the whole issue but to help make the right decision, coordinating with local water and wastewater utilities.

The third one, as I know you recognize, this takes money. And an excellent role for the Federal Government, Mr. Chairman, is to ensure that adequate funding is available to continue to advance the technology, the science, the expertise on this critically important issue to strengthen the security of our water throughout the country.

Thank you very much, Mr. Chairman. I appreciate the opportunity.

[The prepared statement of Mr. Grumbles follows:]

Testimony of
Benjamin H. Grumbles, Director
Arizona Department of Environmental Quality
Before the
Committee on Environment and Public Works
United States Senate
Washington, D.C.

July 28, 2010

Good afternoon Madam Chairman and distinguished members of the Committee. I'm Benjamin H. Grumbles, Director of the Arizona Department of Environmental Quality and former U.S. EPA Assistant Administrator for Water from 2004 to 2008.

Thank you for the opportunity to testify on efforts to promote increased security in the Water Sector, especially focusing on chemical security at drinking water and wastewater facilities, as well as potential impacts of these efforts. Governor Jan Brewer and the citizens of Arizona also appreciate the opportunity to suggest to Congress ways to continue a successful national collaboration that also focuses on local and regional differences and avoids costly or risky Federal mandates.

As a national water official during most of the post-9/11 era, I became aware of the many steps EPA, state agencies, local governments and industry associations were taking, and continue to take to develop tools, training and technical assistance to help water and wastewater utilities identify and mitigate risks associated with chemical security. With the enactment of the Public Health Protection and Bioterrorism Preparedness and Response Act of 2002 and Presidential mandates under Homeland Security Presidential Directives, EPA has worked to improve water security and preparedness and the water community has taken these new roles seriously. As a result, over the past decade, the nation has made great progress in improving the security and resiliency of the nation's water infrastructure, but we can't claim victory yet. We are safer but still not safe enough.

Existing statutory requirements address chemical security at drinking water systems to some degree. Section 1433 of the Safe Drinking Water Act required each community water system to conduct a vulnerability assessment, certify its completion, and submit a copy to EPA. These comprehensive vulnerability assessments addressed security at water systems from collection, to treatment, to distribution including the use, storage and handling of chemicals. Section 1433 also required the preparation or revision of emergency response plans that incorporate the findings of the assessments.

Since 2002, state agencies have received funding from EPA to support enhanced security related efforts. In Arizona, our Drinking Water program has used this funding to expand upon its existing security measures by incorporating new security, emergency preparedness and response initiatives into the core program. Examples of new and enhanced security initiatives include: establishing a security specialist position within the State's drinking water program, providing security-related training and technical assistance to public water systems, facilitating communications between the facilities and the emergency response agencies and conducting emergency response training exercises for facility operators.

Legislation passed last year in the House and under consideration in the Senate would expand the scope of current security legislation to both water and wastewater utilities. A key provision in the House bill is a requirement for utilities to assess treatment methods to consider "inherently safer technologies" or ISTs. While there isn't a single definition, the main focus of IST is minimizing quantities of hazardous materials by substituting safer materials and processes when and where possible. On its face, few would argue with the goal of IST. Perhaps the question is how should it be implemented and by whom?

The primary purpose of drinking water systems is the delivery of safe drinking water. The primary purpose of wastewater treatment systems is the safe and efficient collection, treatment, disposal and increasingly beneficial reuse of municipal, domestic, commercial and industrial wastewater. Efforts to craft Water Sector security legislation must

recognize the essential public health objectives of these facilities, and the impact any new requirements to consider and implement alternate treatment processes may have on accomplishing these important objectives. In other words, any chemical security regulations aimed at the Water Sector needs to balance the primary goal of protecting public health with enhancing security and public safety. We can't afford to sacrifice public health in the name of chemical safety.

To that end, reconciling new security rules with the public health requirements of the SDWA and CWA is an ambitious, but necessary role for the government. However, decisions on the chemical use at individual facilities are best made by the utility experts at the local level. As a result, any future regulations must maintain flexibility for utilities to make these decisions based on a well-reasoned assessment of various factors including: meeting public health and environmental requirements, maintaining reliability of treatment, accounting for local water chemistry and environmental characteristics, ensuring plant worker safety and, of course, addressing security concerns.

Even without legislation, utilities across the nation are evaluating the use of disinfectants in light of security concerns and new water quality requirements like the Stage 1/Stage 2 Disinfectants/Disinfection Byproducts Rules, the Ground Water Rule and the Enhanced Surface Water Treatment Rule under the Safe Drinking Water Act and surface water discharge requirements under the Clean Water Act permitting program. While some utilities have completed a risk assessment and decided to change disinfection methods, for others, chlorine gas remains the only viable form of disinfection to provide sufficient public health protection. Treatment methods will continue to improve but we risk making dangerous trade-offs if we force chlorine substitutes upon community water and wastewater systems without a careful evaluation of local and regional factors.

I'd like to highlight the City of Phoenix Water Services Department's disinfection alternatives evaluation in an effort to underscore the unique, site-specific considerations that underlie achieving the goal of safe drinking water and meeting the disinfection needs of a public water system.

The Phoenix Water Services Department serves drinking water to a population of 1.6 million customers using both surface water, from the Colorado, Verde and Salt Rivers, and groundwater in its production of drinking water. Prior to an alternative disinfection study in 2003, Phoenix used gaseous chlorine at all five surface water treatment plants. The two largest facilities stored chlorine, on-site, in 17-ton railcars. The City also has 78 remote disinfection facilities including well sites, booster pump stations and reservoirs. Prior to the study, the disinfection methods at these remote sites was varied and included on-site generation and storage of sodium hypochlorite, chlorine gas, calcium hypochlorite tablet feeders and bulk sodium hypochlorite storage and feed systems.

The 2003 study identified a number of operational issues with the alternative disinfection methods at the remote facilities. With on-site generation of bulk hypochlorite, for example, if the chemical is not produced and managed properly, the potential exists for introduction of contaminants, namely bromate, perchlorate, and chlorate. In addition, hypochlorite products degrade quickly in the desert heat making disinfectant residuals hard to control and consistently meet the SDWA requirements. As part of the 2003 study, Phoenix also found many of these alternative methods were operator and maintenance intensive.

Through this study, the City of Phoenix was able to evaluate the social, environmental, and financial costs of the various disinfection alternatives to make a balanced, well-informed decision. As a result of the study, the City continues to use chlorine gas at its surface water plants, but has replaced the railcars with 1-ton containers and will be installing double containment at all facilities, minimizing the risk of chemical exposure to the public. The City will also be converting to chlorine gas with double containment at several remote disinfection facilities.

While I'm talking about my home state, in the arid southwest, I cannot stress enough that every drop of water is worth using and reusing. I imagine this is true in other western states where water is so precious. In Arizona, I am co-chairing a large stakeholder

effort, convened by Governor Brewer, to enhance the sustainability of water by increasing reuse, recycling and conservation of water and to support continued economic development while protecting Arizona's water supplies and natural environment. While recognizing the need to safeguard the public, I would encourage those considering future water security legislation to be mindful of possible unintended consequences especially on efforts to conserve, reclaim or reuse water.

In closing, I'd like to reiterate that as a nation we've made great progress in securing our water infrastructure but there is still more to be done.

Congress should provide direction, but not broadly dictate technology or methods. Those decisions should be made by the local utilities which have the necessary expertise and the knowledge of their systems. They are in the best position to make fact-based, risk-based decisions on, what I like to call, "inherently smarter technologies" that will protect both public health and safety.

Security-related decisions need to be made in close consultation with state agencies responsible for regulating both water and wastewater facilities. I am not advocating that states take on all the roles and responsibilities associated with water security but, rather that they have an appropriate role, commensurate with their current responsibilities, for overseeing the implementation of these programs. In addition, states, such as Arizona, have well-developed, ongoing relationships with both the water and wastewater utilities as well as EPA. We are using existing processes, like state "sanitary surveys", done every three years for each facility, to imbed, or institutionalize security considerations into source-to-tap risk assessments and other analyses. That should be allowed to continue.

Lastly, adequate resources should be dedicated and available to the states to assist utilities and operators in making these important decisions that affect both public health and safety. Federal funds are critical to strengthening the science, technology, and expertise in the war against terrorism on the waterfront, as well as the homeland.

Thank you again for the opportunity to testify and I would be glad to answer to any questions that members might have.

Environment and Public Works Committee Hearing
July 28, 2010
Follow-Up Questions for Written Submission
Questions for Benjamin Grumbles

Questions from: Senator James M. Inhofe

1. What are the most important issues that we should consider as we look for ways to encourage greater security in water systems?

I believe tools are already be in place for greater security in water systems and the industry supports the concept of greater security, the real question comes back to how we go about achieving greater security, who carries it out and is there funding to support these efforts. There also needs to be a balance in the regulations so that public health is not sacrificed in the name of chemical safety.

Existing rules require system vulnerability assessments and development of emergency response plans. These efforts help to ensure chemical security at our state's wastewater/drinking water facilities. It also underscores that decision-making regarding water security is best handled at the local level where unique, site-specific local and regional factors can be fully weighed and sound decisions made regarding what is best for a particular system. Secondly, states need to be supported in their role of assisting local water and wastewater utilities in making these decisions.

Lastly, there needs to be adequate funding available to continue to advance the technology, the science and the expertise on these issues. State and local governments are not able to fund research and must look to the federal government for continued investment in this area. This is necessary in order to protect our citizens as the war on terrorism continues to threaten this nation.

2. Thank you for sharing Phoenix's experience with looking at alternative disinfection options. Are you aware of other water facilities that have done similar disinfection options analyses without a mandate from the Federal Government?

Many communities across the country have stepped up to do more security work and planning, even though the Federal Government has not directed them to do so. National trade associations such as AWWA, WEF, NACWA, and AMWA are better positioned to give the names of specific communities and their voluntary efforts to strengthen security systems.

Our experience in Arizona suggests that the majority of public water systems, both municipal and private/for-profit, are continuously analyzing disinfection options for a variety of reasons. Recent rules such as the Stage 1/Stage 2 Disinfectants/Disinfection Byproducts Rules, the Ground Water Rule and the Enhanced Surface Water Treatment Rule under the Safe Drinking Water Act have certainly resulted in some analyses. But other reasons such as operational costs and population shifts (e.g., has new development or a school been constructed next to a well/treatment facility), as well as local or regional factors, underscore the need for continual research and investigation into what works best for a particular system in a particular environment.

3. Is there anything else you would like to add for the record?

In Arizona, there has been tremendous response to agency-sponsored outreach on conducting water vulnerability assessments and emergency preparedness and response trainings. This was made possible, post-9/11, through EPA funding to support enhanced security efforts. I believe this is a tangible benefit that can be gained from continued federal support for these types of "on-the-ground" outreach efforts.

Senator LAUTENBERG. Thank you very much.
Mr. Orum.

STATEMENT OF PAUL ORUM, BLUE GREEN CHEMICAL SECURITY COALITION, INDEPENDENT CONSULTANT TO CENTER FOR AMERICAN PROGRESS

Mr. ORUM. Good afternoon. I am Paul Orum, consultant to public interest organizations on chemical safety and security.

Thank you very much for the opportunity to testify on behalf of the Blue Green Chemical Security Coalition and to present findings from survey reports that show leading water utilities reducing their vulnerability to accidents and terrorism.

I want to stress the following. First, many agencies and organizations have warned that an intentional release of industrial chemicals could harm thousands of Americans. The Homeland Security Council uses 17,000 deaths in a planning scenario; an insurance industry estimate points to $7 billion in potential damages; EPA figures show some 800 wastewater and drinking water facilities each with 10,000 or more people living in its vulnerability zone. And more than 20 Federal agencies and non-governmental organizations have warned about the problem.

Second, there are solutions. Safer and more secure chemicals and processes are widely used and can remove dangers to employees and communities. Four surveys that I have conducted through the Center for American Progress show more than 600 chemical facilities across 20 industries already using an option that avoids the possibility of a catastrophic chemical release, and the water sector, in particular, has many converted facilities.

At least 554 drinking water and wastewater facilities in 47 States have replaced extremely hazardous substances with safer and more secure chemicals or processes, in the process taking more than 40 million Americans out of the danger of a toxic gas plume from those facilities.

Now, two caveats. These conversions took place over 10 years. At this rate, without legislation to push the process it would take a half-century to convert the approximately 2,500 remaining water and wastewater plants that still report large amounts of chlorine gas. Also, legislation is needed to encourage converting the highest hazard facilities to set priorities. Otherwise, these highest hazards could remain around for half a century.

The drinking water facilities typically went from chlorine gas to chlorine bleach, from chlorine to chlorine, whether generated onsite or brought in in bulk. Some wastewater plants also went to liquid bleach. Others converted to ultraviolet light.

The third general area is the facilities that use safer and more secure chemicals and processes avoid certain costs and dangers and requirements. Survey respondents reported avoided costs including regulatory compliance, personal protective equipment they did not have to buy, chemical security they did not have to install, emergency planning and potential liability, among more than 20 types of avoided costs.

One-third of converted facilities anticipated saving money as a result. And this is because gates and guards always cost money while upgrading technology sometimes saves money by modern-

izing facilities. And the avoided security costs for those converted facilities will be roughly $3.1 billion over 10 years.

Now, it only makes sense for facilities to consider safer options before assuming security costs that can be avoided and before imposing costs and dangers on Government agencies and the public. In many cases, even where facilities do not save money alternatives to remove extremely hazardous substances are also cost effective.

Finally, this is a mature issue. There have been bills for 10 years since your original bill in 1999. The current bills before the Committee are the result of significant compromise and include certain principles that we support. They build on current laws, they protect drinking water and wastewater standards, and they preserve State programs in collaboration with local utilities.

Importantly, they provide each facility the flexibility to conduct its own assessment suitable to its own circumstances. Knowledge of solutions is dispersed, Government policy should cultivate those solutions, and we see this proposed legislation as a process to generate those solutions.

More than 100 labor and public interest organizations urge the Senate and the Committee to act before the current program expires on October 4th.

I would be happy to answer any questions.

[The prepared statement of Mr. Orum follows:]

Testimony of Paul Orum
Blue Green Chemical Security Coalition/
Independent Consultant to Center for American Progress

Before the

Committee on Environment and Public Works
United States Senate

July 28, 2010

Good afternoon, I am Paul Orum, consultant to public interest organizations on chemical safety and security. Thank you for the opportunity to testify on behalf of the blue-green chemical security coalition and to present findings from survey reports that show how leading water utilities are reducing their vulnerability to accidents and terrorism.

I also served on the advisory Water Security Working Group to EPA's National Drinking Water Advisory Panel, and on a Government Accountability Office experts' panel on how federal funds should be spent to improve security at wastewater facilities.[i] I formerly directed the Working Group on Community Right-to-Know, an affiliation of public interest organizations concerned with government information policy.

I wish to stress the following:

1. Many parties have warned about security of industrial chemicals.

Many agencies and organizations have warned that an intentional release of industrial chemicals could harm thousands of Americans.

- The Homeland Security Council uses 17,500 deaths in a planning scenario for a terrorist attack on a large chlorine tank in an urban area.[ii]
- An insurance industry estimate points to more than $7 billion in damages from a major urban release of chlorine gas.[iii]
- Environmental Protection Agency figures show some 800 water and wastewater facilities with 10,000 or more people living within the vulnerability zone of a toxic gas release.[iv]

- More than 20 federal agencies, industry associations, labor unions, think tanks, public interest groups, and independent observers warned about the problem. These include: the Department of Homeland Security; Department of Justice; Environmental Protection Agency; Government Accountability Office; Agency for Toxic Substances and Disease Registry; Congressional Budget Office; National Academy of Sciences; Army Surgeon General; Lawrence Livermore National Laboratory; Brookings Institute; Rand Corporation; Center for Strategic and International Studies; Partnership for a Secure America; American Chemistry Council; Association of American Railroads; United Steelworkers; Teamsters Union; Risk Management Solutions (insurance industry); Environmental Defense; U.S. Public Interest Research Group; Greenpeace; Working Group on Community Right-to-Know, and Center for American Progress, doubtless among others.[v]

The oil spill in the Gulf of Mexico reminds us that worst-case releases do happen. Congress should heed warnings about chemical security, and act to protect people, property, and the environment.

2. Safer, more secure chemicals and processes are widely used and can remove dangers to employees and communities.

In four survey reports, the Center for American Progress identified more than 630 chemical facilities across 20 industries that are already using a chemical or process that avoids the possibility of a catastrophic chemical release.[vi] The water sector in particular has many converted facilities.

Findings include:

- At least 554 drinking water and wastewater facilities in 47 states have replaced extremely hazardous substances with safer and more secure chemicals or processes (please see attached map). These changes removed 40 million Americans from the danger of a toxic gas plume from these facilities.

    - These conversions took place over ten years. At this rate, it would take about a half-century to convert the 2,500 remaining water and wastewater facilities that still report large amounts of chlorine gas.[vii]

- There is also no priority for converting the highest hazard facilities (arguably the 35 that still use chlorine gas by the railcar), which could leave in place the greatest chemical hazards for a half-century.

Of the 554 facilities, 235 drinking water facilities typically switched from gaseous chlorine to liquid bleach. Of the 315 converted wastewater facilities, approximately 140 switched to ultraviolet light and 175 switched to liquid bleach. Some wastewater plants also replaced anhydrous sulfur dioxide, used for dechlorination, with sodium bisulfite. (Four of the facilities treat both drinking water and wastewater.)

Some bleach plants that supply water utilities also use production methods that never store or transport chlorine gas.[viii] Other companies provide technologies that eliminate storage and shipment of chlorine gas by generating liquid bleach on-site.[ix]

3. Facilities that use safer, more secure chemicals and processes avoid costs, dangers, and regulatory requirements.

When facilities remove chemical hazards they avoid costs such as potential liability and chemical security regulations.

- Survey respondents reported *costs avoided* with safer alternatives that include regulatory compliance, personal protective equipment, chemical security, hazmat training, emergency planning, hazard communication, and potential liability, among more than 20 types of avoided costs.[x]

- One-third of converted facilities anticipated saving money as a result.[xi] Conventional security *always* costs money, while upgrading technology *sometimes* saves money. Physical site security, however important, cannot assure protection, address supply chain risk, or modernize facilities.

- The Department of Homeland Security estimates regulatory compliance costs under the current interim Chemical Facility Anti-Terrorism Standards (CFATS) to be $12.5 billion for 5,000 facilities over ten years.[xii] At that rate, if 2,500 water and wastewater facilities bear similar costs, and half (1,250) drop out of the program by converting to safer and more secure options, then the avoided costs of compliance for those

1,250 converted water facilities will be roughly $3.125 billion over ten years.

It only makes sense for facilities to consider such options, before assuming security costs that can be avoided and before imposing costs and dangers on government agencies, employees, emergency responders, and the public.

Even where facilities don't save money, alternatives that remove extremely hazardous substances are often cost effective.

- Of 195 converted facilities that provided general cost information, 49 percent reported the changes cost less than $100,000, and 87 percent reported conversion costs below $1,000,000.[xiii]

- Of 20 big city water and wastewater facilities that converted, the highest cost per customer served was $1.50 per year in construction and operating costs—the price of a small bag of potato chips—and most spent well less than that amount.[xiv] The U.S. Government Accountability Office found a similar range of costs for converting large wastewater utilities.[xv]

4. The Senate should act without further delay.

Current interim CFATS standards exempt water and wastewater facilities and do not utilize *smart security*—the cost effective alternatives that can remove unnecessary chemical hazards.

