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Inherently Safer Technologies Can Eliminate Catastrophic Risks

Chlorine Production, Use and Transport Should Be Prioritized for Phase-Out

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"Of all the various remaining civilian vulnerabilities in America today, one stands alone as uniquely deadly, pervasive and susceptible to terrorist attack: toxic-inhalation-hazard industrial chemicals...To date the federal government has made no material reduction in the inherent vulnerability of hazardous chemical targets inside the United States." --- Richard Falkenrath, former Deputy Homeland Security Adviser to President Bush

More Than Four Years of Neglect

The September 11th terrorist attacks successfully used our own infrastructure against us with tragic results. They also demonstrated that tight perimeter security, such as in the case of the Pentagon, is incapable of preventing such attacks. Should a chemical plant be targeted, a truck bomb, a small plane or a high powered rifle would easily render the industry's current reliance on fence-line security totally useless. In fact, U.S. chemical facilities have been referred to as **"pre-positioned"** weapons of mass destruction (WMD).

On July 22, 2004 **"The 9/11 Commission Report"** identified four failures in preventing an attack by the U.S. government the first of which was the failure of **"imagination."** A continuing lack of imagination today exposes millions of Americans to Bhopal magnitude risks largely because new laws or regulations have not yet been adopted to clarify the chemical industry's obligation to prevent catastrophic releases at U.S. chemical plants. In June, 2002 a promising proposal drafted by the U.S. Environmental Protection Agency (EPA) could have completed the first phase of such a program by the middle of 2003 but it was derailed by the White House in the fall of 2002. It was not unlike a bill (S. 1602) authored in 2001 by Senator Jon Corzine (D-NJ) and based on a bill introduced by Senator Frank Lautenberg (D-NJ) in 1999.

The EPA's 2002 proposal included **"substituting less hazardous chemicals for extremely hazardous ones."** The conversion of Washington, D.C.'s main sewage treatment plant from chlorine to safer chemicals, just eight weeks after 9/11, exemplifies the feasibility of such a strategy. At the time of the attacks they had 7 90-ton rail cars of chlorine stored on site.

Of the 15,000 facilities required to report their worst-case chemical disaster scenarios to the EPA, 7,728 plants pose an **"off site consequence" (OSC)** to more than 1,000 people. Approximately 100 facilities reported an OSC to the EPA putting one million or more people at risk. Approximately 65 percent of these facilities' "worst-case-scenarios" are chlorine disasters. Rather than address these risks through the new regulations suggested by the EPA, the Department of Homeland Security (DHS) used a new methodology to downsize the priority list of chemical plants by forty-three percent to 3,400 facilities that put 1,000 or more people at risk.

EPA's 2002 chemical security proposal was slated for a media **"rollout"** at the White House. According to draft documents, **"higher priority chemical facilities should be able to complete a vulnerability assessment and address security vulnerabilities as described in the guidance in 12-18 months."** --- In other words many facilities could already have eliminated or reduce hazards by early 2004.

EPA's documents included a question and answer sheet. EPA Administrator Whitman saying, **"EPA is not seeking legislation on chemical security at this time. Using existing authority under the Clean Air Act, we believe that the guidance and regulation I have**

announced today are the quickest paths to improving chemical facility security...If we later find that there are legislative gaps, then we will consider seeking legislation."

Ultimately, the reversal by the Bush administration and the lobbying pressure by the industry (American Chemistry Council, American Petroleum Institute, etc.) paid off and chemical security legislation was excluded from the Homeland Security Act signed into law in November 2002.

One of the Bush administration's leading opponents to the EPA's 2002 chemical security proposal, Philip J. Perry, (Vice-President Cheney's son-in-law, formerly with the Office of Management and Budget) is now the general counsel to the DHS. This should inform Congress that any legislation enacted by this Congress should also draft legislative language that minimizes administrative discretion in implementing hazard reduction and hazard elimination programs.

In March, 2003 a report by the General Accounting Office (GAO) concluded ***"EPA has not attempted to use these Clean Air Act provisions [because] EPA is concerned that such an interpretation would pose significant litigation risk..."*** The GAO concluded that chemical facility security would be more effectively addressed by passage of specific legislation.

