NAVAL POSTGRADUATE SCHOOL CENTER FOR HOMELAND DEFENSE AND SECURITY
HOMELAND SECURITY DIGITAL LIBRARY
SECURING THE HOMELAND THROUGH THE POWER OF INFORMATION

JULY 28, 2010

PROTECTING AMERICA'S WATER TREATMENT FACILITIES

U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ONE HUNDRED ELEVENTH CONGRESS, SECOND SESSION

HEARING CONTENTS:

Minority Statement

- James M. Inhofe *[view pdf]*
  Ranking Member, U.S. Senate Committee on Environment and Public Works

Witnesses

Panel 1

- Ms. Cynthia Dougherty *[view pdf]*
  Director, Office of Ground Water and Drinking Water, United States Environmental Protection Agency

Panel 2

- Mr. Benjamin Grumbles *[view pdf]*
  Director, Arizona Department of Environmental Quality

- Mr. Paul Orum *[view pdf]*
  Blue Green Chemical Security Coalition, Independent Consultant to Center for American Progress

---

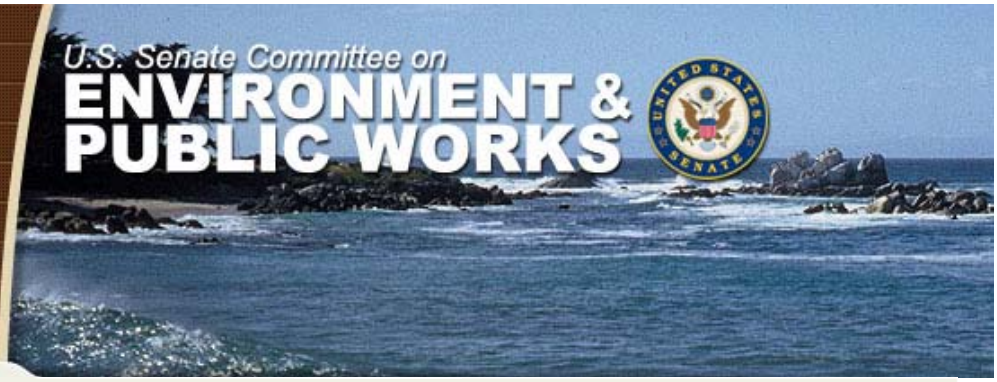
This hearing compilation was prepared by the Homeland Security Digital Library, Naval Postgraduate School, Center for Homeland Defense and Security.

- Mr. Carlos Perea *[view pdf]*
  President and Chief Executive Officer, Miox Corporation

- Darius D. Sivin, Ph.D. *[view pdf]*
  International Representative, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW)

COMPILED FROM:

- *http://epw.senate.gov/public/index.cfm?FuseAction=Hearings.Hearing&Hearing_ID=ff9bc763-802a-23ad-4837-1524c43831fd*



Hearings

- GPO (Government Printing Office)
- 109th Congress Archived broadcasts (RealPlayer)
- 109th Published Hearings
- 109th Congress Statements (2005-2006)
- 108th Congress Statements (2003-2004)
- 108th Congress Published hearings (2003-2004)
- 108th Congress Archived broadcasts (RealPlayer)
- 107th Congress Statements (2001-2002)
- 107th Congress Published hearings (2001-2002)
- 107th Congress Archived broadcasts (RealPlayer)
- 106th Congress Statements (1999-2000)
- 106th Congress Published hearings (1999-2000)
- 105th Congress Statements (1997-1998)
- 105th Congress Published hearings (1997-98)
- Back to Home

Statement of James M. Inhofe
Hearing: Full Committee Hearing entitled, "Protecting America's Water Treatment Facilities."
Wednesday, July 28, 2010

Thank you, Madam 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 twentieth 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 CFAS 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. Sen. 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.

###

Majority Office
410 Dirksen Senate Office Bldg.Washington, DC 20510-6175
phone: 202-224-8832

Minority Office
456 Dirksen Senate Office Bldg.Washington, DC 20510-6175
phone: 202-224-6176

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.

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 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 in 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.

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 c*osts 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.

---

[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.
- Statement before the U.S. House of Representatives Committee on Transportation and Infrastructure, Subcommittee on Railroads, Association of American Railroads, June 13, 2006.
- Homeland Security Committee Urged to Consider Safer Chemicals; Chemical Companies Should Stop Manufacturing Extremely Dangerous Chemicals, Association of American Railroads, 2008.