I am submitting with my testimony a letter signed by more than 100 labor and public health organizations in support of chemical security legislation H.R.2868, S.3598, and S.3599. These groups support disaster prevention policies including safer and more secure technologies, employee participation, and government accountability.

This proposed legislation builds on current laws, and protects current drinking water and wastewater programs and standards, including state primacy and collaboration with local utilities. It provides each facility the flexibility to conduct its own assessment suitable to its activities and circumstances. Knowledge of solutions is dispersed. The proposed legislation makes use of those solutions.

The bill also utilizes computer software and tools to assist smaller (tier 3 and tier 4) facilities with compliance, an innovation that should reduce compliance costs for covered facilities.

There are also elements we urge the Committee to improve. Among these are: improving government accountability and public confidence by making public non-sensitive information on the compliance and implementation of security standards; ensuring integrity of assessments by removing the exclusion from the requirement to correct deficient assessments; and, removing criminal penalties for disclosure of protected information in the absence of such penalties for non-compliance and endangerment.

Congress can significantly improve the safety and security of people who work in and live near water utilities that use extremely hazardous substances. This is a mature issue—Senator Lautenberg first offered legislation in 1999—and current proposed bills are the result of a long process involving significant compromise. We urge the Committee and Senate to act before the temporary interim program expires October 4.

Attachments:
Map of 554 converted water and wastewater facilities.
Blue-green chemical security coalition letter, July 2010.

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[i] Wastewater Facilities: Experts' Views on How Federal Funds Should Be Spent to Improve Security, Government Accountability Office, GAO-05-165, January 2005.
[ii] National Planning Scenario 8: Chemical Attack—Chlorine Tank Explosion, Homeland Security Council in partnership with the Department of Homeland Security, 2005.
[iii] Catastrophe, Injury, and Insurance: The Impact of Catastrophes on Workers Compensation, Life, and Health Insurance, Risk Management Solutions, Inc., 2004.
[iv] Risk Management Planning program figures provided by the U.S. Environmental Protection Agency to the Senate Environment and Public Works Committee, July 1, 2010.
[v] Reports and statements warning about chemical terrorism include:

- Chemical Terrorism: US Policies to Reduce the Chemical Terror Threat, Partnership for a Secure America, September 2008.
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- Homeland Security Committee Urged to Consider Safer Chemicals; Chemical Companies Should Stop Manufacturing Extremely Dangerous Chemicals, Association of American Railroads, 2008.

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- Preventing Toxic Terrorism: How Some Chemical Facilities are Removing Danger to American Communities (2006)
- Toxic Trains and the Terrorist Threat: How Water Utilities Can Get Chlorine Gas off the Rails and Out of American Communities (2007)
- Chemical Security 101: What You Don't Have Can't leak, or Be Blown Up by Terrorists (2008)
- Safer Chemicals Create a More Secure America: We Can Diminish the Security Threat from Chemical Plants (2010).

[vii] Approximate number of drinking water and wastewater facilities that report an extremely hazardous substance under the Environmental Protection Agency's Risk Management Planning program.

[viii] Companies operating or constructing bleach plants that do not store chlorine gas include BleachTech, Odyssey Manufacturing, K2Pure Solutions, Kuehne Chemical, and Clorox.

[ix] Companies that provide technologies for generating chlorine bleach on-site include MIOX Corporation, U.S. Filter, Severn Trent Services, and Electrolytic Technologies.

[x] Preventing Toxic Terrorism, Center for American Progress, 2006, Page 9.

[xi] Preventing Toxic Terrorism, Center for American Progress, 2006, Page 8.

[xii] Regulatory Assessment, Chemical Facility Anti-Terrorism Standards Interim Final Rule, Department of Homeland Security, DHS-2006-0073, April 1 2007, Table 4.

[xiii] Preventing Toxic Terrorism, Center for American Progress, 2006, Page 8.

[xiv] Toxic Trains and the Terrorist Threat, Center for American Progress, April 2007, Pages 12-13.

[xv] Securing Wastewater Facilities: Utilities Have Made Important Upgrades but Further Improvements to Key System Components May Be Limited by Costs and Other Constraints, Government, GAO-06-390, March 2006.

Protecting Americans from Toxic Terrorism

554 Water Utilities No Longer Use Extremely Hazardous Substances

Center for American Progress

AFL-CIO – American Federation of Teachers – Communications Workers of America (CWA)
International Brotherhood of Teamsters – International Chemical Workers Union Council/UFCW
United Automobile Aerospace and Agricultural Implement Workers of America (UAW)
United Food and Commercial Workers – United Steel Workers (USW)
Service Employees International Union (SEIU)
Advocates for Environmental Human Rights – Beyond Pesticides – BlueGreen Alliance
Breast Cancer Fund – Center for Environmental Health – Center for Health, Environment, and Justice
Center for International Environmental Law – Clean Air Council – Clean Water Action
Clean Production Action – Ecology Center – Environment America – Environmental Defense Fund
Environmental Working Group – Friends of the Earth – Greenpeace – Institute for Agriculture and Trade Policy – League of Conservation Voters – OMB Watch – Physicians for Social Responsibility – Sierra Club – U.S. Public Interest Research Group
Alaska Community Action on Toxics – Arizona PIRG – Citizens for a Clean Environment, Inc.
Clean New York – Clean Water Action-Massachusetts – Connecticut Coalition for Environmental Justice
Connecticut Council on Occupational Safety and Health – Deep South Center for Environmental Justice
Don't Waste Arizona – Ecological Conservation Organization (AR) – Empire State Consumer Project
Environmental Health Fund – Environmental Health Strategy Center
Environmental Justice Action Group of WNY – Environment Illinois – Environment Massachusetts
Environment Texas – Farmworker Association of Florida – Galveston Houston Association for Smog Prevention and Mothers for Clean Air (GHASP/MfCA) – Global Community Monitor
Glynn Environmental Coalition – Great Neck Breast Cancer Coalition – Green Action
Green Decade-Newton Chapter – Green Education and Legal Fund, Inc.
Greenwich Citizens Committee – Healthy Building Network – Healthy Schools Network
Huntington Breast Cancer Action Coalition, Inc. – Illinois PIRG – Indiana Toxics Action
International Campaign for Justice in Bhopal – Kentucky Environmental Foundation
Kristen Breitweiser, 9/11 Widow – Louisiana Bucket Brigade – Maine Labor Group on Health
Maine Women's Lobby – Maryland PIRG – Massachusetts Breast Cancer Coalition
Massachusetts Green Jobs Coalition – Massachusetts Interfaith Power and Light – Massachusetts PIRG
Michigan Environmental Council – MomsRising – Natural Resources Council of Maine
New Jersey Environmental Federation – New Jersey PIRG – NJ Work Environment Council
New York PIRG – Oregon PIRG – Oregon Toxics Alliance – People's Settlement Association
Prevention Is The Cure, Inc. – Protect All Children's Environment – Public Citizen-Texas
Science and Environmental Health Network – Sciencecorps – Second Look – Somerville Climate Action
Students for a Just and Stable Future – Texas Campaign for the Environment – Texans for Public Justice
Texas PIRG – Urban Health Environment and Learning Project – Vermont PIRG
Veterans for Peace/Smedley Butler Brigade – Washington Toxics Coalition
Women's Voices for the Earth – Worksafe Inc.

July 2010

Dear Senator,

On November 6, 2009, the House of Representatives passed the *Chemical and Water Security Act of 2009* (H.R.2868) a comprehensive chemical security bill. On July 15, Senator Frank Lautenberg introduced the Secure Chemical Facilities Act (S.3599) and the Secure Water Facilities Act (S.3598). **The undersigned organizations support this legislation and urge the U.S. Senate to pass it before the interim law expires on October 4, 2010.**

Chemical plants and other chemical facilities remain one of the most vulnerable sectors of America's infrastructure to terrorist attacks. The Department of Homeland Security (DHS) has identified approximately 5,000 "high-risk" U.S. chemical facilities. In 2004, the Homeland Security Council planning scenario projected that an attack on a chemical facility

would kill 17,500 people and send an additional 100,000 people to the hospital. A December 2009 Congressional Research Service review of U.S. Environmental Protection Agency (EPA) data shows that 91 chemical facilities each put 1 million or more people at risk.

The current interim statute enacted as a rider to the 2007 Homeland Security appropriations bill temporarily authorized the Chemical Facility Anti-Terrorism Standards (CFATS) to give Congress time to enact comprehensive legislation. As a security program CFATS was intended only as an interim stop gap measure. It fails to protect the millions of Americans at risk by eliminating preventable catastrophic hazards.

The interim statute:

- Prohibits the DHS from requiring any specific "security measure" whatsoever.
- Fails to develop the commonsense use of *smart security* or safer and more secure chemical processes that can cost-effectively prevent terrorists from triggering chemical disasters.
- Explicitly exempts thousands of chemical and port facilities, including approximately 2,400 water treatment facilities and 400-600 port facilities including many oil refineries.
- Fails to involve knowledgeable employees in the development of vulnerability assessments and security plans, or protect employees from excessive background checks.
- Denies the public the information needed to ensure an effective, accountable program.

On February 4th Senator Collins (R-ME) introduced a bill (S. 2996) that would do nothing but extend this inadequate and flawed law for five more years. **We strongly oppose S. 2996 and any further delay in comprehensive chemical security legislation.**

In their March 3rd testimony before the Senate Homeland Security and Governmental Affairs Committee, both the DHS and the EPA called comprehensive legislation that requires high risk facilities to "assess" safer chemical processes and conditionally requires the highest risk plants to use safer chemical processes where feasible. In addition, they urged Congress to eliminate the gap in security for water treatment facilities and to modify the exemption for port facilities now regulated under the Maritime Transportation Security Act to ensure consistency with CFATS.

To correct the flaws in the interim law and enact comprehensive legislation, **we urge you to support Senator Lautenberg's comprehensive chemical security legislation in the Senate** as a companion to H.R. 2868. H.R. 2868 is a compromise that *builds seamlessly on CFATS.* It maintains the DHS as the lead agency regulating privately owned chemical plants, including port facilities, and authorizes the EPA as the lead agency regulating publicly owned water and wastewater treatment facilities and provides funding for publicly owned water facilities to adopt the most protective security measures.

In addition, the Secure Chemical Facilities Act (S.3599) and the Secure Water Facilities Act (S.3598) will:

- Require high risk facilities to assess safer chemical processes and conditionally requires the highest risk plants (approximately 107) to use safer chemical processes where feasible and commercially available and includes a technical appeals process to challenge DHS decisions;
- Provide up to $100 million in the first year to assist privately owned plants to use safer and more secure processes, $125 million for drinking water facilities and an unspecified portion of $200 million for wastewater facilities to use safer more secure processes;
- Involve plant employees in the development of security plans and provide protections for whistleblowers and limits back ground check abuses;
- Preserve state authority to establish stronger security standards;

Passing comprehensive legislation this year is vital to our national security. Since 1999, more than 500 facilities have used *smart security* to eliminate these risks to more than 40 million Americans. In a March 2006 floor statement, then Senator Obama said, "by employing safer technologies, we can reduce the attractiveness of chemical plants as a target...Each one of these methods reduces the danger that chemical plants pose to our communities and makes them less appealing targets for terrorists." In November 2009, the Clorox Company announced plans to convert all seven of its U.S. facilities to eliminate the bulk use of chlorine gas and inherent risks to nearby communities.

The Association of American Railroads issued a statement in 2008 saying, *"It's time for the big chemical companies to do their part to help protect America. They should stop manufacturing dangerous chemicals when safer substitutes are available. And if they won't do it, Congress should do it for them..."*

Disaster prevention is a defining policy in this legislation which has taken on new urgency following the BP oil blow out in the Gulf of Mexico and renewed threats of terrorism. To truly protect employees and surrounding communities, a comprehensive law should:

- Use *smart security* to prevent the catastrophic consequences of an attack by implementing cost-effective safer and more secure chemicals and processes at all of the highest risk facilities.
- Include all categories of facilities such as port facilities and water treatment plants.
- Involve plant employees in developing plant security programs, including participation in workplace inspections, and provide employees with both an appeals and a waiver procedure to protect against excessive background checks.
- Allow citizen suits against chemical facilities and government agencies to enforce the law.
- Ensure greater accountability through the disclosure of non-sensitive information on compliance and implementation of security standards.
- Allow states to set more protective security standards.

We look forward to working with you and your staff on this urgently needed legislation.

Sincerely,

Nathalie Walker & Monique Harden
Advocates for Environmental Human Rights

Tom Trotter
AFL-CIO

Pamela K. Miller
Alaska Community Action on Toxics

Tor Cowan
American Federation of Teachers

Diane Brown
Arizona PIRG

Jay Feldman
Beyond Pesticides

Yvette Pena Lopes
Blue Green Alliance

Gretchen Lee
Breast Cancer Fund

Judy Levin
Center for Environmental Health

Lois Gibbs
Mike Schade
Center for Health, Environment, and Justice

Daryl Ditz
Center for International Environmental Law

Cynthia A. Wilson
Citizens for a Clean Environment, Inc.

Eric Cheung
Clean Air Council

Kathy Curtis
Clean New York

Mark Rossi
Clean Production Action

Lynn Thorp
Clean Water Action

Cindy Luppi
Clean Water Action-Massachusetts

Dave LeGrande
Communications Workers of America (CWA)

Mark A. Mitchell
Connecticut Coalition for Environmental Justice

Mike Fitts
Connecticut Council on Occupational Safety and Health

Dr. Beverly H. Wright
Deep South Center for Environmental Justice

Stephen Brittle
Don't Waste Arizona

Rob Fisher
Ecological Conservation Organization (AR)

Tracey Easthope
Ecology Center

Judy Braiman
Empire State Consumer Project

Anna Aurilio
Environment America

Richard Denison
Environmental Defense Fund

Judy Robinson
Environmental Health Fund

Michael Belliveau
Environmental Health Strategy Center

Judith M. Anderson
Environmental Justice Action Group of WNY

Jason Rano
Environmental Working Group

Max Muller
Environment Illinois

Ben Wright
Environment Massachusetts
Luke Metzger
Environment Texas

Jeannie Economos
Farmworker Association of Florida

Fred Millar
Friends of the Earth

Matthew S. Tejada
Galveston Houston Association for Smog Prevention and Mothers for Clean Air (GHASP/MfCA)

Denny Larson
Global Community Monitor

Daniel Parshley
Glynn Environmental Coalition

Laura Weinberg
Great Neck Breast Cancer Coalition

Bradley Angel
Green Action

Marcia Cooper
Green Decade-Newton Chapter

Mark A. Dunlea
Green Education and Legal Fund, Inc.

Rick Hind
Greenpeace

Tracy Frisch
Greenwich Citizens Committee (NY)

Bill Walsh
Healthy Building Network

Claire Barnett
Healthy Schools Network

Karen Joy Miller
Huntington Breast Cancer Action Coalition, Inc.

Brian Imus
Illinois PIRG

Lin Kaatz Chary
Indiana Toxics Action

Kathleen Schuler
Institute for Agriculture and Trade Policy

LaMont Byrd
International Brotherhood of Teamsters

Shana Ortman
International Campaign for Justice in Bhopal

John Morawetz
International Chemical Workers Union Council/UFCW

Elizabeth Crowe
Kentucky Environmental Foundation

Tiernan Sittenfeld
League of Conservation Voters

Anne Rolfes
Louisiana Bucket Brigade

Peter Crockett
Maine Labor Group on Health

Sarah Standiford
Maine Women's Lobby

Johanna E. Neuman
Maryland PIRG

Deborah Shields J.D., MPH
Massachusetts Breast Cancer Coalition

Massachusetts Green Jobs Coalition (MAGJC)

Massachusetts Interfaith Power and Light

Janet Domenitz
Massachusetts PIRG

Chris Kolb
Michigan Environmental Council

Kristin Rowe-Finkbeiner
MomsRising

Matt Prindiville
Natural Resources Council of Maine

Amy Goldsmith
New Jersey Environmental Federation

Allison Cairo
New Jersey PIRG

Rick Engler
NJ Work Environment Council

Russ Haven
New York PIRG

Brian Turnbaugh
OMB Watch

Dave Rosenfeld
Oregon PIRG

Dona Hippert
Oregon Toxics Alliance

Keith Lake
People's Settlement Association

Kristen Welker-Hood
Physicians for Social Responsibility

Karen Joy Miller
Prevention Is The Cure, Inc.

Elizabeth O'Neal
Protect All Children's Environment

Tom Smith
Public Citizen Texas

Ted Schettler
Science and Environmental Health Network

Kathleen Burns
Sciencecorps

Deborah E. Moore, Ph.D
Second Look

Bill Borwegen
Service Employees International Union (SEIU)

Ed Hopkins
Sierra Club

Maureen Barillaro
Somerville Climate Action

Students for a Just and Stable Future

Craig McDonald
Texans for Public Justice

Robin Scheider
Texas Campaign for the Environment

Melissa Cubria
Texas PIRG

Elizabeth Hitchcock
U.S. Public Interest Research Group (U.S. PIRG)

Barbara Somson
United Automobile, Aerospace and Agricultural Implement Workers of America

Holly Hart
United Steelworkers (USW)

Jo Deutsch
United Food and Commercial Workers

Brenda Gunther
Urban Health Environment and Learning Project (UHELP)

Charity Carbine
Vermont PIRG

Pat Scanlon
Veterans for Peace/Smedley Butler Brigade

Laurie Valeriano
Washington Toxics Coalition

Erin Switalski
Women's Voices for the Earth

Gail Bateson
Worksafe, Inc.

Kristin Breitweiser
9/11 Widow

Bettie D. Kettell, RN
Durham, ME

Responses of Paul Orum
Blue Green Chemical Security Coalition/
Independent Consultant to Center for American Progress
to
Follow-up Questions from Senator James Inhofe
Concerning Protecting America's Water Treatment Facilities

September 13, 2010

The questions and answers below expand upon testimony provided July 28, 2010 before the Senate Environment and Public Works Committee.

1. How many water utilities are represented within the Blue Green Chemical Security Coalition?

The Blue Green Chemical Security Coalition does not represent water utilities. However, a number of the unions in the coalition represent workers at one or more water utilities. These workers could be hurt "first and worst" in the event of a major chemical release. These unions include: United Steelworkers; American Federation of State, County, and Municipal Employees; International Brotherhood of Teamsters; Service Employees International Union; United Food and Commercial Workers; Communications Workers of America; and United Auto Workers. Other unions such as the American Federation of Teachers are involved in chemical security because they represent teachers in schools that are located within range of a toxic gas release from a water utility or industrial facility. Most of the other organizations involved in the coalition similarly represent people who live within vulnerability zones of hazardous chemical facilities.

2. Have the water facilities you mentioned that have already switched to safer processes been able to do so on their own without any help from the government?