The newly elected Republican controlled Congress, the White House and the chemical industry warmed up to the idea of legislation. In May, 2003 Senator James Inhofe (R-OK) introduced a chemical security bill (S. 994), however it would have allowed the new DHS to ***"endorse"*** chemical industry programs as regulations.

However, the powerful chair of the House Energy and Commerce Committee, Representative Joe Barton (R-TX) told the National Journal in August 2003 , ***"If there are enough terrorists who are dedicated enough and equipped well enough, they're going to overwhelm everything that you put up short of some sort of Fort Knox -- which doesn't make much sense, given the cost and the relatively remote possibility that any specific site is going to be targeted."***

Then in December 2003 President Bush further undermined EPA's authority and issued a directive (Directive/Hspd-7) limiting EPA's role on chemical security to ***"drinking water and water treatment systems."*** Under questionable legal authority, this directive attempts to shift responsibility for 15,000 chemical plants to the DHS which has no experience with this industry nor is it inclined to regulate them.

Finally in January 2005, former White House homeland security deputy, Richard Falkenrath told the Senate Homeland Security and Governmental Affairs Committee, ***"the federal government has made no material reduction in the inherent vulnerability of hazardous chemical targets inside the United States. Doing so should be the highest critical infrastructure protection priority for the Department of Homeland Security in the next two years."***

The Threat Is Real

In his book, --- "America the Vulnerable" Stephen Flynn, of the Council on Foreign Relations warned, ***"The chemical industry deserves urgent attention because the stakes are high, the opportunities for terrorists are rich, and no credible oversight process exists. It is the very ubiquity of the U.S. chemical industry that gives it potential to be a serious source of national alarm."***

But members of Congress such as Representative Barton are not only responsible for the failure to enact timely legislation. Their attitude flies in the face of the findings and warnings of countless experts including, the Brookings Institute, Rand Corporation, U.S. Army, U.S. Naval Research Laboratory, General Accounting Office (GAO), Congressional Research Service, Argonne National Laboratory, FBI, CIA, Department of Justice, DHS, chemical industry leaders, members of Congress and investigative journalists.

The magnitude of this threat is daunting. Chemical facility disaster reports to the EPA RMP show that the release of a toxic gas cloud could spread 14 miles in an urban zone and up to 25 miles in rural terrain. According to a 2000 report by the EPA which first identified over 100 facilities that threaten a million or more people, ***“the high number of facilities in both class intervals is primarily due to the prevalent use of 90-ton rail tank cars for chlorine storage in the United States.”***

Although flammable materials such as gasoline also pose frightening scenarios, the OSC of a flammable incident is dwarfed by a poison gas event that can drift and remain harmful 10 to 20 miles from its release. Acutely toxic chemicals such as chlorine, ammonia and hydrogen fluoride are categorized as toxic-by-inhalation (TIH).

--- In July, 2004, the Homeland Security Council estimated that an attack on a single chlorine facility could kill 17,500 people, severely injure an additional 10,000 and result in 100,000 hospitalizations and 70,000 evacuations.

--- In January, 2004, the U.S. Naval Research Laboratory testified before the Washington, D.C. City Council warning that 100,000 people could be killed or injured in the first 30 minutes of a catastrophic release of a tank car of chlorine or similar chemical within blocks of Capitol Hill. They further estimated that people could ***“die at rate of 100 per second.”***

--- In June, 2003 FBI specialist on WMDs, Troy Morgan, in a speech at a chemical industry conference warned, ***“You’ve heard about sarin and other chemical weapons in the news. But it’s far easier to attack a rail car full of toxic industrial chemicals than it is to compromise the security of a military base and obtain these materials.”***

--- In March, 2002, a U.S. Army surgeon general report concluded that 2.4 million people could be killed or injured in a terrorist attack on a U.S. chemical plant in a densely populated area.