- Catastrophe, Injury, and Insurance: The Impact of Catastrophes on Workers Compensation, Life, and Health Insurance, Risk Management Solutions, Inc., 2004.
- Assessing Terrorist Motivations for Attacking Critical "Chemical" Infrastructure, Laurence Livermore National Laboratory, December 20, 2004.
- Testimony of Dr. Jay Boris before the City Council of the District of Columbia, U.S. Naval Research Laboratory, October 6, 2003.
- A Method to Assess the Vulnerability of U.S. Chemical Facilities, National Institute of Justice, U.S. Department of Justice, November 2002.
- Strategic Plan for Homeland Security, U.S. Environmental Protection Agency, September 2002.
- Homeland Security: Voluntary Initiatives Are Under Way at Chemical Facilities, but the Extent of Security Preparedness is Unknown, U.S. General Accounting Office, GAO-03-439, March 14, 2003.
- Homeland Security and the Private Sector, Congressional Budget Office, December 2004.
- Statement by the Department of Homeland Security on Continued Al-Qaeda Threats, Department of Homeland Security, November 21, 2003.
- Industrial Chemicals and Terrorism: Human Health Threat Analysis, Mitigation and Prevention, Agency for Toxic Substances and Disease Registry, 1999; and, Terrorist Use of Expedient Chemical Agents: Health Risk Assessment and Las Vegas Case Study, Agency for Toxic Substances and Disease Registry, undated.
- Study Assesses Risk of Attack on Chemical Plant, Army Surgeon General reported in *Washington Post*, March 12,2002.
- The Terrorist Threat in America, Chemical Manufacturers Association (American Chemistry Council), April 1998.
- PACE International Union Survey: Workplace Incident Prevention and Response Since 9/11, Paper, Allied-Industrial, Chemical and Energy Workers International Union (PACE), October 27, 2004.
- America the Vulnerable: How Our Government Is Failing to Protect Us From Terrorism, Stephen Flynn, 2004.
- Protecting the American Homeland, Brookings Institution, March 2002.
- Toxic Warfare, RAND Corporation, 2002.
- News Release: Chemical Facilities Vulnerable, Center for Strategic and International Studies, December 23, 2003.
- Eliminating Hometown Hazards: Cutting Chemical Risks at Wastewater Treatment Facilities, Environmental Defense, December 2003.
- The Safe Hometowns Guide, The Safe Hometowns Initiative, 2002.
- Needless Risk: Oil Refineries and Hazard Reduction, U.S. PIRG Education Fund, August 2005.
- Unnecessary Dangers: Emergency Chemical Release Hazards at Power Plants, Working Group on Community Right-to-Know, July 21, 2004.
- Chemical Plants Remain Vulnerable to Terrorists: A Call to Action, United Steelworkers of America, undated.
- High Alert: Workers Warn of Security Gaps on Nation's Railroads, International Brotherhood of Teamsters, 2005.

- Making the Nation Safer: The Role of Science and Technology in Countering Terrorism, National Research Council, National Academy of Sciences, 2002.
- Terrorism and the Chemical Infrastructure: Protecting people and Reducing Vulnerabilities, National Research Council, National Academy of Sciences, 2006.

[vi] These survey reports by the Center for American Progress are:

- 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.