Our surveys have not inquired into the specific sources of funding that utilities used to convert off bulk chlorine gas. Presumably, some portion converted without federal support, but it is difficult to determine the extent of federal assistance. For example State Revolving Loan Fund programs for wastewater and drinking water support improvements that upgrade

infrastructure. Security improvements, including the removal of gaseous chlorine, are typically incorporated into capital costs of such infrastructure improvements rather than being considered separately.[1]

What has been missing is a strategic approach to address first the highest hazard water utilities. A federal presence can set a national security priority for converting the remaining water utilities that still use bulk toxic inhalation hazard chemicals. This is a legitimate role that the federal government can perform.

A GAO experts' panel ranked replacement of gaseous chemicals with less hazardous alternatives as the highest federal security funding priority at water utilities.[2] This panel identified direct federal grants and cost-shared grants as the most effective way to distribute funds. The panel also identified characteristics of utilities that could be used to set funding priorities, including serving critical infrastructure, using large amounts of gaseous chemicals, and serving large populations.

3. You mention situations "where facilities don't save money" when switching to different chemical disinfectants. In what circumstances would this occur?

Conversion costs vary widely. Cost factors include the size and characteristics of the facility, and whether the change is part of a larger facilities upgrade (e.g., replacing an undersized building at a utility that has a growing service population). Factors include the disinfectant method selected, construction and capital costs, chemical costs, and cost savings on elements such as regulatory compliance, training, operations, safety devices and security measures, emergency preparedness, and, potentially, on liability associated with a major chemical release.

Proposed federal security legislation would require water utilities to assess conversion costs, including avoided costs and liabilities. These assessments will help each utility to make informed decisions, in particular by thoroughly identifying avoided costs that may otherwise go unrecognized. In our

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[1] U.S. Environmental Protection Agency, "Drinking Water Infrastructure Needs Survey and Assessment, Fourth Report to Congress," February 2009, EPA 816-R-09-001, Page 13.
[2] U.S. Government Accountability Office, "Wastewater Facilities: Experts' Views on How Federal Funds Should Be Spent to Improve Security," January 2005, GAO-05-165.

surveys we have found that chemical facilities may have general construction and chemical cost information, but tend not to have ready information or analysis of costs avoided with safer alternatives.

4. In your written testimony, you say that "of 195 converted facilities that provided general cost information, 49 percent reported the changes cost less than $100,000, and 87 percent reported conversion costs below $1,000,000." Is it safe to assume then that 13 percent reported conversion costs over $1,000,000? What was the maximum conversion cost reported?

Yes, about 13 percent reported conversion costs over $1,000,000. However, facilities that reported larger costs also generally reported that the costs were part of larger facility upgrades (an opportune time for switching to safer operations). Two facilities reported costs over $20 million. Flat glass manufacturer PPG Industries, Fresno, Calif., spent $40 million to upgrade its combustion system, realizing improved product quality and process efficiency. Detergent manufacturer Proctor and Gamble, Pineville, La., spent $50 million while installing equipment on-site that removed the cost and danger of having another company make and ship oleum to the site. These facilities upgraded their processes for many reasons, including improved industrial efficiency and productivity. Reduced vulnerability to an accidental or deliberate release of gaseous chemicals was only one benefit of the changes.

5. You also state that "of 20 big city water and wastewater facilities that converted, the highest cost per customer served was $1.50 per year in construction and operating costs." Will this cost per customer increase for smaller water and wastewater facilities?

As noted, conversion costs vary widely and facility size is only one factor. However, cost savings may be more available to smaller facilities. This is because avoided costs such as regulatory compliance tend to comprise a larger proportion of overall utility costs at smaller utilities. For example, by converting a utility may avoid costs of complying with EPA Risk Management Planning, OSHA Process Safety Management, and future chemical security requirements. Larger utilities tend to more readily absorb such costs within existing compliance programs and staff.

Proposed legislation (S.3598) includes "tools, methodologies, or computer software" to assist lower-tier water utilities (typically smaller facilities). These resources are intended to reduce the costs to utilities of preparing vulnerability assessments and site security plans.

6. If switching away from gaseous chlorine were to create a potential health problem for a utility, should they be forced to switch?

Proposed legislation (S.3598) adequately addresses this issue by requiring utilities to substantiate the problem using a reasonable standard. It requires a utility to substantiate any health hazard of converting in the site security plan submitted to the State and Administrator, and sets a standard for such claims as the inability to comply with drinking water or wastewater requirements of the State or political subdivision in which the utility is located.

The proposal would require the utility in preparing an assessment of methods to reduce consequences to "take into consideration factors appropriate to the security, public health, and environmental mission of the covered water system". This includes assessing how each method could, if applied, "affect the presence of contaminants in treated water, human health, or the environment".

The proposal also includes a realistic standard: "Before making a determination to require implementation of a method to reduce consequences of a chemical release from an intentional act…the State or the Administrator, as applicable, shall take into consideration *factors appropriate to the security, public health, and environmental missions* of covered water systems, including an examination of whether the applicable method to reduce the consequences of a chemical release from an intentional act...*would not render the covered water system unable to comply with other requirements of this act or drinking water standards* established by the State or political subdivision in which the covered water system is located" [emphasis added]. There is parallel language for wastewater treatment works, and a full appeals process.

7. Onsite generation uses a lot of electricity, protecting hypochlorite from degrading in hot climates often requires refrigeration, and transporting by truck, as is often done with bleach shipments, uses more

fuel than shipping by rail. Have you or any of your colleagues done any studies on the effects of chemical switching on carbon footprints?

I am not aware of any specific studies. However, chemical disinfection accounts for a tiny portion of energy used at a typical drinking water utility. A report by the Electric Power Research Institute indicates that a typical surface water treatment plant consumes about 1,406 kWh per million gallons of treated water, of which chlorine disinfection accounts for only 0.20 kWh (0.00014 percent) – or about one ten-thousandth of energy used.[3] Chlorine disinfection accounts for an even tinier portion of energy used in groundwater production. Actual energy use is highly variable by location, depending primarily on the amount of water pumping.

Wastewater disinfection may be more energy intensive, and may more commonly include treatment with ultraviolet light. A study prepared for Pacific Gas and Electric compared the energy intensity of chlorine/hypochlorite processes to ultraviolet light, stating that "[o]n a global energy basis, it appears that UV disinfection can be competitive with chlorine/hypochlorite disinfection and dechlorination."[4]

Producing chlorine is energy intensive regardless of production location, and energy use is similar for producing chlorine gas or hypochlorite. Water utility pumping and flow equipment are also quite similar for chlorine gas and purchased hypochlorite in terms of energy use. Transportation energy use varies by material, distance, mode, and whether the disinfectant is generated on-site. One utility reported that energy use fell with hypochlorite since the utility no longer had to power chlorine gas evaporators to heat and convert chlorine gas that had been liquefied by pressure for shipping.[5] Energy used for emergency response and recovery is presumably much greater for chlorine gas than for hypochlorite in the event of a major release.

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[3] Electric Power Research Institute, "Water & Sustainability (Volume 4): U.S. Electricity Consumption for Water Supply & Treatment - The Next Half Century," March 2002, Figure 2-1.
[4] Pacific Gas and Electric Company, "Energy Benchmarking Secondary Wastewater Treatment and Ultraviolet Disinfection Processes at Various Municipal Wastewater Treatment Facilities," 2001.
[5] U.S. Government Accountability Office, "Securing Wastewater Facilities: Costs of Vulnerability Assessments, Risk Management Plans, and Alternative Disinfection Methods Vary Widely," March 2007, GAO-07-480.

Senator LAUTENBERG. Thank you very much.
Mr. Perea.

STATEMENT OF CARLOS PEREA, CHIEF EXECUTIVE OFFICER, MIOX CORPORATION

Mr. PEREA. Senator Lautenberg, good afternoon.

My name is Carlos Perea. I am the CEO of MIOX Corporation. We are a company that has been solving water quality issues for approximately 20 years. Our products are used in U.S. Naval ships as well as some of the top resorts and hotels around the world.

But the majority of our experience has been in serving the needs of the municipal drinking water facilities around the country, and our systems are used by hundreds of facilities in 45 States. I actually brought a small example of the technology and the small purifier pen which is standard issue for U.S. Marines for drinking water.

It is an honor to be a part of this discussion regarding the safety and security of our Nation's water treatment facilities. I have three simple messages for this Committee and welcome any questions.

The first is, please know there are well-tested solutions that can virtually eliminate the safety and security issues of concern. Second, these solutions do not have to cost more money and do not have to add burden to the treatment facilities and the communities. And third, without responsible legislation the rate of change will continue to be slow, and the majority of our communities will be vulnerable to accidents, or worse, to deliberate acts of terrorism for years to come.

We have all read about and heard about the risks to large urban facilities and communities, that as many as 6 times the number of people who died in the horrific acts of 9/11 could be affected in the event of a gaseous chlorine spill in an urban area.

However, I want to talk more about the dangers to our small rural communities. I believe these are the ones that we should be concerned about, both given their numbers and the likelihood they may not be as well resourced with the same safety and security precautions as larger cities.

I believe the best way to deal with these risks are to eliminate the need to store and transport these chemicals altogether, and this is entirely possible with a well-proven approach. As was mentioned earlier, MIOX is part of a larger industry segment called onsite generation of disinfection chemicals.

MIOX, along with others, has the ability to take ordinary salt, power, and water and to convert it into a chlorine base that is very powerful and effective but yet very dilute and safe and can be used as a complete alternative to gas and chlorine systems, including commercial strength bleach. The process uses electrolysis, and the only by-product is hydrogen gas that is easily vented.

This approach has several benefits. First, it is completely compliant with EPA drinking water standards. Second, it eliminates the need to store and transport chemicals altogether. Third—and importantly—it saves money and can often achieve 50 percent cost savings or more over the life of the equipment. It is more environmentally responsible. It reduces the number of truckloads of chemi-

cals that must be delivered. And it eliminates the need to decontaminate used containers.

But most importantly it is very simple for the users to adopt, and existing systems can be retrofitted with no downtime and minimal training. This approach is used in over 5,000 installations, many of which have been in service for 10 years or more, some of which are very small communities of 2,000 or less.

To give you three brief examples. The city of Santa Fe has been using MIOX systems since 1998 and has published reports of better overall water quality and lower operational costs. In the last several months Lakehaven Utility in Washington decided to switch from both gas and liquid chlorine for safety benefits. They also found they were able to save over $850,000 over the projected life of the project.

But the most compelling example that I would like to share with you is from Apple Valley, California, that switched over 10 years ago due to safety concerns from caustic liquid bleach.

To quote one of their operators, these are the folks who are actually working with the chemicals day in and day out; before switching to onsite generation in Apple Valley we literally had to employ a shower at every site. Transferring the liquid bleach was a slippery mess—we had to get geared up in full facials, goggles, aprons, the works every time. When we switched to onsite and were given the proper training, the installation was problem free, we didn't need any special protective equipment or gear, it was easy to get the salt, it was totally safe, and we saw huge cost savings.

So, if these systems are safer and they can save money, why would all communities not follow these examples? And why should we consider additional regulations? I believe there are many reasons. Many of these communities are working hard to meet EPA drinking water standards. However, they have no clear signal on how much they need to focus on overall safety and risk.

Some communities have tried new approaches only after an accident or a near miss with hazardous chemicals. Others have adopted because they are proactive and want to save money or want to be more environmentally responsible. But the majority are not likely to change, at least not very quickly, unless they are prompted. They may just be too busy with day to day operations or other priorities.

Whatever the reasons, I believe it is time to take steps to make our communities safe from these toxic chemicals. If we can make them safer and reduce operational costs, why wouldn't we? I hope it does not take a tragic accident or deliberate act of terrorism for us to help the rest of the Nation's communities and drinking water systems take notice.

[The prepared statement of Mr. Perea follows:]

Senate Committee on Environment and Public Works

July 28, 2010

"Protecting America's Water Treatment Facilities"

Testimony of:

Carlos Perea,

MIOX Corporation

Albuquerque, New Mexico

Introduction

Chairman Barbara Boxer, Ranking Member James Inhofe, and distinguished Members of the Committee, thank you for inviting me here today. My name is Carlos Perea, and I am the CEO of MIOX Corporation, a company that has been solving water quality issues for approximately 20 years. Based in Albuquerque, New Mexico, MIOX manufactures on-site generators (OSGs) for water disinfection. Using just ordinary food grade quality salt, power, and water to produce a very powerful and effective, but very safe, chemical alternative to gas chlorine and commercial strength bleach, OSGs eliminate the security and safety hazards associated with transporting, handling, and storing potentially dangerous chemicals. With more than 1,500 OSG installations in hundreds of U.S. communities and over 30 countries, MIOX systems are treating more than 6.5 billion gallons of water per day, serving millions of people worldwide, including a recent series of cost-effective, easy-to-install OSG systems in the poverty-stricken state of Chiapas, Mexico, where poor water quality had been a staggering source of illness and death. On-site generation is safely used for potable water, wastewater and reuse, commercial swimming pools, on board military and cruise ships, cooling towers, food processing, the beverage industry, other commercial and industrial applications. MIOX technology was developed under a government contract at Los Alamos National Labs to create a portable water disinfection unit for use in any remote location. In addition, the technology was designed to achieve purification standards of Type II, highly contaminated water as defined by US Environmental Protection Agency (EPA).

Over the years, our science and technology teams have worked with numerous agencies to promote safe water treatment around the world in both remote and populated areas. These groups include the Pan American Health Organization (PAHO), the Centers for Disease Control and Prevention (CDC), the Department of Homeland Security (DHS), the World Health Organization (WHO) and other internationally-recognized scientists from institutions and universities. The hand-held purifier development is one of DARPA's success stories, and continues to serve our men and women in uniform.

Although MIOX is just one of many companies that have been manufacturing on-site generators since their inception in the 1970s, it is my privilege to be here today to share with you, on behalf of the industry, how on-site generation is a safe, economical, and effective water disinfection method that can significantly reduce security and safety risks at American water treatment facilities. OSG is a well-tested solution that can virtually eliminate the safety and security issues of concern. It does not have to cost more money or add burden to the treatment facilities and communities, and is fully compliant with current drinking water regulations.

But despite these compelling reasons to switch to on-site generation - a proven, affordable, readily available option - not all communities are adopting OSG, instead continuing to use traditional, more dangerous technologies. Some communities only adopt safer approaches after an accident or close call with the storage or transport of their hazardous chemicals, while others prefer a proactive stance, switching for safety, security, or environmental reasons. But most are not likely to change, at least not until they are prompted, despite the competitive cost comparisons to traditional forms of chlorination. They may not realize how easy it is to change, or how much they could save in operations costs. Or, more likely they are just too busy with day to day operations and other priorities. While many US communities are working hard to meet EPA drinking water standards, they may not have a clear understanding of how best to address risks and overall safety. Without responsible legislation, the rate of change will continue to be slow, leaving the majority of our communities vulnerable to accidents, or, worse, to deliberate acts of terrorism for years and decades to come.

The Basics of Water Disinfection

Chemical disinfection of public drinking water supplies, started in the United States in 1908 with the use of chlorine, has been heralded by the US CDC as one of the 10 great public health

improvements of the twentieth century to control infectious diseases. This global water treatment practice is one component of the multi-barrier approach to water treatment that also includes source water protection, sedimentation, filtration, and maintaining the integrity of the distribution system. [i]

Disinfection of public water supplies as well as reused water and wastewater discharged to streams and lakes is required in the United States under provisions of the Safe Drinking Water Act and Clean Water Act. Some states have imposed additional requirements for disinfection. Disinfectant selection is central to the design and operation of drinking water, wastewater, and reuse systems. Our understanding of methods to safely deliver chlorine has significantly improved since 1908, when chlorine gas was the only option available.

Chlorine gas, bulk bleach (hypochlorite), and chloramines are commonly used to chlorinate water systems, but each of these technologies involves at least one hazardous chemical. The EPA and DHS are promoting safer chlorination alternatives to minimize the risks associated with hazardous chemicals during transport, storage, and use. Classified as an inherently safer technology, on-site generation significantly minimizes risks and satisfies the EPA distribution system chlorine residual requirement.

Gas Chlorination Imposes National Security and Safety Risks

While chlorine gas has been used successfully for over 100 years to eliminate diseases in drinking water, it is a pressurized poisonous gas that causes serious injury and even death upon inhalation. In fact, chlorine gas was used as a chemical weapon during World War I and is heavily regulated by the EPA. Moreover, it is a potential terrorist target for release or theft of small cylinders. Worst case scenario risk assessments performed by utilities indicate that millions of people could perish if large quantities of gas were released in an urban area. Although the safety record for chlorine gas is admirable considering its rate of use, tragedies continue to occur daily with accidents at water treatment facilities, train or tanker truck wrecks, and other disasters that cause additional loss of life due to the toxic nature of the chemical.

Fundamentals of On-Site Generation

With OSG, chlorine-based disinfectant is generated on site, on demand, using just salt, water and power, replacing the need to purchase, transport and store dangerous chemicals. Creating

disinfectant on site is cost effective and environmentally responsible, cutting back transportation requirements by up to 80%, reducing carbon emissions and fuel consumption, and eliminating the storage and disposal of chemical containers.

With an OSG system, a brine – salt and water - solution is passed through an electrical current to produce hypochlorite, or bleach, via electrolysis. The low-concentration disinfectant ($\leq 0.8\%$) is collected in a storage tank and metered into the water stream on-demand. While on-site generators are also used industrially and commercially to provide disinfection for swimming pools, cooling towers, and sanitation for clean-in-place operations, the largest application of OSG technology is municipal drinking water disinfection. Many water municipalities are moving away from more traditional chlorine delivery systems such as chlorine gas, concentrated sodium hypochlorite, and bulk calcium hypochlorite, and turning instead to OSG systems as a safer, more cost-effective disinfection method that also has less environmental impact. For example, it is estimated that it takes one delivery of salt to produce the same amount of chlorine as five deliveries of 12.5% sodium hypochlorite – bulk bleach - solution. Using OSG reduces the carbon footprint of the plant because less fossil fuel is needed to supply the plant with disinfectant.
On-site generation is simple to adopt; systems can be retrofitted with no downtime to the plant operations and minimal training.

On-Site Generation (OSG) is an Inherently Safer Technology
One of the biggest driving forces behind OSG systems is the need to provide safer technology and safer storage to communities throughout the world, without compromising production or quality. Since many water treatment facilities are located adjacent to day care centers, schools, subdivisions and businesses, safety is an important consideration. The OSG process used by MIOX and other companies eliminates the transportation, handling, and storage of hazardous water disinfection chemicals like chlorine gas and delivered concentrated bleach.

Many utilities have converted to purchasing bulk quantities of sodium hypochlorite in an effort to mitigate this hazard. In general, bulk sodium hypochlorite is considered to be safer, but it still poses the potential for a toxic release, particularly when spilled or inadvertently combined with other chemicals. Exposure to a heat source can cause spontaneous ignition.

In contrast to alternative disinfection methods, the safe on-site generation of hypochlorite uses only salt, water, and power as feed stocks. Neither the salt nor the hypochlorite produced is classified as hazardous by the regulatory agencies. On-site generation for municipal water treatment has an excellent safety record, with approximately 6,000 units, from a variety of manufacturers, installed worldwide.