The Risks Have Been Known for Nearly a Century

The potential for sudden large-scale loss of life is not theoretical. Chlorine was the first lethal chemical weapon used in modern warfare in World War I, when it was used by the Germans against the French in Belgium in 1915 with horrific effects resulting in as many as 5,000 casualties. According to the U.S. government, by the end of World War I, poison gas had inflicted 1.3 million casualties and 90,000 deaths.

Deadly Accidents

It is not hard to imagine that a terrorist attack on a chemical plant could exceed the loss of life suffered at the 1984 Union Carbide Bhopal disaster. Forty tons (half a rail car) of methylisocyanate (MIC) leaked into the community at midnight killing 8,000 people within days and claiming another 12,000 lives since. The Bhopal legacy continues to this day. The plant

was abandoned leaving tons of pesticides to seep into ground water causing extensive contamination of drinking water supplies.

The Indian government still has an arrest warrant and an extradition request to the U.S. State Department for the former CEO of Union Carbide, Warren Anderson. Union Carbide, now owned by Dow Chemical, is currently defending itself in the U.S. Federal Appellate Court (Second Circuit) in New York City against liability for the clean up and compensation for this disaster. If found liable the costs could easily reach hundreds of millions of dollars.

According to the U.S. Coast Guard's National Response Center, there have been more than 3,000 chemical accidents involving more than 10,000 pounds of hazardous materials since 1987. A December 2000 assessment by the Argonne National Laboratory on the risks of transporting hazardous materials warned that, ***"...releases of toxic chemicals can kill and injure people located relatively far from the accident...As a result, failure to identify and evaluate opportunities to reduce the risks from these types of relatively rare accidents could ultimately lead to thousands of fatalities, injuries, and evacuations."***

Of the 1,900 accidents identified by the EPA between 1994 and 1999, 518 of them were chlorine accidents listed by plants required to submit report to the EPA's Risk Management Program (RMP). Of these, 226 were at water treatment facilities, many of which are located in populated areas.

The RMP came to being as the ***"Bhopal amendment"*** to the 1990 Clean Air Act. This program built upon the success of the Toxic Release Inventory (TRI) program that was added to the 1986 Superfund reauthorization, also inspired by the Bhopal disaster.

In June, 2004, three people were killed in a train accident in a remote area southwest of San Antonio, Texas when a tank car carrying chlorine broke open in the 25 mph crash, releasing a portion of the tank car contents.

On January 6, 2005 ten people were killed, 58 hospitalized and hundreds sought treatment in Graniteville, South Carolina when chlorine was released again when one train slammed into a parked train in the middle of the night. The cars involved were allegedly state of the art construction.

Both of these tragedies could have resulted in even higher fatalities and injuries if they had occurred in densely populated areas.

Community Involvement & Right-to-Know

Following the January 2005 Graniteville train disaster, the U.S. Conference of Mayors wrote to Secretary Ridge urging ***"immediate action"*** to improve notification of the rail transport of hazardous material transported through cities. Today few emergency responders, let alone local residents are aware of the lethality of high volume tank cars that routinely roll through their communities. Full respirator suits required to respond to such a disaster are in short supply at fire departments.

Since the Community Right to Know program in Superfund in 1986 and the 1990 Clean Air Act was established reporting by chemical facilities of their emissions and storage quantities has been a major motivator for improved practices. Both of these laws were inspired by the 1984 Bhopal disaster in India. The RMP authorized by the Clean Air act is one of the main sources of

information on the vulnerabilities of the chemical industry to terrorism and catastrophic accidents. The nation's rail system would benefit greatly from a similar RMP for the railroads. In particular, annual reports on hazardous materials shipped volumes (rail cars) would give communities an idea of the magnitude of threats they face and the nature of their vulnerability.

New National & Local Rail Safety Standards Are Needed

The Department of Transportation (DOT) has long had authority to re-route shipments of hazardous substances but has never used this authority to protect public safety. The railroads have also been exempted from regulations that cover similar handling of large quantities of hazardous chemicals by the chemical industry.