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

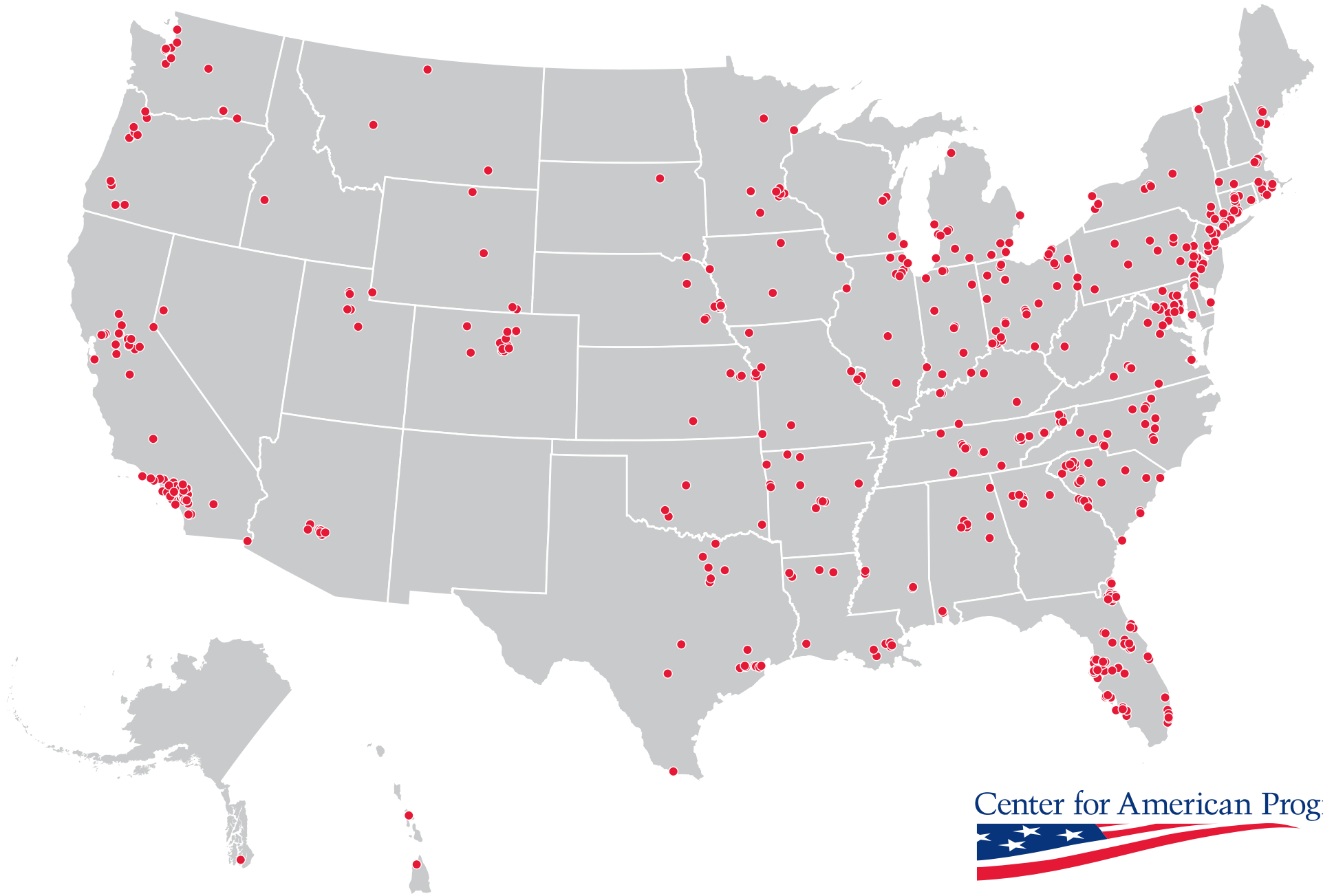
Gail Bateson
Worksafe, Inc.

Kristin Breitweiser
9/11 Widow

Bettie D. Kettell, RN
Durham, ME

Protecting Americans from Toxic Terrorism

554 Water Utilities No Longer Use Extremely Hazardous Substances



Center for American Progress

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 (≤ 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

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."

---

[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

TABLE OF CONTENTS

EXECUTIVE SUMMARY 2

I. INTRODUCTION 6

II. TITLE I: CHEMICAL FACILITY SECURITY 7

III. TITLE II: DRINKING WATER SECURITY 8

IV. TITLE III: WASTEWATER TREATMENT WORKS SECURITY 9

V. EXPENDITURE ESTIMATES 10

VI. ECONOMIC AND EMPLOYMENT ESTIMATES 17

VII. REFERENCES 19

APPENDIX: THE MISI MODEL 20

MANAGEMENT INFORMATION SERVICES, INC. 26

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.