Apple Valley, California, converted to OSG in 1996 after concerns with the hazards of caustic 12.5% bulk bleach drove them to seek a safer alternative. "Before switching to on-site generation," reported Mark Beppu, Control and Instrumentation Technician at Apple Valley, "we literally had to have a portable shower at every site. Transferring the liquid bleach with a tube was a slippery mess and we were all geared up in full face shields, goggles, aprons - the works - every time. When we switched to on-site, we were given proper training, installation was problem-free, and we didn't need any special equipment or gear. The salt was easy to get, totally safe, and we saw a huge cost savings. The run times vary by location, but a typical unit runs about 2.5-3 hours a day and makes a bunch of disinfectant."

Improved Operator Safety

In addition to the broad-range security risks posed by gas chlorination, they also pose a variety of hazards to the operator. Chlorine gas is probably the most hazardous source of chlorine used by water treatments plants; it is toxic and the use of chlorine gas cylinders also poses a pressure hazard. Industrial strength bleach used for water disinfection is a 12.5 percent-by-weight solution, which is caustic. OSG systems use only water and salt and produce nonhazardous oxidant solutions with a chlorine content that typically contains less than 0.8 percent free available chlorine. Treatment plants that use OSG systems typically have to face less oversight from state health agencies, provide less safety training for operators, and have less of an insurance issue compared to those using traditional forms of chlorine.

On-Site Generation is Cost-Effective

Because it is unnecessary to continuously purchase expensive chlorine chemicals, on-site generators typically produce chlorine at a much lower cost than traditional delivery methods. Additional savings are also realized by decreased safety-related and transportation costs,

including possible lower insurance premiums. Although OSG systems may present a significant up-front capital equipment cost, many water plants realize a return on their investment in OSG equipment within two to three years.

Recently, the Lakehaven Utility District, located between Seattle and Tacoma, installed a new MIOX on-site generator, replacing the gas chlorine and bulk bleach currently employed. The Lakehaven Board of Commissioners voted to upgrade the facility to a MIOX on-site generator based on safety and cost efficiencies. A capital lease program allowed Lakehaven to improve their facility at less cost to the utility than a capital equipment purchase or the monthly cost of chemicals.

"Switching to MIOX was a carefully considered decision," said Chris McCalib, wastewater operations manager, Lakehaven Utility District. "We knew we needed to address the potential costs and complications associated with process safety management if we were to continue to use gaseous chlorine. At the same time, we had microbiological issues that we needed to address, particularly filamentous bacteria in the secondary treatment system. It made sense to go with on-site generation for safety and cost benefits, and after careful scrutiny and evaluation, we chose MIOX because of their excellent safety record and the superior effectiveness..."

Cost Comparison with Other Chlorine Technologies The cost of operating an on-site generation system depends on the cost of salt and power. In general, the lifecycle cost of on-site generation is very competitive with chlorine gas alternatives, and is typically less than delivered hypochlorite and the advanced disinfection technologies of chlorine dioxide, ozone and UV.

Maintenance needs are nominal, particularly for systems using good quality salt. In addition, the elimination of hazardous chemicals translates into reductions in regulatory paperwork, safety training requirements, safety inspections, and liability exposure.

Transportation Costs The cost of freight significantly impacts the daily costs of chemical disinfectants. Given that the OSG process only utilizes salt, power and water, the freight costs are far less. Many more deliveries of bulk bleach are required for the same chlorine equivalent generated by a single delivery of salt.

As fuel costs rise, this variable becomes even more influential. Rises in the cost of fuel and subsequent rises in freight equate to a significant increase in the cost of bulk bleach.

High Quality Chemicals

Since hypochlorite quality degrades during time in storage, older hypochlorite contains progressively less free available chlorine, becoming less effective. Degradation of the product can become an issue in areas that are required to have 30-day or higher supplies of disinfectant chemicals on hand. OSG systems, on the other hand, typically produce only a two- to three-day supply of chlorine at a time, thus providing a potent disinfectant. Salt does not decompose, so that long-term requirements can be met by storing enough salt to comply with regulations. This is especially important for smaller, rural communities that purchase larger quantities of bulk bleach to save money up front, then find that the degradation of the product in storage is only a percentage of its original strength. This can create problems with dosing to meet regulations and is avoided when fresh OSG solutions are used.

On-Site Generation is a Proven Disinfection Method

On-site generation is not a new and innovative technology; it has been disinfecting water for decades. Collectively, OSG providers, including MIOX, have well over 5,000 installations worldwide, including many systems that have been employed for over 10 years. For example,

City of Bloomfield, New Mexico

Commissioned 1998, 2.7 MGD

The water treatment plant for the City of Bloomfield, New Mexico, with a population of just over 6,000, had been disinfecting their water using gas chlorine stored in 1-ton cylinders, then injected into the water stream to disinfect. OSHA requires submittal of a Process Safety Management (PSM) plan for over 1,500 pounds of chlorine stored on-site, while EPA requires a Risk Management Plan (RMP) for 2,500 pounds stored on-site. Since the MIOX solution produces disinfectant as needed, and the concentration is so dilute, regulatory paperwork was reduced or eliminated.

Cedar Knox Rural Water Project, Nebraska

Commissioned 2000, 300,000 -700,000 gallons per day

Before 2000, the rural community of Cedar Knox – with just over 1,000 residents – had been using gas chlorine to treat its water system. Operators had to transport 150-pound chlorine gas cylinders from the office-warehouse building 45 miles to the treatment plant via pick-up truck. The last 8½ miles were over graveled country roads that could be difficult to travel, especially in inclement weather. By switching to on-site generation, employees only had to transport harmless food-quality grade salt, without the safety and security concerns associated with having hazardous chemicals at the plant.

City of Las Vegas, New Mexico

Commissioned 2000, 3.5 MGD

Situated 65 miles east of Santa Fe with a population of approximately 14,000, Las Vegas, NM required two one-ton chlorine gas cylinders totaling 4,000 pounds, putting them above the EPA limits for a Risk Management Program. Changing out the cylinders required two operators with full gas masks and air tanks and another person outside the chlorine room on standby. A fourth person would wait by the phone for a quicker response in the event of an accident. In contrast, on-site generation involves no hazardous chemicals whatsoever. According to the operators, "The safety aspect alone of MIOX would pretty much sell anybody."

City of Crossville, Tennessee

Commissioned 2000, 3.5 MGD

The City of Crossville, Tennessee, located 110 miles east of Nashville, operates two water treatment plants that serve the City's community of 11,500. In 1999, Crossville began investigating water disinfection methods in an effort to improve the safety of their plants, reduce the potential liability involved with using and storing gas chlorine, a hazardous and regulated chemical, and reduce disinfection byproducts (DBPs). Between the inherent safety risks involved with transportation of gas chlorine and stricter regulations imposed by the Risk Management Program and the Disinfection Byproducts Regulations, a section of the Safe Drinking Water Act, chlorine gas was no longer an

attractive water disinfection method.

Since 2000, MIOX reduced operational costs for the City of Crossville while eliminating the safety and liability issues involved with using chlorine gas. Crossville has recently upgraded to newer, more efficient MIOX OSG systems that have been running successfully since January 2009.

North Table Mountain, Colorado
Commissioned 2000, 5 MGD

North Table Mountain, with approximately 10,000 residents, was concerned both with public safety and plant personnel safety. An accidental release of chlorine gas meant possible harm to an operator or nearby residents, including large new subdivisions and a lake area across the street that is a popular destination for boaters and fishers. With on-site generation, the site no longer uses, produces, stores, or transports any hazardous materials. Liability has been reduced, the plant no longer has to maintain a Risk Management Program or file reports with the local fire department, and the operators no longer need to attend HAZMAT training or use safety equipment.

Sangre de Cristo Water Company, Santa Fe, New Mexico
Commissioned 1998-2002, 3.5 MGD

Capital of New Mexico and cultural hotspot, Santa Fe wanted to help secure the safety of their community and tourists by eliminating chlorine gas. The treatment plant stored 3 tons of chlorine gas at the plant. One well field stored 1-ton cylinders at the site, while five others had 150-lb. cylinders stored around the city in residential areas and commercial districts. Delivery trucks traveled up a very narrow residential road to the plant, which is above a heavily-touristed area. By switching to on-site generation in 1998, Santa Fe eliminated the need to transport, store, or handle chlorine gas, and is not required to develop an EPA Risk Management Plan or an OSHA Process Safety Management plan, and is no longer required to conduct HAZMAT training.

Summary

Today, we need to protect America's water treatment facilities. On-site generation is a proven method to do just that, economically and fully in compliance with current drinking water regulations. I believe the risks are real and are much more widespread than is often reported. We have all read about findings from the Department of Homeland Security that estimate how a single major chlorine gas spill in a urban area could kill 17,500 people, or about 6 times as many that died in the horrific attacks of September 11. Or another study done by a major insurance company that a rail spill of chlorine could cause over $7 billion in damages, a catastrophe that would be in the unfortunate league of the current Gulf oil spill crisis.

While these figures are alarming, the reality is that this dangerous situation is not limited to urban areas and mass scale events. It is the smaller, rural communities that also have real danger from these toxic chemicals that are transported and stored as part of today's water treatment processes. In many respects, these smaller communities probably pose more of a danger given their numbers and the likelihood that they may not be resourced to take the same safety and security precautions as larger cities.

The best way to deal with these potential risks is to eliminate the need to store and transport these dangerous chemicals all together.

This approach:

a) Is completely compliant with existing EPA drinking water standards;
b) eliminates the need to store and transport hazardous chemicals altogether;
c) saves money, typically achieving cost savings of 50% or more over the life of the equipment;
d) is more environmentally responsible as one truckload of salt equals 5 trucks of delivered chemical and it eliminates the need to decontaminate used containers;
e) is simple for existing users to adopt as systems can be retrofitted with no downtime and minimal training.

Moreover this approach is well tested with approximately 6,000 existing installations, many of which have been in service for 10 years or more and many of which are very small communities of 2,000 residents or less.

So, if these systems are safer and can save money, why aren't all communities following these examples and why should we consider additional regulations? I believe there are many reasons. Many of these communities are working hard to meet EPA drinking water standards. However, they have no clear signal on how much they need to focus on overall safety and risk. Some communities have only adopted these approaches after an accident or near miss with their hazardous chemicals. Others have adopted because they are proactive and want to take steps to be safer, lower cost and more environmentally responsible. But most are not likely to change, at least not until they are prompted. They may not realize how easy it is to change, or how much they could save in operations costs. Or, more likely they are just too busy with day to day operations and other priorities.

Whatever the reasons, I believe it is time we take steps to make our communities safe from these toxic chemicals. If we can make them safer and reduce their operational costs, why wouldn't we? I hope it doesn't take a tragic accident or deliberate act of terrorism for us to help the rest of the nation's communities and drinking water systems to take notice. Thank you for your consideration on this critical public concern.

[i] Source: www.awwa.org

Environment and Public Works Committee Hearing
July 28, 2010
Follow-Up Questions for Written Submission

Questions for Perea

Questions from:

Senator James M. Inhofe

1. I am aware of several concerns that stem from onsite generation of and use of hypochlorite disinfection. I understand excess hydrogen gas is one byproduct of the onsite generation process. Also, hypochlorite solutions can contain impurities such as bromate, chlorate, chlorite and even perchlorate. Is MIOX doing any studies or working with research institutions on dealing with the potential problems created by hypochlorite use or generation?

For the record, in response to Senator Inhofe's questions.

1. On site generation of hypochlorite is much safer than the storage and transportation of traditional chemicals. Yes, hydrogen gas is a by-product of the process of using on site generation systems such as MIOX equipment. However, this is at very low levels and is safely vented to the atmosphere. MIOX and other producers design equipment with safe operations in mind. In the case of MIOX we have hired an outside, third party expert agency, The Hydrogen Safety Council,the same group that performs hydrogen safety for NASA, to certify our designs as safe. See the attachment for details. Moreover, these systems have been installed and in use in many US EPA regulated public drinking water facilities for over 14 years with excellent safety records and a history of cost savings and improved performance.

2. On site generated hypochlorite is actually much less likely introduce impurities or unwanted by products into the public drinking water including formation of perchlorate and chlorates. On site generation is the same basic chemical as delivered commercial bleach or chlorine. However, because it is freshly made there is less chance of the unwanted by products that form with chemical aging and exposure to heat and the environment. This has been studied in conjunction with leading academic researchers as well as with industry experts at Southern Nevada Water Authority. We have also submitted plans for additional NSF funded research to understand how to optimize this process.

HYDROGEN SAFETY, LLC

Douglas M. Rode, P.E.
Principal & Managing Director

HYDROGEN SAFETY IN MIOX ON-SITE GENERATORS

MIOX Corporation is the safety leader for hydrogen mitigation for on-site generation technologies. Their designs use liquid barrier hydrogen ventilation systems to confine hydrogen to piping systems and eliminate accumulation of hydrogen gas in large spaces, such as the oxidant storage tanks. They offer hydrogen dilution air systems for any size system, and the dilution air systems are standard equipment on the larger generators. Their latest generation of product offerings utilizes a common blower for power supply cooling and hydrogen dilution air, offering their customers greater safety at reduced costs.

Their designs utilize compact, small volume cells that minimize hydrogen gas accumulation. Their cells are designed for low rupture pressures to avoid energetic rupture of the cell in the event of a detonation in the cell. Indeed, their safety record in this regard is excellent. To further protect operators from an abnormal cell rupture, cabinet designs in their larger systems have been designed and tested to contain a cell in the event of a detonation.

Dilution air systems from MIOX are based on a dual blower design for redundancy and safety. Air dilution flows are based on a ratio of 100 parts air to each part of hydrogen produced in the generator. As such, hydrogen concentration is maintained at a maximum level of 25 % of the lower explosive limit (LEL) of hydrogen (4.1%). Controls are fully integrated with the on-site generators to ensure safe shutdown in the event that dilution airflow is not detected in the ductwork at the discharge from the facility. Hydrogen gas detectors are offered to provide a positive indication of hydrogen leaks from the system. These systems can be interlocked to the on-site generators to ensure safe shutdown in an abnormal condition.

MIOX Corporation is among the first companies to have one of their key technical staffers (Director of Engineering) trained as a hydrogen safety specialist. Hydrogen Safety, LLC, who is an independent third party engineering consultant on hydrogen risks, has reviewed many of the company's designs, contract documentation, and labeling information to provide for personnel safety and system integrity.

Submitted By:

Douglas M Rode

March 16, 2007

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Senator LAUTENBERG. Thank you very much.
Dr. Sivin.

STATEMENT OF DARIUS D. SIVIN, PH.D., LEGISLATIVE REPRESENTATIVE, INTERNATIONAL UNION, UNITED AUTOMOBILE, AEROSPACE AND AGRICULTURAL IMPLEMENT WORKERS OF AMERICA (UAW)

Mr. SIVIN. Senator Lautenberg, thank you for the opportunity to testify today.

I am Dr. Darius Sivin, Legislative Representative for the International Union UAW. We represent over 1 million active and retired workers. Before serving as a Legislative Representative I worked as an industrial hygienist at the UAW where one of my responsibilities was facility visits and worker training related to chemical safety.

Although this is not a legislative hearing I would like to begin by urging the Committee to mark up and quickly approve S. 3598, the Secure Water Facilities Act, and to make the improvements identified in this testimony.

The UAW appreciates the opportunity to testify at this hearing on protecting America's water treatment facilities. We are greatly concerned about the security of toxic inhalation chemicals at these facilities because our members get hurt first and worst in any attack.

We represent workers at the Detroit Wastewater Facility which uses railcars of chlorine gas. The fact that Detroit has recently been a terrorist target last Christmas increases our concern for the more than 2 million people—including many of our members—who live and work in the vulnerability zone of the Detroit Wastewater Facility.

We are encouraged that 11 wastewater treatment facilities in Michigan have already converted from chlorine gas to ultraviolet or liquid chlorine bleach. It is likely that the Detroit facility can do the same.

We believe that water facility chemical security legislation will create jobs, and this belief is supported by a recent report by Management Information Services. It is hard to imagine otherwise given that the legislation requires public facilities to invest in security, and this requirement is accompanied by funds to help defray the costs. Moreover, water facilities cannot be closed or moved far away without being replaced locally. Every community needs drinking water and wastewater treatment.

I want to emphasize that assessment and implementation of methods to reduce the consequences of attack are important security measures. They are security measures. Government agencies should be able to require a facility to implement its own plans to reduce the potential consequences of an attack. The bipartisan Partnership for a Secure America has stated the development of inherently safer, economically beneficial, and efficient technology should be prioritized.

In a 2007 piece titled The Next Attack, Dr. Stephen Flynn, President of the Center for National Policy and a former Fellow of the Senate Foreign Relations, said the following. Public water filtration plants use large quantities of chlorine, one of the gases used as a

weapon during World War I, lethal for anyone caught downwind, potentially placing tens of thousands of people at risk. This risk could be alleviated by replacing chlorine with sodium hypochlorite, the active ingredient in household bleach.

We fully agree with these security experts that methods to reduce the consequences of an attack are important security measures. We are pleased that your bill, S. 3598, provides for assessment and appropriately conditional implementation of methods to reduce the consequences of an attack.

We believe that vulnerability assessments and site security plans can benefit from workers' direct and current knowledge and experience of facility operations. Moreover, union staff that enters multiple facilities in the course of their work can bring the best nonproprietary ideas from one facility to another. For that reason, we are pleased that S. 3598 provides for including workers and their representatives in the development of vulnerability assessments and site security plans.

We favor a statutory requirement for facilities to provide copies of vulnerability assessments and site security plans submitted to Government agencies to the very employees and representatives who participated in developing them. Without such a requirement the minority of employers who are unscrupulous could change the assessment prior to submitting it.

Water facility security legislation must also include language requiring employees to be trained in methods to reduce the consequences of attack. In my written testimony I have identified a number of ways in which we believe that the information and accountability in the legislation can be expanded. Let me just add that we do not think that there should be criminal prosecutions for sharing what may or may not be protected information.

In conclusion, even though this is not a legislative hearing we urge the full Committee to mark up and quickly approve S. 3598, the Secure Water Facilities Act, and make the following improvements: Require employees to be trained in methods to reduce the consequences of attack, require employers to provide copies of vulnerability assessments and site security plans to those who participated in development of them, expand public disclosure of information, and eliminate criminal penalties for disclosing information about vulnerability in the absence of criminal penalties for noncompliant employers.

We look forward to working with this Committee to make this happen.

Thank you very much.

[The prepared statement of Mr. Sivin follows:]

TESTIMONY OF

DARIUS D. SIVIN, PHD

LEGISLATIVE REPRESENTATIVE

INTERNATIONAL UNION, UAW

on the subject of

PROTECTING AMERICA'S WATER TREATMENT FACILITIES

before the

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

UNITED STATES SENATE

July 28, 2010

Senator Boxer, Senator Inhofe, Members of the Committee, thank you for the opportunity to testify today. I am Dr. Darius Sivin, a Legislative Representative for the International Union, United Automobile, Aerospace & Agricultural Implement Workers of America (UAW). The UAW represents over one million active and retired workers. I have been serving as a legislative representative for the UAW since November, 2007. Previously, I worked in the UAW Health and Safety Department as an industrial hygienist. In that capacity, one of my responsibilities was to participate in facility visits and worker training related to chemical safety.