In March, 2004 the National Transportation Safety Board (NTSB) found that of the almost 60,000 rail road tank cars now in service, more than 35,000 were built before manufacturers began using a stronger steel in 1989. The NTSB urged the Federal Railroad Administration (FRA) to assess the safety of these cars, which can remain in service for 50 years, and develop new safety standards for the construction of new rail cars.

According to a series of investigative reports in the New York Times (November 7, 2004 and January 9, 2005) rail safety has been compromised by an overly friendly relationship between the railroads and FRA regulators who prefer a **"partnership"** approach to regulation that is lax on enforcement. For example, the FRA admitted to levying fines for only about two percent of the violations it finds.

In Washington, D.C. hazardous materials trains pass within four blocks of the U.S. Capitol every day. As evidence of this vulnerability to terrorism in central Washington and the seat of government, bi-partisan legislation was first introduced in the City Council in October, 2003 by Council members Kathy Patterson.

On April 6, 2004, Admiral David Stone, Administrator of the Transportation Security Agency (TSA) sent a letter responding to Greenpeace saying, ***"A working group has been established to explore and determine solutions in securing the District of Columbia rail corridor...Upon closure of this project, a written report will be drafted outlining the facts and findings of the security review. The report will serve as the baseline for shaping national policies in the transport of hazardous materials for other high rail traffic areas."***

The TSA report was never issued even though TSA officials acknowledged that their findings were completed by the summer of 2004. The lack of any report ultimately was used to delay legislation in both the D.C. City Council and Congress.

After more than a year of hearings, negotiations and delays, the Washington, D.C. City Council finally voted 10 to 1 on February 1, 2005 to enact a mandatory 90 day re-routing law. The day after the Mayor signed the bill on February 15, 2005, CSX, the railroad industry and the Bush administration took legal action to overturn the new law. The case is tied up in Federal Court and may not be decided for a year or more.

Hazardous materials shipments are a small minority of overall freight rail traffic. Hazardous materials that pose the greatest threat such as chlorine represent an even smaller fraction of rail traffic. They include substances known as toxic-by-inhalation (TIH). According an April, 2003 Government Accounting Office (GAO) report, 95 percent of the ton miles of TIH substances shipped in the U.S. are shipped by rail.

According to a December 2000 risk assessment of hazardous materials transportation by Argonne National Laboratory, **chlorine represents 58.5 percent of the risk of death from accidents involving TIH substances. Of the 150 most shipped hazardous materials, only 10 substances were listed by Argonne as TIH.**

An example of the relatively small universe of the most dangerous hazardous materials was confirmed in statements submitted in federal court on March 10th by CSX railroad which acknowledged that only about **"295"** rail cars of chlorine were shipped north or south through the Capitol Hill rail line in 2003. Contrary to public claims by CSX only a small fraction of the freight rail business is effected by re-routing.

Following the terrorist attacks on commuter trains in Madrid, Spain, CSX secretly began re-routing some hazardous materials around Capitol Hill in Washington, D.C. in May of 2004. However, they now admit to continuing east-west shipments through the north eastern sector of Washington, less than 2 miles from the U.S. Capitol. The legislation adopted by the District of Columbia covers a 2.2 mile exclusion zone within D.C. and would therefore also cover this east-west corridor, protecting all of D.C. CSX told local media that this was a less threatened rail line.

The Bush administration's handling of this vulnerability in the nation's capitol where such a large recognized threat has not been addressed, demonstrates a profound hypocrisy about homeland security when it presents a choice between regulating powerful industrial interests and public safety.

In fact, re-routing is the fastest most efficient way to eliminate this transportation risk. All other proposals such as, "hardening" the rail corridor or increasing security with lights and cameras, running "decoy" cars or eliminating rail car placards are fraught with new risks and at best only mislead the public that risks are being addressed.

The D.C. re-routing law and national legislation in Congress by Senator Joseph Biden (D-DE) and Representative Edward Markey (D-MA) include reasonable common sense conditions that exempt rerouting in certain circumstances. These conditions make re-routing policies feasible in virtually any high risk area. There is no excuse NOT to include re-routing in our tool box of preventing catastrophic terrorist attacks. --- In fact, it is the only policy on rail security that will eliminate this threat. Everything else gambles with public safety and national security.