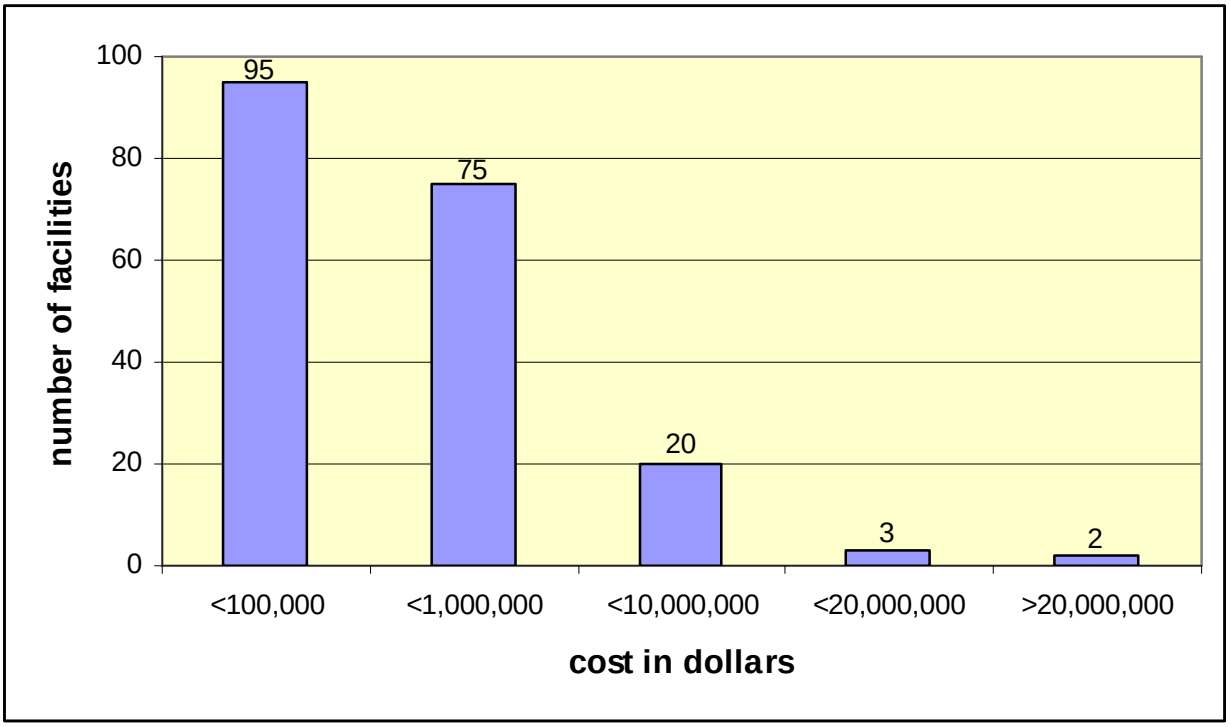
Conversion Costs

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.

VII. REFERENCES

American Solar Energy Society. *Green Collar Jobs in the U.S. and Colorado*, by Roger Bezdek, 2009.

Bezdek, Roger H. and Wendling, Robert M. *Fuel Efficiency and the Economy*, American Scientist, Vol. 93, No.2, March-April 2005.

Center for America Progress. *Chemical Security 101 – What You Don't Have Can't Leak, or Be Blown Up by Terrorists*, by Paul Orum, November 2008.

_____. *Preventing Toxic Terrorism – How Some Chemical Facilities are Removing Danger to American Communities*, by Paul Orum, April 2006.

_____. *Toxic Trains and the Terrorist Threat - How Water Utilities Can Get Chlorine Gas Off the Rails and Out of American Communities*, by Paul Orum, April 2007.

Congressional Budget Office. *H.R. 2868 - Chemical Facility Anti-Terrorism Act of 2009 Cost Estimate*. October 23, 2009.

Congressional Research Service. *Chemical Facility Security: Reauthorization, Policy Issues, and Options for Congress*, by Dana A. Shea, November 10, 2009.

Library of Congress. *Summary of H.R. 2868,* November 6, 2009.

U.N. Environment Programme. Sustainable Energy Finance Initiative. *Why Clean Energy Public Investment Makes Economic Sense – The Evidence Base*, by Management Information Services, Inc., 2009.

U.S. Government Accountability Office. Homeland Security. *DHS Is Taking Steps to Enhance Security at Chemical Facilities, but Additional Authority Is Needed*, GAO-06-150, January 2006.

U.S. House of Representatives. "Chemical and Water Security Act of 2009", June 2009 (H.R. 2868) as adopted by the House on November 6, 2009.