Although this is not a legislative hearing, I would like to begin by urging the Committee to mark up and quickly approve S.3598, the Secure Water Facilities Act and to make the improvements that will be identified in this testimony.

UAW's Interest in Security of Water Facilities

The UAW appreciates the opportunity to testify at this hearing on "Protecting America's Water Treatment Facilities." The security of toxic inhalation chemicals at these facilities is an issue of great concern to us because our members will get hurt first and worst in the case of an attack. We represent workers at the Detroit wastewater facility, which uses rail cars of chlorine gas. Because so many of our members live and work in the vulnerability zone of the Detroit wastewater facility, which includes over 2 million people, we are concerned about the fact that Detroit has been a terrorist target as recently as last Christmas. We are encouraged by the fact that eleven wastewater treatment facilities in Michigan have already converted from chlorine gas to ultraviolet light or liquid chlorine bleach. It is likely that the Detroit facility can do the same.

Water Facilities Should be Covered by Chemical Security Legislation

The UAW and more than 100 coalition partners who recently signed a letter endorsing S.3598, the Secure Water Facilities Act, believe that water facilities should be covered by security legislation. In 2006, the Government Accountability Office reported that two thirds of large U.S. wastewater facilities use a disinfectant other than chlorine gas or plan to switch away from chlorine gas[1]. An April, 2007 report by The Center for American Progress (CAP) indicated that, between 1999 and 2007, at least six drinking water and 19 wastewater facilities that had previously used chlorine gas by the rail car switched to a less hazardous disinfectant, such as liquid bleach or ultraviolet light. As a result, about 26 million people in nearby communities and millions more along rail delivery routes were no longer threatened by chlorine gas from these facilities. CAP reported that the cost of converting from the use of chlorine gas was typically no more than $1.50 per ratepayer per year and often much less. According to the same report,

[1] Government Accountability Office. (GAO, 2006). *Securing Wastewater Facilities: Utilities Have Made Important Upgrades, but Further improvements to Key System Components May be Limited by Costs and Other Constraints.* Washington DC: GAO http://www.gao.gov/new.items/d06390.pdf (Accessed July 23, 2010)

24 drinking water and 13 wastewater facilities still used rail shipments of chlorine gas, posing a potential danger to more than 25 million Americans living nearby, and millions more near railways that deliver the chlorine gas[2]. In our judgment, the low cost of conversion and the large number of people who would be protected by eliminating the possibility of chlorine gas releases argue strongly for security legislation covering drinking water and wastewater facilities.

Water Facility Chemical Security Legislation Will Create Jobs

According to a recent report by Management Information Services, Inc.[3], water facility security legislation will create jobs. It is hard to imagine that requiring public facilities to invest in security would do otherwise, especially when this requirement is accompanied by funds to help defray the cost. Moreover, the nature of water services is such that facilities cannot be closed or moved far away without being replaced locally. Every community needs drinking and wastewater treatment.

Assessment and Implementation of Methods to Reduce the Consequences of an Attack are Important Security Measures

We believe that government agencies should have the authority to require a facility to implement its own plans to reduce the potential consequences of an attack. The bipartisan Partnership for a Secure America (PSA), whose advisory board includes Howard Baker, Warren Rudman, Zbigniew Brzezhinski and other prominent Democrats and Republicans known for their national security expertise, has called for the use of safer and more secure technologies to reduce the consequences of a terrorist attack as a national security priority. In a report[4] entitled *Chemical Terrorism: US Policies to Reduce The Chemical Terror Threat* (which we have submitted for the record), PSA has stated:

> [I]t is essential to reduce the risk that terrorists could attack an industrial chemical facility as a means to cause the release of a plume of toxic vapor and inflict mass casualties, or to inflict economic damage by destroying a key element of the nation's critical infrastructure.

PSA also stated that "the development of inherently safer, economically beneficial, and efficient technology should be prioritized."

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[2] Orum P. (2007). *Toxic Trains and the Terrorist Threat*
How Water Utilities Can Get Chlorine Gas Off the Rails and Out of American Communities. Washington DC: Center for American Progress.
http://www.americanprogress.org/issues/2007/04/chemical_security_report.html (Accessed July 23, 2010)

[3] Management Information Services, Inc. (MISI 2010). *Economic and Employment Benefits of the Chemical and Water Security Act OF 2009 (H.R. 2868).* Prepared for Greenpeace, Inc.

[4] Kosal ME (2008). *Chemical Terrorism: US Policies to Reduce the Chemical Terror Threat.* Washington DC: Partnership for a Secure America.

In his 2007 piece entitled, "The Next Attack[5]," Dr. Stephen Flynn[6] said the following:

> [P]ublic water-filtration plants... use large quantities of chlorine. Chlorine was one of the gases used as a weapon along the western front during World War I, and was lethal for anyone caught downwind. It is often transported under pressure in liquid form by tanker trucks, which must drive through city streets to reach the treatment facilities. Then it is stored in tanks adjacent to plants that may be close to residential neighborhoods, potentially placing tens of thousands of people at risk. This risk could be alleviated by replacing chlorine with sodium hypochlorite, the active ingredient in household bleach.

We fully agree with these security experts that these methods to reduce the consequences of an attack are important security measures. We are pleased that S. 3598 provides for assessment and appropriately conditional implementation of methods to reduce the consequences of an attack.

Worker Participation and Training

We believe that vulnerability assessments and security plans can benefit from workers' direct and current knowledge and experience of facility operations, and from the knowledge of union staff, who enter multiple facilities in the course of their work and can bring the best non-proprietary ideas from one facility to another. Including workers and their representatives in this process will enhance security and protect against attacks at water facilities. For these reasons, we favor granting employees and their representatives the right to participate in vulnerability assessments and site security plans, including participation in assessment and implementation of methods to reduce the consequences of a chemical release from an intentional act. We are pleased that S.3598 provides for such participation.

Water facility security legislation must include language requiring employees to be trained in methods to reduce the consequences of a terrorist attack. We believe such training will make employees very valuable partners in reducing facility vulnerability.

We favor a statutory requirement for facilities to provide copies of the vulnerability assessments and site security plans submitted to government agencies to the employees and representatives who participated in developing them. Such language was included in the version of H.R. 2868 as approved by the House Committee on Homeland Security. It is not enough merely to direct the EPA Administrator to provide procedures for sharing portions of a vulnerability assessment and site security plan relating to the roles and responsibilities of employees. Such language lacks a clear requirement that the assessment of methods to reduce the consequences of a chemical release from an intentional act must

[5] Flynn S (2007). The Next Attack. Washington Monthly. http://www.washingtonmonthly.com/features/2007/0703.flynn.html (Accessed July23, 2010)

[6] Dr. Flynn is President of the Center for National Policy. He serves as a member of the bipartisan National Security Preparedness Group, co-chaired by former 9/11 commissioners, Governor Tom Kean and Congressman Lee Hamilton. He served as the lead policy advisor on homeland security for the presidential transition team. Before that, he spent a decade as a senior fellow for National Security Studies at the Council on Foreign Relations.

be shared with employees and/or employee representatives who participated in their creation. This would allow an unscrupulous employer to change the assessment prior to submitting it. Those who had participated in the assessment would have no way to know this. Moreover, the right to ongoing possession of these documents at the facility site is necessary in order to hold the employer accountable for its security commitments.

Information and Accountability

In order for a water facility security program to be successful, citizens must be able to get enough information to determine whether their security is adequately protected. In addition, it is necessary to have procedures by which citizens can hold the government accountable. Excessive secrecy does not increase security. Instead, it simply provides cover for officials who may be failing to live up to their responsibilities. While we agree that information concerning specific vulnerabilities of specific facilities should not be disclosed, it is still important to provide the public with enough information to make an evaluation as to whether the government is adequately carrying out its duties. Good security legislation would require government agencies to disclose what kinds of enforcement activity they are engaging in. The impact on security of such a duty to disclose could only be beneficial. Access to basic facility identification and regulatory status information should not be restricted. Such basic information will help develop public confidence in the security program by allowing people to know that the chemical facility and drinking water facility security programs are working as they should to keep us secure.

We oppose criminal penalties for those who disclose protected information about the vulnerability of a water system. Our members should be able to communicate about pressing safety and security concerns, so long as their communication does not directly replicate materials in vulnerability assessments and security plans, or is derived from sources other than vulnerability assessments or security plans. It is particularly offensive to subject heroic whistleblowers to potential jail time, while the owners and operators of a facility who leave the employees and the public vulnerable by non-compliance are potentially subject only to civil penalties. Criminal penalties for disclosure of protected information have a chilling effect on employees and agency officials who have legitimate reasons for sharing information that may or may not be protected with others, such as first responders who have legitimate reasons for having the information. We believe that chemical facility legislation should not contain criminal penalties for disclosure of protected information.

Many parties play a role in improving industrial practices, including regulatory agencies, academic institutions, state and local governments, employees and employee representatives, national laboratories, inventors, private sector safety and security experts, and vendors of alternate technologies. For this reason, information on alternative technologies should be made available to these parties to the maximum extent consistent with security and with intellectual property law.

Conclusion

We urge the full committee to mark up and quickly approve S.3598, the Secure Water Facilities Act and to make the improvements identified in this testimony including:

- requiring employees to be trained in methods to reduce the consequences of a terrorist attack,
- requiring employers to provide copies of vulnerability assessments and site security plans to the employees and representatives who participated in developing them,
- expanding public disclosure of information,
- and eliminating criminal penalties for disclosing information about vulnerability in the absence of criminal penalties for non-compliant employers.

We look forward to working with this committee to make this happen.

ECONOMIC AND EMPLOYMENT BENEFITS OF THE CHEMICAL AND WATER SECURITY ACT OF 2009 (H.R. 2868)

Prepared for

Greenpeace, Inc.

By

Management Information Services, Inc.
Washington, D.C.

July 2010

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EXECUTIVE SUMMARY

There are roughly 12,000 geographically dispersed facilities in the U.S. that manufacture, consume, or store significant amounts of hazardous substances.[1] These substances represent a significant risk to the population and environment if accidentally leaked into the air, and the industries affected by chemical security vulnerabilities range across the spectrum of U.S. industries. The companies and industries involved span the economy and include chemical manufacturers, fertilizer and pesticide facilities, food manufacturing, pulp and paper manufactures, storage and distribution facilities, utilities, refineries, and water and wastewater treatment facilities. Not only are these facilities subject to an accidental release of chemicals that threaten the health and life of millions of Americans, but those located in densely populated areas are now also recognized as being potential targets for terrorist actions.

The Department of Homeland Security (DHS) and the Environmental Protection Agency (EPA) have jurisdiction over hazardous substances and air and water quality, but do not have the power to require the reduction of these inherent risks to society to acceptable levels. A number of Congressional bills have been introduced over the last few years giving federal government agencies a leading role in protecting the public. The most recent is H.R. 2868, the Chemical and Water Security Act of 2009 which passed the House of Representatives November 6, 2009 and contains three Titles that direct DHS and EPA to formulate a new approach to chemical, water, and wastewater treatment facility security by providing operational funding and grant money to stimulate a greater private-sector response. This report summarizes the House-passed bill and the three Titles and estimates the economic and employment impacts of the bill on the U.S. economy for a ten year period.

There are a number of methods that have been used over the last decade to create safer facilities, and almost all of the changes that have occurred were based on sound business decisions that did not affect the company's bottom line. Hundreds of chemical facilities have already transitioned to safer, more secure alternatives on their own. In many cases, facility owners experienced cost-savings after switching because of a:

- Reduced requirement for physical security measures
- Reduced regulatory reporting burden
- Reduced liability and other insurance
- Increase in process efficiency
- Increase in production and product quality
- Decrease in worker-related health and safety costs

[1] There are 12,029 facilities according to EPA's Risk Management Program.

Economic and employment impacts in the U.S. will occur because of expenditures related to the Congressional bill and the stimulus that the bill provides to covered facilities to conduct process changes or any other method that reduces or eliminates the potential consequences of a terrorist attack. Here we examined each of the Titles in detail and estimated the likely expenditures forecast through 2020 – Table EX-1.

Table EX-1
Direct Annual Expenditures Attributable to H.R. 2868
(millions of dollars)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Title I										
Conversion grants	100	75	50	50	50	50	50	50	50	50
DHS expenditures	225	225	225	233	233	233	233	233	233	233
Private matching and other expenditure	100	75	50	50	50	50	50	50	50	50
UMRA intergovernmental costs	-	-	-	-	-	-	-	-	-	-
UMRA private sector costs	-	-	-	-	-	-	-	-	-	-
Total	425	375	325	333	333	333	333	333	333	333
Title 2										
EPA/State government expenditures	30	31	31	32	32	32	32	32	32	32
Conversion assistance	125	128	130	133	133	133	133	133	133	133
Training grants	160	164	167	172	172	172	172	172	172	172
Owner matching and other expenditure	25	25	25	25	25	25	25	25	25	25
UMRA intergovernmental costs	-	-	-	-	-	-	-	-	-	-
UMRA private sector costs	-	-	-	-	-	-	-	-	-	-
Total	340	347	354	362	362	362	362	362	362	362
Title 3										
EPA/State government expenditures	-	-	-	-	-	-	-	-	-	-
Conversion grants	150	150	150	150	150	150	150	150	150	150
Assistance and training grants	50	50	50	50	50	50	50	50	50	50
Owner matching and other expenditure	25	25	25	25	25	25	25	25	25	25
UMRA intergovernmental costs	-	-	-	-		-	-	-	-	
UMRA private sector costs	-	-	-	-		-	-	-	-	
Total	225	225	225	225	225	225	225	225	225	225
Programmatic Total	990	947	904	920	920	920	920	920	920	920

Source: Management Information Services, Inc., 2010.

We estimated that, including the public-sector program and the private sector expenditures, the total chemical facilities program will cost an estimated $990 million in 2011, decreasing to $904 million in 2013, but then staying at a level of $920 million from 2014 through 2020. Using the MISI input-output model, we estimated that H.R. 2868 will create a total gross sales impact of almost $2 billion in the first year of 2011 and account for 8,000 jobs -- Table EX-2. The economic impact is projected to stay close to the $1.9 to $1.8 billion estimate over the period through 2020 as a combination of government programs and private-sector expenditures continue to transform the

facilities to safer configurations. The number of employees across the country working on these new economic activities (the gross employment impact) is forecast to remain at about 8,000 every year through 2020.

Gross sales are defined as the added activity in the U.S. economy that results from the initial expenditure. Comparing the resultant gross sales to the initial direct expenditure provides a measurement of the impact multiplier. In this case, the multiplier is around 2.0 every year, meaning that for every dollar spent, the direct and indirect impacts across the economy totaled almost two dollars. Because the initiative affects a diverse mix of sectors in the economy, the resultant 2.0-multiplier is close to the national average. For instance it can be compared to a low multiplier, when there is additional demand for the real estate industry of 1.5, to a higher multiplier of 2.4 when there is additional demand for output in the primary metals industry.

Table EX-2
Economic and Employment Impacts Attributable to H.R. 2868

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gross sales impact (million dollars)	1,953	1,870	1,779	1,813	1,813	1,813	1,812	1,810	1,808	1,807
Gross employment impact (thousands)	8	8	8	8	8	8	8	8	8	8
Net employment impact (thousands)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Source: Management Information Services, Inc., 2010.

We also conducted a *net* jobs analysis by examining a scenario where expenditures allocated in a normal pattern throughout the U.S. economy were reprogrammed to pay for the H.R. 2868 initiative, keeping government and private expenditures at a net-zero dollar level. In this case, the change in net employment across the economy was not large enough to measure. The impacts were less than a net loss or net gain of fewer than 500 jobs across the country. While the impacts of H.R. 2868 will affect many companies and as many as 8,000 jobs in various industries, the net, economy-wide job impact will likely be close to zero. Under H.R. 2868, productivity advancements will be made in the facilities included in this study and the demand for labor will continue to decline as it would under baseline economic growth without the legislation, and it will decline no more so than in other industries over the 2011-2020 period. After the facility conversions and upgrades, the industries affected will be in a more sustainable position and will be positioned to offer greater job security to their workforce.

Some of the more detailed results of this study include identifying key industries that will be positively affected more than others, both in terms of increased gross sales and employment. These industries include, in order of positive economic impact over the 2011-2020 period:

- Chemical products (about 14 percent of the economic impact)
- State and local government (9 percent)
- Federal government (9 percent)
- Miscellaneous professional, scientific, and technical services (6 percent)
- Water utilities (5 percent)
- Waste management and remediation services (5 percent)

I. INTRODUCTION

Across the U.S., roughly 12,000 facilities manufacture, consume, or store significant amounts of hazardous substances that represent a significant risk to the population and environment if accidentally leaked into the air according to EPA's Risk Management Program. The companies and industries involved span the economy and include chemical manufacturers, fertilizer and pesticide facilities, food manufacturing, pulp and paper manufactures, storage and distribution facilities, utilities, refineries, and water and wastewater treatment facilities. Not only are these facilities subject to an accidental release of chemicals that threaten the health and life of millions of Americans, but those in densely populated areas are now also recognized as being potential targets for terrorist actions.

The Department of Homeland Security (DHS) and the Environmental Protection Agency (EPA) have had jurisdiction over hazardous substances and air and water quality, but do not have the power to require the reduction of these inherent risks to society to acceptable levels. Because of the lack of resources and a strong charter to improve the Nation's safety, a number of Congressional bills have been introduced over the last few years giving federal government agencies a leading role in protecting the public. The most recent is H.R. 2868, the Chemical and Water Security Act of 2009, which passed the House of Representatives November 6, 2009 and contains three Titles that direct DHS and EPA to formulate a new approach to chemical, water, and wastewater treatment facility security by providing operational funding and grant money to stimulate a greater private-sector response.

This report provides a summary of the House-passed bill and the three Titles and then, using publicly available information, descriptions, and analyses, estimates the economic and employment impacts of the bill on the U.S. economy for a ten year period. The analysis focuses on identifying key industries affected both directly and in the supply chain.

II. TITLE I: CHEMICAL FACILITY SECURITY

Title I of H.R. 2868, The Chemical Facility Anti-Terrorism Act of 2009,[2] amends the Homeland Security Act of 2002, providing more regulation of security practices at chemical facilities and government monetary grants to owners for conversion of their facilities to inherently safer facilities.[3]

Some of the provisions of Title I that are most relevant to this assessment include those that:

- Authorize the Secretary of the Department of Homeland Security to designate substances of concern and establish chemical safety thresholds
- Direct the Secretary to maintain a list of chemical facilities segmented in four risk categories
- Establish standards and procedures for security assessments and plans and require them, and conformance to them, by facility owners
- Establish a program to award grants to eligible organizations to provide for training and education of employees and emergency responders
- Require the owner or operator of a covered chemical facility to include in the site security plan an assessment of methods to reduce the consequences (MRC) of a terrorist attack on that facility and where appropriate implement MRC
- Authorizes $100 million in grants in the first year to offset the costs of implementing MRC
- Direct the Secretary to issue regulations to require covered chemical facilities to increase a wide range of personnel security measures
- Authorize the Secretary to carry out the Chemical Facilities Anti-Terrorism Standards until permanent rules take effect
- Authorize appropriations to fund these activities

[2]H.R. 2868, "Chemical and Water Security Act of 2009" was adopted by the House of Representatives November 6, 2009: a bill to amend the Homeland Security Act of 2002 to enhance security and protect against acts of terrorism against chemical facilities, to amend the Safe Drinking Water Act to enhance the security of public water systems, and to amend the Federal Water Pollution Control Act to enhance the security of wastewater treatment works, and for other purposes, introduced June 15, 2009 in the 111th Congress.