Acute Health Effects Can Be Lethal

There is no doubt about the lethality of chlorine and other TIH substances. According to the EPA, the acute health effects of chlorine on humans range from shortness of breath, chest pain, vomiting to heart complications and death from pulmonary edema (drowning in lung fluid). Immediate health consequences can begin with as little as 1-3 parts per million (ppm) exposure. At concentrations of 46 to 60 ppm pulmonary edema can begin to occur. At 430 ppm chlorine can kill after 30 minutes of exposure. The Chlorine Institute's disaster models assume a plume of chlorine gas could remain at 40 ppm concentration more than 10 miles from the release. The also assume a win speed that could only be out run by a runner who meets the qualifying time for the Boston Marathon.

Long-term Health and Environmental Effects

Long before the 9/11 attacks many experts recognized the need and availability of safer chemicals and technologies due to the widespread environmental risks posed by industrial chemicals. Since Rachel Carson wrote *“Silent Spring”* in 1962, the use of chlorine to make substances such as DDT, PCBs and by-products such as dioxins, has been challenged because of the long-term impact of these compounds on humans and the environment.

Chlorine compounds can have profound long-term effects on the environment for two fundamental reasons. First, they are resistant to degradation and tend to build up in ecosystems over time because their rate of release into the environment far exceeds their *“half-life.”* Second, they are more soluble in oils and fats than in water, so they tend to migrate to the fatty tissues of living organisms and bio-accumulate at the top of the food chain, including humans.

While a few of these chemicals have been banned or restricted, hundreds of potentially toxic chlorine-based chemicals and their by-products have yet to be fully assessed for their health hazards. The U.N Stockholm Treaty on persistent organic pollutants (POPs) was signed in 2001 by more than 100 countries and has since been ratified by 59 nations. The POPs treaty targets the twelve most dangerous chemicals (all chlorine compounds) for a legally mandated global phase out.

There is a Safer Way

Re-routing TIH and other hazardous materials is one immediate step that can be taken but it should not be the only step. Simultaneously safer technologies should be substituted where feasible at all facilities producing, using or storing large quantities of TIH chemicals. These safer alternatives have been referred to as *“inherently safer technology”* (IST).

Although the oil and chemical industry vehemently oppose IST, some industry veterans have been proponents of IST. Retired Rohm and Haas engineer, Dennis Hendershot advised, *“The first solution to a process safety problem should always be to get rid of the hazard, not control it.”* Trever Kletz, formerly with Imperial Chemical Industries (ICI) says, *“The very best way to prevent an explosion is to simply replace the material that explodes with one that does not or at least keep the stock down so low that it hardly matters if it all leaks out.”*

In his 2001 book, *Materials Matter*, Kenneth Geiser says, *“If we paid closer attention to the materials that we produce, we could pay less attention to the impacts of those materials once they are released into the environment and people are exposed to them. Instead of investing in complex technologies for managing toxic pollutants and hazardous wastes and negotiating complicated institutional systems for permitting environmental releases and enforcing standards of human exposure, we could try to produce safer materials and use them more carefully.”*

Choosing safer technologies and chemicals instead of inherently dangerous ones or those that have not been fully tested for their impact on human health and the environment is also known as taking the *“precautionary principle.”* This approach was put forth by the International Joint Commission (IJC) in their 1992 and 1994 biennial reports and in 2001 by the United Nations in the Stockholm Convention on POPs. The precautionary principle is now also being considered by the European Union as part of their chemical reform policy known as the Registration, Evaluation and Authorization of Chemicals (REACH).