_____. Committee on Energy and Commerce. *Drinking Water System Security Act of 2009*, Report 111-313, October 23, 2009.

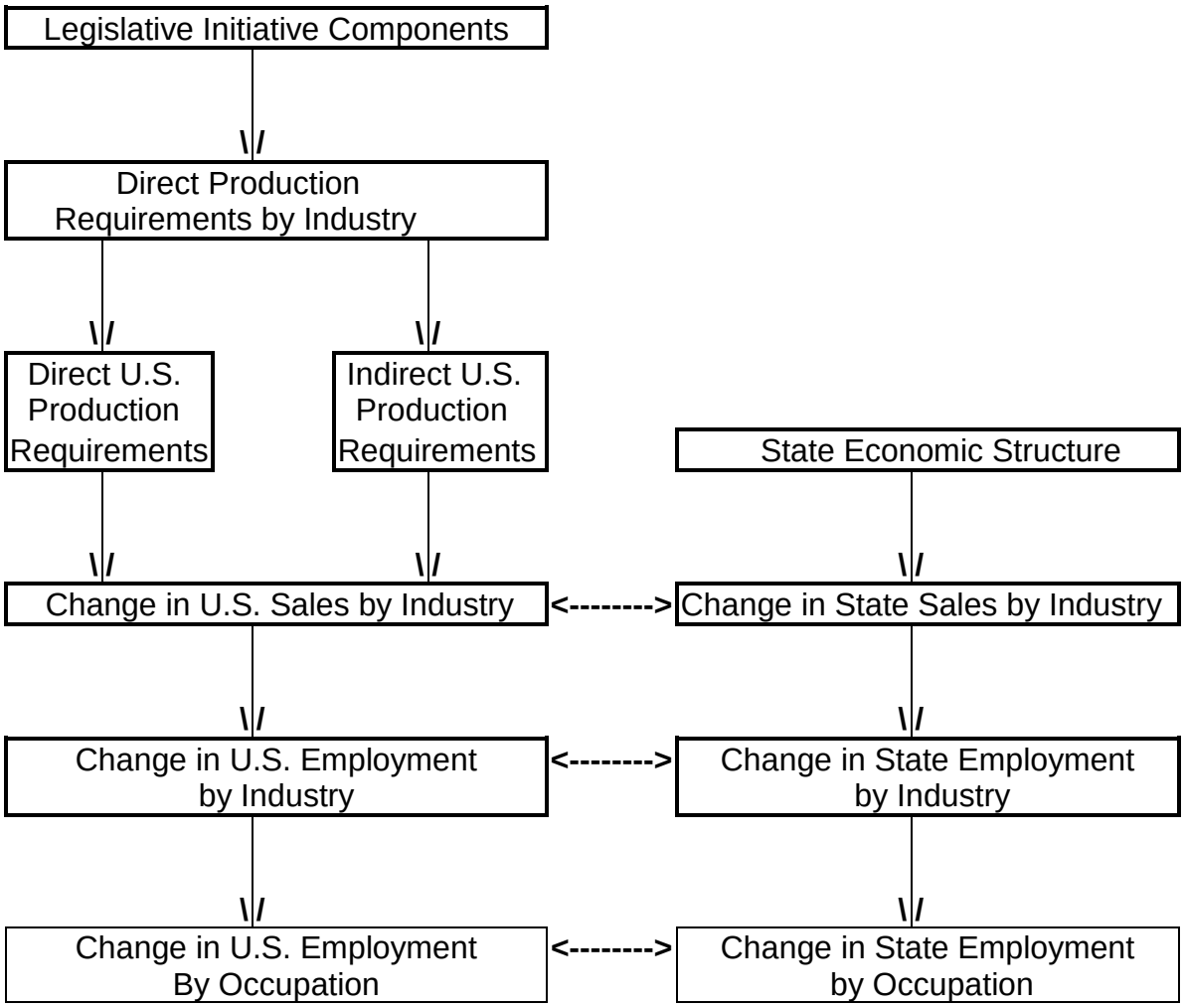
_____. Homeland Security Committee Summary. *Section by Section Analysis of H.R. 2868 - The Chemical Facility Anti-Terrorism Act of 2009*, June 2009.

U.S. PIRG Education Fund. *Needless Risk: Oil Refineries and Hazard Reduction, by Meghan Purvis and Margaret Herman*, August 2005.

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.