[3]Title I "amends the Homeland Security Act of 2002 to set forth provisions governing the regulation of security practices at chemical facilities."

III. TITLE II: DRINKING WATER SECURITY

Title II of H.R. 2868, the Drinking Water System Security Act of 2009, amends the Safe Drinking Water Act and expands the requirements for assessments by water systems covered under the act and their vulnerability to intentional acts of sabotage.[4] "Covered water systems" are defined as community public systems that serve a population greater than 3,300 or that present a security risk.

Some of the provisions of Title II that are most relevant to this assessment include those that:

- Authorize the Administrator of the EPA to designate substances of concern in issuing water system security standards
- Direct the Administrator of the EPA to issue regulations to establish tiered, risk-based performance standards for the security of covered water systems and requirements for the systems to conduct vulnerability assessments; develop site security and emergency response plans
- Provide training to system and contractor employees and authorize $160M per year in training grants
- Specify that EPA regulations must address the vulnerability of a water system to intentional acts and levels of risk; and require the Administrator to review and approve the vulnerability assessments and site security plans of covered water systems, including an assessment of MRC, and where appropriate, to implement MRC in partnership with local and state authorities
- Authorize the Administrator to award $30M in grants to states in implementing new regulations under this Act and for assessing and implementing methods to reduce the consequences of a release
- Authorize $125 million in the first year in grants to help fund the implementation of MRC.

[4]Title II "amends the Safe Drinking Water Act to revise and expand requirements for assessments by covered water systems of their vulnerability to intentional acts of sabotage."

IV. TITLE III: WASTEWATER TREATMENT WORKS SECURITY

Title III of H.R. 2868, The Wastewater Treatment Works Security Act of 2009 amends the Federal Water Pollution Control Act (Clean Water Act) requiring owners or operators of a wastewater treatment facilities that have a treatment capacity of at least 2.5 million gallons per day or, at the discretion of the EPA Administrator, that presents a security risk to conduct and update a vulnerability assessment; develop and implement a site security plan; and develop an emergency response plan for the wastewater treatment works.[5]

Some of the provisions of Title III that are most relevant to this assessment include those that:

- Authorize the Administrator of the EPA to designate substances of concern in issuing wastewater treatment system security standards
- Direct the Administrator of EPA to issue regulations by December 31, 2010 establishing risk-based standards for the security of the systems; and submissions of facility vulnerability assessments and implementation of site security plans, emergency response plans, and provisions of annual training to employees of the treatment facilities
- Require the Administrator to provide a classification of four risk-based tiers of facilities, taking into consideration the facility size, neighboring population, and the potential impact of intentional acts on the environment, infrastructure, and public health and safety; assign each covered facilities to one of such tiers; establish risk-based standards for site security plans and emergency response plans that reflect the level of risk associated with the risk-based tier assignment
- Require a facility that possesses a chemical of concern in sufficient quantities to include an assessment of methods to reduce the consequences of an intentional chemical release (MRC), and where appropriate to implement the MRC in partnership with local and state authorities
- Authorize the Administrator to provide grants to individual or multiple state or local government organizations to conduct a vulnerability assessment of a publicly owned facility, and to provide for security-related training of employees and emergency response related training
- Authorizes $200 million a year in grants to enhance security at local facilities, including MRC.

[5]Title III "amends the Federal Water Pollution Control Act (commonly known as the Clean Water Act) to require each owner or operator of a treatment works that has a treatment capacity of at least 2.5 million gallons per day or, in the discretion of the Administrator, that presents a security risk making coverage appropriate, to: (1) conduct and update a vulnerability assessment of its treatment works; (2) develop, periodically update, and implement a site security plan; and (3) develop and revise an emergency response plan for the treatment works."

V. ESTIMATED EXPENDITURES

The industries affected by chemical security vulnerabilities range across the spectrum of U.S. industries. In 2008, the Center for American Progress (CAP) identified 101 highest-hazard facilities in the U.S. and identified commercially available, safer and more secure alternatives for nearly all of them.[6] Table 1 breaks down these facilities by industry and North American Industry Classification System (NAICS) code. The first group in the table represents the 101 highest-hazard facilities. In addition, CAP identified a number of other industries of concern due to their use of chlorine, sulfur dioxide, and anhydrous ammonia, and those 23 facilities are classified at the bottom of Table 1.

Table 1
Dispersion of High-Hazard Facilities in the U.S. Economy

Top 101	Facilities	NAICS	Industry Title
Drinking water & wastewater treatment	15	221	Utilities
Pulp and paper manufacturing	1	322	Paper manufacturing
Petroleum refining	8	324	Petroleum & coal products manufacturing
Bleach manufacturing	30	325	Chemical manufacturing
Fertilizer manufacturing	1	325	Chemical manufacturing
Other chemical manufacturing	37	325	Chemical manufacturing
Rail transportation storage	2	482	Rail transportation
Chemical transportation (road)	3	484	Truck transportation
Chemical terminals (marine)	2	488	Support activities for transportation
Hazardous waste incinerators	2	562	Waste management & remediation services
Others of Concern			
Power plants	13	221	Utilities
Food processors	5	311	Food manufacturing
Secondary aluminum smelters	5	331	Primary metal manufacturing

Source: Center for American Progress, 2008 and Source: Management Information Services, Inc., 2010.

Not only are the industries wide-ranging, but they are also geographically dispersed, and their locations range from California and Washington to New York and Florida.

Identifying Critical Facilities

When assessing the most critical facilities that need to evolve into safer facilities, it is import to triage the list. Each of H.R. 2868 Title's have their own method for classifying dangerous plants, but most would rely on the number of persons affected by a catastrophe.

[6]Paul Orum, *Chemical Security 101: What You Don't Have Can't Leak, or Be Blown Up by Terrorists*, Center for American Progress, November 2008.

There are clear guidelines for Title I regulated facilities, since they are classified in tiers. MISI's best current estimates, based on Department of Homeland Security classifications of "Final Tiering" and "Awaiting Final Tiering" facilities, are that there will be:

- 229 facilities classified as Tier 1 facilities
- 575 facilities classified as Tier 2
- 1,276 facilities classified as Tier 3
- 3,739 facilities classified as Tier 4

H.R. 2868 would also add 400 to 600 port facilities currently regulated under the Maritime Transportation Security Act and likely to be contained in EPA's Risk Management Plan data base. It is not known which risk tier these facilities would be assigned to but some will eventually be classified as Tier 1 and Tier 2 facilities.

According to current EPA sources, there are only 1,554 drinking water facilities out of 9,000 medium and large sized community water systems that may be required to assess MRC. These Title II Tier 1 and 2 facilities will likely be classified based on the affected population. For our analysis, we anticipate that the population number is fixed at 100,000, which results in 45 facilities classified as Tier 1 and Tier 2.

Finally, according to EPA sources, the universe of eligible Title III wastewater treatment facilities will include 1,800 systems with a capacity of over 2.5 million gallons a day, but only 871 of them may be required to assess MRC. Tier I and II facilities will likely be classified based on the affected population. For our analysis, we anticipate that the population number is fixed at 100,000, which results in 28 facilities classified as Tier 1 and Tier 2.

Risk Reduction Methods

There are a number of methods that have been used over the last decade to create safer facilities. Hundreds of facilities have already made this move, particularly since 2001. Almost all of the changes that have occurred were based on sound business decisions that did not affect the company's bottom line. Given the time, companies typically waited for the next round of plant upgrades or other corporate planned events to also incorporate safety-related changes. There have been a number of options employed thus far and each facility and company had unique circumstances that led them to choose the best technique for reducing chemical hazards. These choices included:

- Raw material changes where other substances are used, or solids and liquid forms used in place of gaseous versions
- Process changes so that high-technology solutions reduce or replace the need for chemical inputs
- Just-in-time delivery or just-in-time on-site creation of chemicals, so that hazardous inventories are reduced

- Hardened and more secure storage
- Combining plants so that only one facility needs to be secured or moving plants to less densely populated areas

It must be noted that the last option of combining facilities or moving them to other locations is not necessarily a preferred solution. Because of the continuing nature of the risk presented, this may not be an eligible option that can be employed in the future.

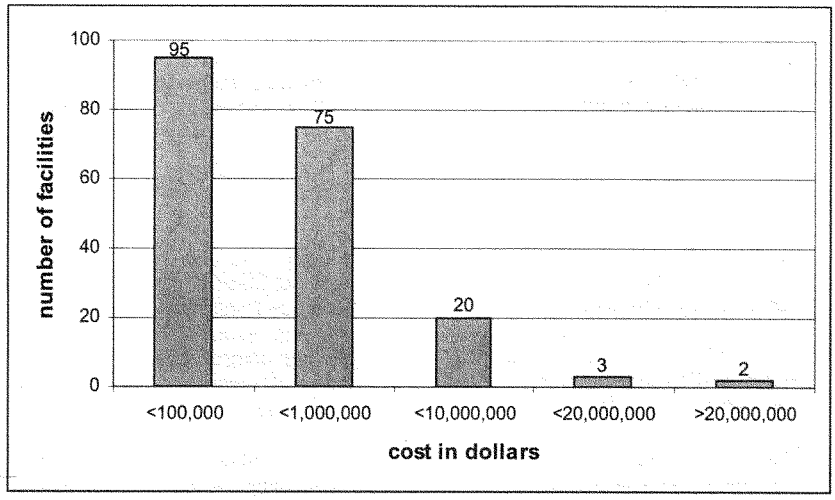
Conversion Costs

Hundreds of facilities no longer represent a threat because of a switch to less hazardous substances or a change in the process. Almost all these conversions were made voluntarily by companies. CAP documented 284 of these transitions in their 2006 survey and report.[7] On the survey question of final costs, the results were mixed and almost neutral. Out of the 226 respondents: 34 percent of the companies reported that they expected cost savings or improved profitability, 45 percent responded they did not expect cost savings, and just over one-fifth expected little change in costs.

On another survey question, 195 facilities reported their cost of switching to less hazardous substances or a change in the process, and responses were provided in five ranges of dollars spent to implement the change. These are represented in Figure 1 and show that 95 facilities reported spending less than $100,000, 75 additional facilities reported spending up to $1 million, 20 additional facilities reported spending up to $10 million, three additional facilities reported spending up to $20 million, and finally, two reported spending over $20 million. While this is not an unbiased sample because it represents not only past volunteer organizational actions but also volunteer responses to the survey, it nonetheless provides an idea of typical conversion costs in a spectrum of industries. Of these self-reported actions, 87 percent cost less than $1 million. Making some assumptions about the distribution of the costs, we can estimate that the median conversion cost for this group of facilities was roughly around $125,000. Making another heroic assumption about the two very expensive outliers, we can also estimate that the average cost of the changes to these facilities might have been around $1.25 million. These estimates are fraught with caveats, but without actual, definitive reported, and verifiable information, they give us an idea of what relative magnitude future conversions may cost.

[7]Paul Orum, *Preventing Toxic Terrorism: How Some Chemical Facilities are Removing Danger to American Communities*, Center for American Progress, April 2006.

Figure 1
Costs to Convert to Safer Facility



Source: Center for American Progress, 2006 and Management Information Services, Inc., 2010.

Clearly, typical costs will vary by chemical, industry, facility size, conversion option chosen, etc. For instance, the conversion costs for a petroleum refinery to switch from hydrofluoric acid to the less dangers sulfuric acid may be between $20 and $30 million according to one estimate and between $7 and $30 million according to the U.S PIRG.[8] (A majority of 98 refineries already use safer alternatives, but as many as 50 still use the most hazardous form of hydrofluoric acid.) Other processes can be changed to safer alternatives for less than $100,000.

Annual Expenditures

Economic and employment impacts in the U.S. will occur because of direct expenditures related to the Congressional bill and the stimulus that the bill provides to organizations with covered facilities to conduct process changes or implement other methods to reduce or eliminate the potential consequences of a terrorist attack.

For this analysis, each of the Titles was examined in detail and direct expenditures documented or estimated -- see Table 2.

[8] See *Washington Monthly* article, "The Next Attack", by David Flynn, July 3, 2007 and U.S. PIRG Education Fund (2005).

Table 2
Direct Annual Expenditures Attributable to H.R. 2868[9]
(millions of dollars)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Title I										
Conversion grants	100	75	50	50	50	50	50	50	50	50
DHS expenditures	225	225	225	233	233	233	233	233	233	233
Private matching and other expenditure	100	75	50	50	50	50	50	50	50	50
UMRA intergovernmental costs	-	-	-	-	-	-	-	-	-	-
UMRA private sector costs	-	-	-	-	-	-	-	-	-	-
Total	425	375	325	333	333	333	333	333	333	333
Title 2										
EPA/State government expenditures	30	31	31	32	32	32	32	32	32	32
Conversion assistance	125	128	130	133	133	133	133	133	133	133
Training grants	160	164	167	172	172	172	172	172	172	172
Owner matching and other expenditure	25	25	25	25	25	25	25	25	25	25
UMRA intergovernmental costs	-	-	-	-	-	-	-	-	-	-
UMRA private sector costs	-	-	-	-	-	-	-	-	-	-
Total	340	347	354	362	362	362	362	362	362	362
Title 3										
EPA/State government expenditures	-	-	-	-	-	-	-	-	-	-
Conversion grants	150	150	150	150	150	150	150	150	150	150
Assistance and training grants	50	50	50	50	50	50	50	50	50	50
Owner matching and other expenditure	25	25	25	25	25	25	25	25	25	25
UMRA intergovernmental costs	-	-	-	-		-	-	-	-	
UMRA private sector costs	-	-	-	-		-	-	-	-	
Total	225	225	225	225	225	225	225	225	225	225
Programmatic Total	990	947	904	920	920	920	920	920	920	920

Source: Management Information Services, Inc., 2010.

Title I expenditures will include $100 million in grants to facilities to fund conversions to safer technologies in 2011, $75 million in 2012, and $50 million in 2013 through 2020. These levels include $3 million for designated farm suppliers. The remainder of the appropriated budget will be used by DHS for internal programs and to conduct facility employee and first-responder training. This level is at $225 million until 2014 when the anticipated level rises to $233 million, remaining at that level through 2020. Our assumption is that DHS will provide a grant program that includes a dollar-

[9]Note that the years listed are fiscal years due to federal government budget conventions and are Budget Authorized levels. The dollar expenditures for 2011-2014 are in current dollars due to federal government budget conventions. The dollar expenditures for 2015-2020 but are in constant FY 2014 dollars for economic modeling and projection purposes. Because most of the government-supplied budget expenditures levels are straight-lined during 2011-2014 and a negligible level of annual inflation is expected by CBO, the error inherent in comparing the 2011-2014 dollar values with future values in minimal.

matching program and that facility owners will contribute to continued facility conversions without government subsidy. We assume here that private funds will equal the level of the grant money available in 2011-2014 and that, based on the results of the conversion cost study expenditures will remain at 2014 levels through 2020. To account for that, private funding is forecast to continue at a level of $50 million per year until 2020.

Two other expenditure categories remain: The impact on intergovernmental and private-sector organizations covered under the Unfunded Mandates Reform Act (UMRA). The Congressional Budget Office (CBO) determined that because the cost of some of the mandates would depend on future regulatory actions, the impacts could not be estimated and that, therefore, CBO could not determine whether the costs would exceed the annual thresholds established in UMRA: $69 million for intergovernmental organizations and $139 million for private sector organizations in 2009.[10] In keeping with this CBO finding, here we made no estimates for those costs.

Title II expenditures in 2011 will include $30 million programmatic expenditures for EPA for state governments, $125 million to fund conversions to safer technologies, and $160 million for training, to prepare assessments and security plans, and implement security enhancements. These levels would increase every year, from $315 million in 2011 to $328 million in 2014. For this analysis, we assumed that these expenditures would continue at the 2014 funding level through 2020. Taking into consideration that most of the conversions will be less expensive compared to Title I facility changes, and that there may only be around 45 Tier 1 and Tier 2 facilities, we estimate that between cost-sharing programs and other conversions performed voluntarily that as much as $25 million will be spent by organizations every year over the period. Again, the CBO choose not to estimate the UMRA-related costs, so they are not estimated here.

Title III expenditures will include $200 million each year for 2011 through 2014 and organizations are expecting that to include $150 million for conversion grants and $50 million for grants to support assessments, worker training, and other security enhancements. It is also assumed that these expenditures continue out to 2020. Taking into consideration that most of the conversions will be moderately to less expensive compared to Title I facility changes, and that there may only be around 28 Tier 1 and Tier 2 facilities, we estimate that between cost-sharing programs and other conversions performed voluntarily that as much as $25 million will be spent by organizations every year over the period. Again, the CBO choose not to estimate the UMRA-related costs, so they are not estimated here.

[10]See Congressional Budget Office, "Cost Estimate of H.R. 2868 Chemical Facility Anti-Terrorism Act of 2009, as ordered reported by the House Committee on Homeland Security on June 23, 2009," July 9, 2009; Congressional Budget Office, "Cost Estimate of H.R. 2868 Chemical Facility Anti-Terrorism Act of 2009 as ordered reported by the House Committee on Energy and Commerce on October 22, 2009, October 23, 2009.

Combining the public-sectors programs and the private sector expenditures, the total chemical facilities program will cost an estimated $990 million in 2011, decreasing to $904 million in 2013, but then staying at a level of $920 million from 2014 through 2020.

VI. ECONOMIC AND EMPLOYMENT IMPACTS

The expenditures estimated and detailed in Table 2, were classified into industry-level expenditures and applied to the MISI 70-order input-output model which translates direct expenditures into per unit output requirements from 70 supporting industries in the economy.[11] The model is based on extensive proprietary and non-proprietary databases, including those from the Bureau of the Census, Department of Labor, the Bureau of Economic Analysis, and economic forecasting databases for the U.S and most states. The national and regional versions of the MISI input-output model have been used for numerous studies of energy and environmental projects, economic initiatives, proposed legislation and numerous government programs (NASA, DOD, DOE, etc.) and has been validated over three decades of use. This application of assessing the industrial-level economic and employment impacts of federal legislation represents one of the classic and best uses of the input-output model.

Applying the model over the 2011–2020 period, we estimate that H.R. 2868 will create a total gross sales impact of almost $2 billion in the first year of 2011 and account for about 8,000 jobs – Table 3. The economic impact is projected to stay close to the $1.9 to $1.8 billion estimate over the entire period as a combination of government programs and private-sector expenditures continue to transform the facilities to safer environments. The gross jobs impact attributable to the legislative initiative is forecast to stay at around 8,000 every year through 2020.

Gross sales are defined as the added activity in the U.S. economy that results from the initial expenditure. Comparing the resultant gross sales to the initial direct expenditure provides a measurement of the impact multiplier. In this case, the multiplier is around 2.0 every year, meaning that for every dollar spent, the direct and indirect impacts across the economy totaled almost two dollars. Because the initiative affects a diverse mix of sectors in the economy, the resultant 2.0-multiplier is close to the national average. For instance it can be compared to a low multiplier, when there is additional demand for the real estate industry of 1.5, to a higher multiplier of 2.4 when there is additional demand for output in the primary metals industry.