Chaired by conservative Republican Gordon Durnil, the IJC concluded, ***“persistent toxic substances are too dangerous to the biosphere and to humans to permit their release in ANY quantity...Accordingly, the Commission concludes that the use of chlorine and its compounds should be avoided in the manufacturing process.”***

A May 2006 report by the National Academy of Sciences, “Terrorism and the Chemical Infrastructure: Protecting people and Reducing Vulnerabilities,” recommended more research on new technologies but stated, **“The most desirable solution to preventing chemical releases is to reduce or eliminate the hazard where possible, not to control it. This can be achieved by modifying processes where possible to minimize the amount of hazardous material used, lower the temperatures and pressures required, replace a hazardous substance with a less hazardous substitute, or minimize the complexity of a chemical process.”**

By all accounts chlorine is one of the leading toxic-by-inhalation threat due it’s widespread use in populated areas and its acute toxicity. Chlorine is a by-product of the production of caustic soda which results in large amounts of relatively inexpensive but dangerous chlorine. However, there are alternative ways to produce caustic soda. Trona ore is one alternative source. Caustic soda use can also be reduced by 50 to 90% in major industries through greater efficiency and recycling. Soda ash, lime, or calcium, magnesium, or potassium hydroxides are also substitutes for caustic soda.

The largest uses of chlorine are in making plastic (PVC), bleaching paper and making solvents, for which there are numerous commercially available safer alternatives. In 2001 Cargill-Dow opened a \$300 million plant in Blair, Nebraska which produces chlorine-free plastics out of vegetable matter. Large pulp and paper producers in Canada and Europe have been using chlorine-free bleaching such as oxygen for many years. The U.S. military and the EPA helped promote the development of commercially available chlorine-free solvents made from carbon dioxide and water, respectively.

However, some of the relatively small uses of chlorine represent the greatest acute toxic threats to densely populated areas. The use of chlorine in water treatment, particularly sewage treatment, which represents approximately 4 percent of the total use of chlorine, is widely distributed by 90-ton rail cars which are also used as temporary storage vessels across the country. Fortunately, this is one of the easiest uses of chlorine to substitute.

For example, the Blue Plains sewage treatment plant in Washington, D.C. halted its use of chlorine and switched to safer chemicals just eight weeks after the 9/11 attacks due to fears of another attack. The plant had seven rail cars of chlorine on sight following the 9/11 attacks. The conversion only cost approximately .50 per year for each water customer. In other words, by using safer technologies we can neutralize and eliminate targeting by terrorists and prevent catastrophic accidents as well at negligible costs. There is now no reason to ship 90-ton rail cars of chlorine into the District of Columbia.

This is only the first step. Switching to safer ***“drop-in”*** chemicals, such as sodium hypochlorite (bleach) without a long-term plan can leave lingering risks in communities where the bleach is produced. While switching to bleach at a sewage plant clearly eliminates the immediate hazard at that facility, the bleach formulators who use and store large quantities of chlorine to make bleach still pose serious risks to workers and surrounding communities. However, as part of an orderly transitional program these formulators can offer safe and effective alternative

disinfectants to their customers. Bleach makers are well positioned to guide their customers toward alternatives such as ozone and ultra-violet light (UV) which are widely available and do not pose catastrophic hazards.

A Government Accountability Office report (GAO-05-165) identifies chlorine gas and 90-ton chlorine rail cars as "among the top five terrorist-related wastewater system vulnerabilities." Among the top three recommendations: "Replacing gaseous chemicals used in wastewater treatment with less hazardous alternatives." In addition, the largest majority of experts gave replacing these chlorine the highest priority for federal funding. The report also identifies using smaller containers for shipping and storing chlorine, such as 1-ton cylinders.

A 2006 GAO report (GAO-06-150), Homeland Security DHS Is Taking Steps to Enhance Security at Chemical Facilities, But Additional Authority Is Needed," concluded that **"Implementing inherently safer technologies potentially could lessen the consequences of a terrorist attack by reducing the chemical risks present at facilities, thereby making facilities less attractive targets."**

And according to a 2003 report by Environmental Defense (ED), "Eliminating Hometown Hazards: Cutting Chemical Risks at Wastewater Treatment Facilities" twelve wastewater facilities that posed a threat to 100,000 or more residents have already converted to safer alternatives since 1999. Four of these switched to UV technologies. The full ED report is available at www.environmentaldefense.org

An April 2006 report, "Preventing Toxic Terrorism How Some Chemical Facilities are Removing Danger to American Communities," by the Center for American Progress (CAP) identified 284 facilities in 47 states that have converted to safer chemicals, processes or moved to more remote locations since 1999. Seventy-two percent of these plants were wastewater and water treatment facilities. The full report is at: www.americanprogress.org

According to EPA data just four ultra-hazardous TIH chemicals account for 55 percent of the processes that threaten communities nationwide; they are: chlorine, ammonia, sulfur dioxide and hydrogen fluoride (HF).

The CAP report identified hundreds of success stories among these four chemicals:

*** More than 200 water treatment facilities (including Washington, D.C.) have converted to safer alternatives such as ultraviolet light since 1999 eliminating the use ultra-hazardous chlorine and sulfur dioxide gas. But more than 100 water treatment plants still threaten more than 100,000 people.

*** Ninety-eight petroleum refineries use safer alternatives to deadly HF. But 48 refineries still threaten millions of people with ultra-hazardous HF.

*** At least 36 electric power plants use safer alternatives to anhydrous ammonia gas such as dry urea. But 166 power plants still use ultra-hazardous anhydrous ammonia gas.

While the costs of conversion can easily be amortized over time. But the cost of defending against personal injury law suits, relocating communities and resolving environmental clean up liability are wildly unpredictable and can threaten the very existence of a company. Having registered an OSC with the EPA and perhaps again with the DHS, it would be hard to claim

ignorance or even defend against negligence, knowing that many IST options are widely available.

The use of safer technologies offers a more stable business plan with fewer regulations, potentially zero liability, more sustainable profitability and better relationships with workers and neighboring communities.

Inadequate Actions

Without new preventive state or federal safety standards the country remains at the mercy of voluntary programs designed by the American Chemistry Council, the American Petroleum Institute and other lobbying groups. Voluntary initiatives by the industry are neither adequate nor acceptable. The public has no faith in the industry's ability to regulate itself. That was true for the airlines and it is especially true for the chemical industry.

The primary flaw in the chemical industry's voluntary programs and legislative agenda is its focus on fence-line security. Guarding a plant perimeter, although necessary, is inadequate in preventing dedicated terrorist attacks and has been dramatically exposed by the media as woefully lacking even on its own terms. Prevention through safer technologies is clearly the only prudent response.

The DHS announced in June, 2004 that they are installing web cameras at 17 priority chemical plants at a cost of \$4.2 million to deter terrorists and possibly increase intelligence. Unfortunately security only deters those who don't want to be caught. Suicide squads are less subject to deterrence. In addition, site security advocates recommend waiting for "**threat based**" information to trigger a response. This fails to recognize the limits of our intelligence gathering and the almost limitless choices an attacker would have among U.S. chemical facilities. Public safety should not depend upon on promises of new intelligence, especially given the spectacular failures of intelligence leading up to and following the 9/11 attacks.

While security should have been enhanced by the chemical industry immediately following 9/11, web cams are hardly more than we had in airports before 9/11. Seeing grainy photos of the next set of terrorists, days or weeks after another tragedy, will not be consolation to the families of the victims. The very selective implementation of site security at a handful of facilities speaks volumes about what DHS is NOT doing at thousands of other facilities across the country.

Will Congress Act?

Continuing negligence by industry and government will not be judged kindly by posterity. Stephen Flynn, Senior Fellow in National Security Studies at the Council on Foreign Relations said in his book, *America the Vulnerable*, "***The morning after the first terrorist strike on this sector, Americans will look around their neighborhoods and suddenly discover that potentially lethal chemicals are everywhere, and be aghast to learn that the U.S. government has still not developed a plan to secure them. The subsequent political pressure to shut down the industry until some minimal new safeguards can be put in place -- as we did with commercial aviation following the 9/11 attacks -- will be overwhelming.***" In his book Flynn also recommended converting dangerous chemical plants and re-routing ultra-hazardous cargoes.