Table 3
Economic and Employment Impacts Attributable to H.R. 2868

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Gross sales impact (million dollars)	1,953	1,870	1,779	1,813	1,813	1,813	1,812	1,810	1,808	1,807
Gross employment impact (thousands)	8	8	8	8	8	8	8	8	8	8
Net employment impact (thousands)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

Source: Management Information Services, Inc., 2010.

[11] See the Appendix for a full description of the model and other applications for its use at ASES (2009) and Bezdek and Wendling (2005).

During the course of the research we also projected a *net* jobs analysis. Here, we examined a scenario where expenditures allocated in a normal pattern throughout the economy were reprogrammed to pay for the H.R. 2868 initiative, keeping government and private expenditures at a net-zero dollar level. In this case, the change in net employment across the economy was not large enough to measure. The impacts were less than a net loss or net gain of 500 employees across the country. While the implications of H.R. 2868 will affect many companies and as many as 8,000 jobs in various industries, the net impact is close to zero. What we **do** expect to see under H.R. 2868 is that productivity advancements will be made in the facilities included in this study and the demand for labor will continue to decline, but no more so than in other industries. After the facility conversions and upgrades, the industries affected will be in a more sustainable position and will be positioned to offer greater job security to their workforce.

Some of the more detailed results of this study include identifying key industries that will be positively affected more than others, both in terms of contributions to increased gross sales and to employment. These industries include, in order of positive impact over the 2011-2020 period:

- Chemical products (about 14 percent of the economic impact)
- State and local government (9 percent)
- Federal government (9 percent)
- Miscellaneous professional, scientific, and technical services (6 percent)
- Water utilities (5 percent)
- Waste management and remediation services (5 percent)

In summary, the analysis suggests that H.R. 2868 will have a slight positive impact on the U.S. economy and a small increase in net employment nationwide. In addition, the legislation will place thousands of employees and millions of U.S. residents in a vastly safer environment.

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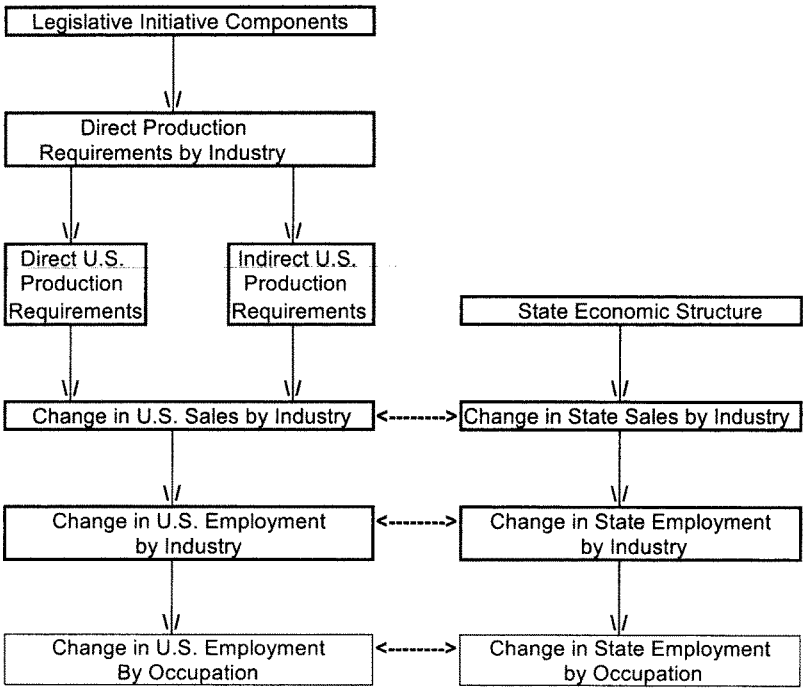
APPENDIX
THE MISI MODEL

The economic and employment effects of H.R. 2868 were estimated using the Management Information Services, Inc. model, data base, and information system. A simplified version of the MISI model as applied in this study is shown below.

Use of the MISI Model to Estimate Economic and Employment Impacts



Source: Management Information Services, Inc., 2010.

The first step in the MISI model involves the estimation of the direct requirements of the government initiative including grants, subsidies, and expenditures by other government programs. Additional direct requirements are included based upon estimates of industry investments.

The MISI model translates the direct expenditures into per unit output requirements from every supporting industry in the economy. While the MISI model contains 490 commodities and industries, in the work conducted here a 70-order industry scheme is used -- the 70-order industries are listed below

Second, the direct output requirements of every supporting industry affected as a result of the government initiative are estimated, and they reflect the production and technology requirements implied by the initiative. These direct requirements show, proportionately, how much an industry must purchase from every other industry to produce one unit of output. Direct requirements, however, give rise to subsequent rounds of indirect and induced requirements as additional purchases are made by industries and consumers.

The sum of the direct, indirect, and induced requirements represents the total output requirements from an industry necessary to produce one unit of output based on the government initiative. Economic input-output (I-O) techniques allow the computation of the direct as well as the indirect production requirements, and these total requirements are represented by the "inverse" equations in the model. The ratio of the total requirements to the direct requirements is called the input-output multiplier.

Thus, in the third step in the modeling sequence the direct industry output requirements are converted into total output requirements from every industry by means of the input-output inverse equations. These equations show not only the direct requirements, but also the second, third, fourth, nth round indirect industry and service sector requirements resulting from the government initiatives and the private-sector investment.

Next, the total output requirements from each industry are used to compute sales volumes, value added (including profits and taxes) for each industry. Then, using data on manhours, labor requirements, and productivity, employment requirements within each industry are estimated. This allows computation of the total number of jobs created within each industry.

U.S. Input-Output Industry Codes and Titles, 70-Order

Industry Code	Industry Title	NAICS Code
111CA	Farms	111,112
113FF	Forestry, fishing, and related activities	113-115
211	Oil and gas extraction	211
212	Mining, except oil and gas	212
213	Support activities for mining	213
22	Utilities	22
23	Construction	23
311FT	Food and beverage and tobacco products	311, 312
313TT	Textile mills and textile product mills	313, 314
315AL	Apparel and leather and allied products	315, 316
321	Wood products	321
322	Paper products	322
323	Printing and related support activities	323
324	Petroleum and coal products	324
325	Chemical products	325
326	Plastics and rubber products	326
327	Nonmetallic mineral products	327
331	Primary metals	331
332	Fabricated metal products	332
333	Machinery	333
334	Computer and electronic products	334
335	Electrical equipment, appliances, and components	335
3361MV	Motor vehicles, bodies and trailers, and parts	3361-3363
3364OT	Other transportation equipment	3364-3369
337	Furniture and related products	337
339	Miscellaneous manufacturing	339
42	Wholesale trade	42
44RT	Retail trade	44, 45
481	Air transportation	481
482	Rail transportation	482
483	Water transportation	483
484	Truck transportation	484
485	Transit and ground passenger transportation	485
486	Pipeline transportation	486
487OS	Other transportation and support activities	487-492
493	Warehousing and storage	493

U.S. Input-Output Industry Codes and Titles, 70-Order (continued)

Industry Code	Industry Title	NAICS Code
511	Publishing industries (includes software)	511
512	Motion picture and sound recording industries	512
513	Broadcasting and telecommunications	513
514	Information and data processing services	514
521CI	Federal Reserve banks, credit intermediation, and related activities	521, 522
523	Securities, commodity contracts, and investments	523
524	Insurance carriers and related activities	524
525	Funds, trusts, and other financial vehicles	525
531	Real estate	531
532RL	Rental and leasing services and lessors of intangible assets	532, 533
5411	Legal services	5411
5412OP	Miscellaneous professional, scientific and technical services	5412-5414, 5416-5419
5415	Computer systems design and related services	5415
55	Management of companies and enterprises	55
561	Administrative and support services	561
562	Waste management and remediation services	562
61	Educational services	61
621	Ambulatory health care services	621
622HO	Hospitals and nursing and residential care facilities	622, 623
624	Social assistance	624
711AS	Performing arts, spectator sports, museums, and related activities	711, 712
713	Amusements, gambling, and recreation industries	713
721	Accommodation	721
722	Food services and drinking places	722
81	Other services, except government	81
GFE	Federal government enterprises	n/a
GFG	Federal general government	n/a
GSLE	State and local government enterprises	n/a
GSLG	State and local general government	n/a
S004	Inventory valuation adjustment	n/a

Notes: n/a - Not applicable

Source: Management Information Services, Inc. and U.S. Department of Commerce, Bureau of Economic Analysis, 2010.

Utilizing the modeling approach outlined above, the MISI model allows estimation of the effects on employment, personal income, corporate sales and profits, and government tax revenues in the U.S. and in each state. Estimates can then be developed for detailed industries and occupations.

The MISI model and data base permit economic impacts to be estimated for any region composed of one or more counties and for any industry in the national I-O table. MISI can estimate the impacts of project and program expenditures by industry on regional output (gross receipts or sales), earnings (the sum of wages and salaries, proprietors' income, and other labor income, less employer contributions to private pension and welfare funds), and employment.

For the MSAs there may be further interest in estimating the impact on requirements for specific occupations. This can be accomplished using the MISI occupation-by-industry matrix, the coefficients of which show the percent distribution of occupational employment among all industries. The 500-by-800 matrix was developed from the *Current Population Survey*, and was modified to conform to the available data.

The methodology employed is state-of-the-art and credible, and has been used by MISI over past three decades in many studies of energy and environmental projects, economic initiatives, proposed legislation, government programs, etc.

Databases and Data Sources

MISI maintains extensive proprietary and nonproprietary databases on the U.S. economy, the state economies, on the Metropolitan Statistical Areas within the states, and on counties in the states. The major public sources of the nonproprietary data include:

- The Bureau of Economic Analysis of the U.S. Commerce Department
- The Bureau of the Census of the U.S. Commerce Department
- The Bureau of Labor Statistics of the U.S. Labor Department
- The Energy Information Administration of the U.S. Energy Department

In addition:

- MISI has proprietary economic forecasting databases for the U.S. and for most states, developed and utilized over the past three decades.
- MISI staff has developed extensive technology-, program-, environmental-, and state-specific economic and statistical databases and satellite models.

Thus, the direct, indirect, and effects of the original government program on the national and state economies can be disaggregated into the impact on:

- Industry sales (490 4-digit NAICS industries)
- Jobs (800 occupations and skills)
- Corporate profits
- Federal, state, and local government tax revenues
- Employment and unemployment (by industry and occupation)
- Net growth or displacement of new businesses
- Major economic, technological, social, and environmental parameters and externalities

MISI derives these estimates using quantitative models and databases it has on-line and which have been used by MISI in many other analogous disaggregate regional, economic, technological, and environmental studies. These models and data are unique and proprietary and give MISI substantial estimation capabilities in this area. These models include:

- The U.S. Commerce Department's national input-output model
- A modified version of the Commerce Department's regional econometric forecasting model.
- A modified version of the Regional Input-Output Modeling System (RIMS) supplemented with the Census Bureau/BLS industry-occupation matrix -- adapted to state and sub-state economies by MISI.
- A modified version of the Energy Externalities Simulation (EES) model developed by MISI.

Use of these proprietary models and the associated databases permitted MISI to develop estimates of the economic, employment, and occupational impacts of various programs or technology development scenarios.

MANAGEMENT INFORMATION SERVICES, INC.

Management Information Services, Inc. is an economic research and management consulting firm with expertise on a wide range of complex issues, including energy, electricity, and the environment. The MISI staff offers expertise in economics, employment, engineering, and finance, and includes former senior officials from private industry, federal and state government, and academia. Over the past two decades MISI has conducted extensive proprietary research, and since 1985 has assisted hundreds of clients, including Fortune 500 companies, nonprofit organizations and foundations, academic and research institutions, and state and federal government agencies including the White House, the National Academy of Sciences, the U.S. Department of Energy, the U.S. Environmental Protection Agency, the Energy Information Administration, the Department of Defense, NASA, and the U.S. General Services Administration.

For more information, please visit the MISI web site at http://www.misi-net.com.

Responses to Follow-Up Questions for Darius Sivin
from Senator James M. Inhofe
Environment and Public Works Committee Hearing July 28, 2010

1. *How many of your members work at water utilities?*

We represent a bargaining unit of 100 workers at the Detroit wastewater facility. Moreover tens of thousands of our active and retired members and their dependents are among the two million people who live in the vulnerability zone of the facility. A successful terrorist attack on the facility could not only cause our members and their dependents physical harm but it could wreak economic havoc causing temporary or permanent loss of employment.

2. *Your testimony referenced a 2010 report by Management Information Services that concluded security legislation would create jobs. However, the report acknowledges that it used "heroic assumptions" to determine what a past conversion "might" have cost. The authors of the report acknowledged that their estimates for future cost "are fraught with caveats", and that their estimates are not based on "actual, definitive reported, and verifiable information ... " An accurate assessment would need to model costs at the individual plant level. Are you aware of any studies that have done actual cost modeling at an individual plant level and used actual, reported and verifiable information?*

I am not aware of a study of the effects on employment that used actual cost modeling at an individual plant level. However, lack of information is one of the deficits that proposed chemical security legislation is intended to address, by requiring water utilities to generate such information in when assessing methods to reduce consequences of a chemical release from an intentional act. In addition, the table below, which contains individual plant cost estimates, is from a 2006 GAO report entitled *Securing Wastewater Facilities: Costs of Vulnerability Assessments, Risk Management Plans, and Alternative Disinfection Methods Vary Widely.*

Table 1: Reported and Planned Disinfection Conversion Costs for Large Wastewater Treatment Facilities

Facility name	Facility location	Conversion year	Facility size (in millions of gallons treated per day)[a]	Disinfection method	Reported or planned conversion cost[b] (in dollars)
Facilities that have completed conversion from chlorine gas					
Chambers Creek	University Place, Wash.	2002	19	Ultraviolet light	$3,900,608
Blue Plains	Washington, D.C.	2003	307	Sodium hypochlorite	12,980,726
Northeast	Philadelphia, Pa.	2003	190	Sodium hypochlorite	2,600,000
Back River	Baltimore, Md.	2004	150	Sodium hypochlorite	3,300,000
Essex and Union	Elizabeth, N.J.	2004	65	Sodium hypochlorite	775,000
Chesapeake-Elizabeth	Virginia Beach, Va.	2004	21	Sodium hypochlorite	1,225,000
Nansemond	Suffolk, Va.	2004	17	Sodium hypochlorite	1,650,740

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Columbia Boulevard	Portland, Ore.	2005	143	Sodium hypochlorite	4,660,490
Valley Creek	Bessemer, Ala.	2005	46	Ultraviolet light	3,561,272
Dry Creek	Fort Wright, Ky.	2005	36	Sodium hypochlorite	646,922
Southern Regional	Boynton Beach, Fla.	2005	22	Sodium hypochlorite[c]	2,592,800
Burbank	Burbank, Calif.	2005	9	Sodium hypochlorite	2,500,000
Southeast	Philadelphia, Pa.	2006	90	Sodium hypochlorite	1,920,000
Papillon	Omaha, Neb.	2006	62	Sodium hypochlorite	3,000,000
Facilities that plan to convert from chlorine gas					
Metro Central	Denver, Colo.	2007	130	Sodium hypochlorite	13,135,000
Fort Wayne	Fort Wayne, Ind.	2007	43	Sodium hypochlorite	1,791,417
Everett	Everett, Wash.	2007	18	Sodium hypochlorite	2,562,460
South Central	Delray Beach, Fla.	2007	18	Sodium hypochlorite[c]	2,454,700
Mill Creek	Cincinnati, Ohio	2008	120	Sodium hypochlorite	3,085,000
Western Branch	Laurel, Md.	2008	20	Ultraviolet light	4,000,000
South Treatment Plant	Renton, Wash.	2009	75	Sodium hypochlorite	2,575,000
Hartford	Hartford, Conn.	2009	51	Ultraviolet light	10,892,000
Eugene-Springfield	Eugene, Ore.	2009	38	Sodium hypochlorite	4,498,000

Senator LAUTENBERG. Thank you to each one of you for your testimony.

We are going to defer for the moment to Senator Udall from New Mexico because Mr. Perea is here.

Please.

Senator UDALL. Thank you, Mr. Chairman, and thank you for the courtesy. It is really appreciated.

Mr. Perea, your testimony notes that your company was founded as a spin-off from Los Alamos National Lab, which is a great example of the jobs and technological advancements that the labs create. I want to applaud you and the labs on that. I do not have a question right now, but I may come back to that.

Your testimony notes that the main obstacle for municipal utilities considering onsite disinfectant technologies is the lack of information and reason to consider alternatives. Could you expand on that and describe how the process in Senator Lautenberg's legislation could inform utilities' decisionmaking?

Mr. PEREA. Thank you, Senator Udall.

The question, I believe, is how would this legislation help promote adoptive technologies such as MIOX and inherently safer technologies? Is that the nature of the question?

Senator UDALL. That is right.

Mr. PEREA. Yes. As you know, utilities are not driven by profit motives. It is actually, ironically, much easier for us, and as a business we have turned more of our attention to the private sector.

Utilities are constantly dealing with shifting priorities and compliance. Our experience—my experience personally—has been that some of these utilities have safety of their workers and safety of the communities at the forefront of any of their decisionmaking, where others, they have not had an accident, they have not had an issue, and quite frankly their focus and attention is elsewhere in terms of water compliance.

Senator UDALL. One of the objections we hear is that safer alternatives may be more expensive. New Mexico has many rural areas and towns that do not have a lot of financial resources, but several of them have adopted your alternative, including Las Vegas, New Mexico, and Bloomfield. How did these communities end up deciding to use an onsite purification technology, and how do the costs compare to the traditional chlorine process?

Mr. PEREA. Yes, Senator. The communities that have adopted MIOX systems or competing alternatives typically have a longer range horizon in mind when they consider costs. Typically they are paying for gas chemical or liquid chemical on a monthly basis on some type of contract. To adopt a technology like MIOX the user will end up buying a piece of capital equipment, which then allows them to have a much lower operational cost on the monthly basis.

The equipment typically pays for itself, versus a liquid system, inside of 2 years, and often over a gas system inside of several years more than that. So, the Lakehaven example is very common. I do not know the exact percentage in that case, but I am sure it is 30, 40, or maybe even as much as 50 percent cost savings over the life of the equipment.

Senator UDALL. You heard me ask, I think, the EPA about the letter received from the American Metropolitan Water Association

which raised some concerns with the legislation that pushes utilities to adopt safer alternatives. Have you had an opportunity to see that letter, and if so, what is your response to any concerns they raised?

Mr. PEREA. Unfortunately, I also am aware of the letter, but have not read it in detail. Nor do I have a specific response to it.

Senator UDALL. Could you just tell us briefly about the spin-off and how that happened, MIOX from Los Alamos?

Mr. PEREA. Yes, of course. The origins of the technology in the company pre-date my involvement, which is approximately 5 of the 20 years. But my understanding in talking to the original founders of the company, the original contract was specifically for this same exact issue for the U.S. military looking to get rid of gas chlorine in the field. That was the origin of the technology and the original SBIR. And it is indeed used today for that specific purpose as well.

Senator UDALL. Thank you. Once again, I applaud that spin-off.

And Chairman Lautenberg, I want to thank you for your courtesies very much, and the Ranking Member, Senator Inhofe, for that.

Senator LAUTENBERG. We are happy to provide it. You are very helpful in all matters, and we were glad to accommodate you.

Senator Inhofe.

Senator INHOFE. In fact, we were saying, we were talking briefly, how much we like New Mexico and the time we have spent there.

[Laughter.]

Senator UDALL. I will stay here for that.

Senator LAUTENBERG. I skied in Taos.

Senator UDALL. Come back. Come back.

[Laughter.]

Senator INHOFE. Well, I have a very important question—the most important question to be asked today—of Ben Grumbles. Do you realize how many years you and I have been working together?

Mr. GRUMBLES. Yes, sir.

[Laughter.]

Senator INHOFE. No further questions.

[Laughter.]

Mr. GRUMBLES. And it has been a pleasure, and it dates back decades.

Senator INHOFE. It dates back to 1987, and you were on the Committee. You could not have been more than 15 years old then, but that was 24 years ago. And I have enjoyed working with you all of these years.

I thank you for coming to share your experiences on both the national level and on the State level. And the second question I want to ask is which do you like better, Washington, DC, or Arizona?

Mr. GRUMBLES. Can I submit that for the record?

[Laughter.]

Mr. GRUMBLES. I love Washington, DC. Arizona is a wonderful place to live and work and play and visit.

Senator INHOFE. Sure. It is kind of hot.

I was intrigued to hear that Arizona has incorporated safety information into its sanitary service surveys. Are you the only State that is doing that?

Mr. GRUMBLES. Absolutely not. And Senator Lautenberg, I think it is an excellent point. Everyone should look for ways to embed, to institutionalize security into Safe Drinking Water Act as well as Clean Water Act practices and procedures.

The State of Arizona, like many other States, is looking for opportunities to embed security considerations so that when the State agency is doing its source to tap risk assessments at individual water facilities, they look at security-related aspects of it. And I think that is something that the Congress should continue to encourage and EPA encourage.

Senator INHOFE. Have you learned some lessons from that that you can share with some of the other States?

Mr. GRUMBLES. Well, one of the lessons that we learned is that it is not just about the treatment methodology at the plant. It is also looking at the entire system—the water system, the water lines, the sewers, the whole lifeblood, and so always one of the greatest risks of some type of act or intentional act is not just at the plant itself but also in the water lines, the drinking water lines or the sewer lines. And that is an important part to keep in mind.

The other is to look at the specific pros and cons of the different types of treatment practices and methodologies. We, in Arizona, particularly based on the Phoenix study, really want to be asking those questions. How well do substitutes to gaseous chlorine work? Do they meet the Safe Drinking Water Act or Clean Water Act requirements? Does the heat of certain areas of the country change the dynamics? And I think those are important that we learn in the sanitary surveys as well.

Senator INHOFE. And which is one of the arguments you would use when doing this on a local level. Now, you are closer to the water facilities because you are at that level. Do you think that they would make the appropriate security upgrades if they had the resources to do it?

Mr. GRUMBLES. I think that well-trained local water utility officials are in the best positions to make those decisions. They should be subject to oversight or regulation, absolutely. Some of the utilities, some of the communities in the State of Arizona, are moving away from gaseous chlorine. It is what fits the local watershed and the local community's needs. And I think that is a good way to go I think at the national level and at the State level, though there should be oversight and support to help those local experts make those decisions with the most information available.

Senator INHOFE. Are there any other barriers other than money that would prevent upgrades in security?

Mr. GRUMBLES. I think—this does not directly answer the question—but I think particularly in the Southwest or in other parts of the country that are looking at the water quantity, water quality challenge, every decision about what treatment methodology to use you should be asking not just what is the safest methodology at the local level but also what is going to also provide for a product that can be more effectively reclaimed and reused.

So, ensuring that there are not unintended consequences to changing your treatment practices, I think, is an important one that the water security arena needs to take into account and other environmental regulations is a change in practice at a utility going

to make it more difficult to reclaim that water and to reuse it downstream and other approaches because water is increasingly scarce in some parts of the country.

Senator INHOFE. Well, next time you are here in Washington come by, and we can visit. You probably noticed a few minutes ago Ruth Van Mark who was with me 20-some years ago when you were still with me; she is still in probation, but she is still with me. So, I look forward to having a chance to visit with you.

Mr. GRUMBLES. Thank you very much.

Senator LAUTENBERG. Thanks, Senator Inhofe.

Senator Inhofe and I have an interesting relationship. It is with respect and admiration and disagreement.

[Laughter.]

Senator LAUTENBERG. We have overcome the disagreement side to have, generally, a good opportunity for an exchange of views and differences of opinion. And they are widely respected.

So, Mr. Grumbles, how tough was it to get away from Senator Inhofe?

[Laugher.]

Senator LAUTENBERG. Oh, I am sorry.

[Laugher.]

Senator LAUTENBERG. Anyway, one of the things that we talk about, and you note in your testimony, how scarce water is in Arizona. So, therefore, virtually every drop has to have a quality about it that is safe while being readily available.

Is it fair to say that if there is an inherently safer technology that there would be an urgency to getting it in place before a system is interrupted and dangerous, obviously, for the communities that do tend to cluster, I think, near the water supply?

Mr. GRUMBLES. Well, Senator, I think the goal of inherently safer is right on. The key is how is that implemented and at the local level what options are available that are safer and also practical, affordable, and doable?

I know one of the—some of the communities across the country—and I can say specifically in Arizona—are weighing whether to move to alternatives to gaseous chlorine such as onsite generation of hypochlorite. And one of the questions is how much—what is the energy footprint of that? It can require more energy to generate hypochlorite onsite. That does not mean that it will not be the method chosen.

But it can be, as I am learning in Arizona, the energy-water nexus is so important that the utilities practitioners, the officials there, need to be asking what is safer, what meets the Safe Drinking Water Act or Clean Water Act mandates, and what also, what can our ratepayers afford? And energy is increasingly expensive. So, you have to look at that part of the equation as well.

Senator LAUTENBERG. Oh, I am sure that is so. But I think wherever possible effectiveness and costs, all of these things have to be taken into consideration. But even beyond those factors are, what is the security? What are the protections that we have? There, again, people in your State are so committed to preserving water supplies that disruptions would be——

Mr. GRUMBLES. Well, and the concept of vulnerability assessments and updating those is critically important because we, as a

State, are vulnerable. Our future sustainability is at stake if we do not have clean and safe water supplies. So, I support you in your efforts, your goal of bringing people together to find practical and meaningful progress.

Senator LAUTENBERG. We are going to try.

Mr. Perea, the Act, the bill that we have developed, gives States authority to require utilities to implement safer technology when it is cost effective, feasible, and allows continued compliance with water quality standards. Might there be jobs created by requiring these changes and making more jobs available if they are, if the water supply is available and we know that it is clean and safe?

Mr. PEREA. Yes, Senator, I think it is a complex question with a lot of implications. I think as community water systems look to make upgrades, whether it be for water quality reasons or safety and security measures, it requires a level of training, a level of upgrading, if you will, and there is a stimulation effect in that, including the providers of equipment, whether it be onsite systems or other technologies or equipment or services that are used to provide those. So, I do believe there is a positive economic effect. It does entail change.

Senator LAUTENBERG. Over 500 water facilities have switched to safer methods, but at least 2,600 water facilities still use large amounts of chlorine gas and other toxic gaseous chemicals. Why have so few facilities converted to safer technology, do you think?

Mr. PEREA. I am speculating, obviously, since I have not surveyed these. But I think that the rate of change in utilities and public drinking water systems can be slow and is often driven by compliance, not by innovation certainly and not by cost savings or other motivations.

My experience has been that those that have had near accidents—or near misses rather—with their chemicals have been amongst the first to look seriously. And I think those who have looked seriously have found that there are cost savings that can be realized. And most often when communities get to that stage there is a very high rate of conversion to safer alternatives. But I do not think it is on most communities' radar screens.

Senator LAUTENBERG. Mr. Orum, what do you think about that?

Mr. ORUM. I have spoken with many facilities that have converted, and almost always they are very proud of what they have achieved and very relieved that the chlorine gas is no longer there.

On the other side, though, sometimes facilities have used chlorine gas for a long time without an incident. And these are low probability-high consequence events that are very hard for facilities to make a priority before they happen.

One facility told me that they have used chlorine gas since 1915 without an incident. They were bringing it in by rail. Unfortunately, current regulations encourage that shifting of risk onto the rails. There are about 35 water utilities that still use chlorine gas by rail. And so our laws also encourage and perpetuate hazards in cases where they really do not need to exist.

Senator LAUTENBERG. Mr. Grumbles, in your written testimony you say that decisions on these chemicals at individual sites are best made by utility experts, that Congress should simply "provide direction.' Do I understand correctly? Because that sounds like the

same voluntary approach that has allowed 2,600 facilities to continue to use lethal chlorine gas when safer alternatives are available.

Why should States not be able to require utilities to take reasonable, cost effective steps to protect communities who are near water facilities?

Mr. GRUMBLES. Senator, I think Congress should provide direction and support for a range of different strategies and tactics to move beyond the status quo to increase the security of water and wastewater systems.

When it comes to mandating inherently safer technologies I think it should be made primarily by the utility, and I think at the State level. I think that is preferred to the Federal level, making a choice or review of what size fits, and I think that it gets very difficult and complex, and there can be tradeoffs that are lost in the mix when it is decided ultimately at the Federal level what a particular utility should do.

I think the key is to emphasize focus on the local level decision, but hold them accountable and make sure that they are looking at the range of factors.

Senator LAUTENBERG. At what point does risk take over other parts of the decisionmaking? Is there a point in time, a vulnerability age of the structure, et cetera?

Mr. GRUMBLES. I think these are questions that are all about risk and risk management. I think it is important not to be taking tools off the table necessarily from the Federal level, but to be encouraging cleaner and safer practices and approaches that result in cleaner and safer product, the water.

I think that the progress that has been made since the 2002 Bioterrorism Act—one of the real steps that I know you should be proud of is that local utilities and those in the water sector are taking it very seriously and training themselves and getting EPA and DHS support for ways to better identify and characterize the risks and to manage them.

And when it comes to what choice of chemicals or treatment practices I think it needs to be very careful that it is done on a local and regional basis.

Senator LAUTENBERG. But the State agencies have an important role to play in this decision?

Mr. GRUMBLES. Yes, sir.

Senator LAUTENBERG. Mr. Orum, opponents have argued that switching to safer alternatives could be too costly, even though studies found the annual costs to be less than $1.50 per customer. Now, what is a bigger threat to our society, requiring cost effective safer alternatives or release of chlorine gas which is so lethal?

Mr. ORUM. I do not know of any macro studies comparing the cost of prevention to response, but I think it is safe to say that $1.50 per customer per year, which is the upper end of converting a big city water utility off chlorine gas, is a much better deal than $7 billion in damages, which the insurance industry says could result from a worst case release. Certainly, just look at the Gulf oil spill where billions are being spent to clean up a problem that could have been prevented for a fraction of the cost.

The Association of American Railroads always reminds us that toxic inhalation hazard chemicals account for one-quarter of 1 percent of their cargo, yet are the bulk of their liability costs and potentially ruinous liability. And 35 or so water utilities, as I noted, still use chlorine gas by the railcar.

Dr. Sivin mentioned a report by Management Information Services showing 8,000 jobs created as a result of the House Bill. Clorox plans to eliminate all of its bulk chlorine use at all of its bleach plants around the country at no loss of jobs. In comparison New York City spent almost—said it had almost $94 billion worth of economic cost in the first year alone after 9/11. I think it really just boils down to an ounce of prevention being worth a pound of cure.

Senator LAUTENBERG. Dr. Sivin, what, how about the people who are manning these stations and are concerned about or connected with the transportation of chlorine gas? What are they saying? They do not want their jobs at risk but nor do they want their lives at risk with their families. Can an inherently safer technology provide the security for them and maintain it? Is there a job shift at all that takes place with any of these facilities, to your knowledge, that have made the change?

Mr. SIVIN. No, we do not, we have not seen one. In general, when a facility invests, we invest in place. It tends to protect jobs. Bringing new investment into a facility tends to provide job security to its employees.

We also think, in the case of water treatment facilities, as I mentioned, there is not much risk of a job loss because a water treatment facility is attached to a community. It cannot go elsewhere. They tend to be public facilities. They tend to be tax supported. Where is a water treatment facility going to go? And if one went somewhere else, that community would have to create new jobs by bringing in a new one.

It is not—we simply do not perceive that as much of a risk, and even if the argument is that they would have to spend money on something else, first of all, as Mr. Orum pointed out, in most cases it is not much less money and in some cases there is actually a long-term savings, so there is actually more money available to expand, hire more employees, whatever the case may be. And there is also Federal assistance in the various pieces of legislation out there to assist facilities.

So, we think all of that information together supports the conclusion of MISI that it is likely to add jobs.

Senator LAUTENBERG. Well, I want to say thank you to each of you for your contribution as we conduct our research on where to go, what to add to our legislation or change, we will come up with something that we would be happy to have your testimony or suggestions on.

If there are questions by any member of this Committee who have yet to ask them and they submit the question to you in writing, we would ask for as quick a response as you can give us. And we thank you.

This Committee is adjourned. Thank you.

[Whereupon, at 4 p.m., the Committee was adjourned.]

[Additional material submitted for the record follows:]

NACWA
A Clean Commitment to America's Waters

August 3, 2010

The Honorable Barbara Boxer, Chairman
The Honorable James Inhofe, Ranking Member
Committee on Environment and Public Works
United States Senate
Washington, DC 20510

Dear Chairman Boxer and Ranking Member Inhofe:

On behalf of the National Association of Clean Water Agencies (NACWA), the leading advocacy organization representing the nation's municipal wastewater treatment agencies, I would like to offer comments on the "*Secure Water Facilities Act*" (S. 3598) and security issues generally at wastewater utilities. I would like for this letter to be included as part of the record for the Committee's July 28th hearing "*Protecting America's Water Treatment Facilities.*"

First, let me say that NACWA understands policy-makers' interest in closing the perceived gap that exists in the federal government's security-related oversight programs of facilities that maintain chemicals of concern and that could potentially be the target of terrorist attacks. While Congress exempted publicly-owned treatment works (POTWs) and community water systems (CWS) when it created the Chemical Facilities Anti-Terrorism Standards (CFATS) Program in 2006, concerns have since been raised that these facilities should comply with federal security standards to ensure that our water and wastewater treatment capabilities cannot be compromised. While NACWA supports this overall policy objective, it is critical to recognize that any such program must be balanced with the requirements of the Clean Water Act and key site-specific considerations.

As Congress began the process of drafting legislation last year, a critical consideration from our members' perspective was to ensure that any security program for drinking water and wastewater utilities follow similar guidelines to each other and have Federal oversight responsibilities provided by the U.S. Environmental Protection Agency (EPA). For these reasons, we were pleased that legislation passed by the House, the *Chemical and Water Security Act of 2009* (H.R. 2868), reflected this policy priority.

A second important consideration was whether POTWs would be required to switch to "inherently safer technologies" (IST). NACWA does not support a federal mandate to require implementation of IST and we certainly would not support the emergence of legislation that places an IST requirement on the water sector and not on the chemical sector. Given the Senate Homeland Security and Government Affairs Committee ordered to be reported CFATS reauthorization legislation that does not contain an IST requirement for the chemical sector, NACWA will not support legislation that imposes any IST requirement on the water sector.

NACWA at 40
A CONTINUING MOMENT
1970–2010

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NACWA believes that the choice of treatment method for disinfection purposes must remain a local decision. As part of the wastewater treatment process, EPA regulations require that treated effluent meet strictly enforced discharge requirements. To meet these requirements, utilities undertake an extensive evaluation of disinfection methods based on local factors and individual permit specifications. When deciding which treatment method to utilize, factors such as climate, physical limitation of plant location, cost, safety and compliance with the Clean Water Act (CWA) are considered. Based on this wide variety of factors, use of an IST approach may not be possible for all wastewater utilities. However, an informal survey of NACWA members conducted in 2009, shows that clean water agencies are using IST when local factors enable them to do so. In fact, 66% of survey respondents indicated they no longer use gaseous chlorine in their disinfection process. Of the 33% that continue to utilize gaseous chlorine, 20% plan to switch to another disinfectant within a one to two year timeframe. We do not believe an IST mandate is necessary, rather we believe that decisions regarding IST should reside within the local community.

The nation's wastewater utilities take their security responsibilities with the utmost seriousness. As a new federal security program is being discussed, it is important to have an understanding of the measures already being implemented by the nation's clean water utilities. POTWs have fiduciary responsibilities to the public and, as such, most facilities have already implemented measures to protect against intentional acts after the 9/11 attack occurred. A 2007 survey found that an overwhelming number of clean water agencies have implemented significant security enhancements. For example, the survey found a large majority of utilities installed fencing (88%), gates (65%) and warning signage (64%) to reduce unauthorized access to their facilities. In addition, 85% of utilities reported that systems such as manual locks, electronic access controls, and visitor restrictions are in place to further reduce unauthorized access.

In addition, as was noted in testimony before the committee on July 28, 2010, NACWA participates in a water sector-wide council on security issues that has developed a suite of security-related standards for water and wastewater utilities to follow as well as tools for assessing vulnerabilities and for making necessary security upgrades. Vulnerability Assessments (VAs), Site Security Plans (SSPs) and Emergency Response Plans (ERPs) are tools that many POTWs already have in place.

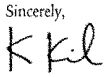
A further policy consideration is access to critical security documents. In order to create the most effective VAs, SSPs and ERPs it is obviously important that supervisory and non-supervisory employees be included in this process. However, NACWA does not believe it is appropriate to require outside collective bargaining agents access to these sensitive documents. Protecting these documents is of critical importance as any information leaked will expose a utility's vulnerabilities by providing a road map for individual(s) intending to do harm. Limiting access is a prudent course of action if the intent is to safeguard communities to the maximum extent practicable.

Finally, NACWA believes that any legislation should provide funding to help utilities meet federal security requirements. Costs borne by wastewater utilities in conducting VAs, SSPs and ERPs could be extensive depending on the size of the system. Before taking these potential new requirements into account, utilities already face significant financial challenges. The recent

EPA *Clean Watersheds Needs Survey* indicates that the total clean water infrastructure needs for the nation are $298.1 billion. To meet this backlog, utilities are raising their rates significantly. In fact, NACWA's 2009 rate index survey shows that sewer rates increased by 9 percent during that year. In looking ahead, the index projects a 34 percent increase from 2008 levels over the next few years with double digit annual increases very likely. For these reasons, it is important that Congress provides funding to assist POTWs in meeting additional security-related federal mandates.

NACWA looks forward to working with the committee and providing input into this important discussion on ensuring the nation's clean water assets are protected by responsible and sound national policy. If you would like to discuss these comments further, please do not hesitate to contact John Krohn, NACWA Legislative Manager at 202-833-4655 or via email at jkrohn@nacwa.org.

Sincerely,



Ken Kirk
Executive Director

CC: Members of the Environment and Public Works Committee