Clearly, facilities that use or store TIH substances pose an inherent risk to workers and surrounding populations. This is a threat that has been studied by many agencies of

government and other independent organizations. In July of 2002 Senator Corzine's bill (S. 1602 in the 107th Congress) was unanimously adopted by the Environment and Public Works Committee but was never made part of the Homeland Security Act in 2002. He plans to reintroduce a bill this year.

Corzine's bill would not only have beefed up site security, it would have required high priority plants to evaluate the availability of a wide variety of safer technologies or chemicals. If these alternatives were shown NOT to be cost-effective or "**practicable**" they would not be required to adopt them. The bill is both modest and limited in scope. It does not ban or phase out any dangerous chemicals.

Chemical industry opponents of Corzine's bill claim that "a one-size-fits-all" program won't work for such a diverse industry. However, the bill anticipated this concern and allowed enough flexibility to include a wide range of options including, safer chemicals/substances, smaller quantities of dangerous chemicals, increased efficiency, reduced storage, buffer zones, etc. -- Ideally, risk reduction would be seen as the first step toward efforts to eliminate these risks in the long-term.

Although Senator James Inhofe (R-OK) voted for the Corzine bill in July, 2002 he flip-flopped in the fall of 2002, effectively blocking the bill from inclusion in the 2002 Homeland Security bill. Inhofe introduced an industry friendly bill (S. 994) in May 2003. It was narrowly adopted on a party-line vote in the EPW Committee in October, 2003 and ultimately died.

Before Hurricane Katrina, a May 22, 2005 New York Times editorial entitled, "Inside the Kill Zone" captures the urgency surrounding this neglected vulnerability:

"There is a park outside New Orleans with rows of old oak trees and the ruins of a colonial plantation. It is a pleasant place to take a stroll - and it would be an ideal staging ground for a terrorist attack on Chalmette Refining. An attack on the refinery, which has 600,000 pounds of hydrofluoric acid on hand, could put the entire population of New Orleans at risk of death or serious injury.

"Chalmette Refining, a joint venture of Exxon Mobil, is one of more than 15,000 potentially deadly chemical plants and refineries nationwide. More than 100 of them put a million or more people at risk. These time bombs are everywhere, from big cities like Los Angeles to small towns like Barberton, Ohio. Many are so inconspicuous - a chlorine plant may be a couple of tanks and access to a railroad line - that the people in the kill zone do not even know to be worried.

"The worst possible outcomes are chilling. A successful terrorist attack on a chlorine tank could produce, according to a Department of Homeland Security report, 17,500 deaths, 10,000 severe injuries and 100,000 hospitalizations. In Bhopal, India, in 1984, when methyl isocyanate escaped accidentally from a chemical plant, at least 3,800 people were killed and as many as 600,000 injured.

"The security holes at chemical facilities are glaringly obvious. On a recent visit to Chalmette Refining, a Times editorial writer had no trouble standing in the nearby park for 15 minutes with a large knapsack. At two plants in Dallas that use large amounts of chlorine, the same writer parked a car on the periphery and milled about for more than a half-hour without being stopped.

The fencing was minimal - far less than at a nearby automobile factory. It would not have been hard to explode a bomb or fire a weapon near the chlorine.

“Nuclear power plants are required by federal law to have physical barriers and trained security forces, and to hold simulated terrorist attack exercises. Chemical plants should be subject to the same sort of requirements. But common-sense safety measures are being blocked by special interest politics. Chemical companies do not want to pay for reasonable security, and the industry, a major contributor to presidential and Congressional campaigns, has succeeded in preventing Congress from acting.

“There is no way to guarantee that terrorists will not successfully attack a chemical facility. But it would be grossly negligent not to take defensive measures. The question Americans should be asking themselves, says Rick Hind, legislative director of the Greenpeace Toxics Campaign, is, “If you fast-forward to a disaster, what would you want to have done?” These should be some of the priorities:

“1. Tighter plant security There should be tough federal standards for perimeter fencing, concrete blockades, armed guards and other forms of security at all of the 15,000 facilities that use deadly chemicals.

“2. Use of safer chemicals Refineries, when practical, should adopt processes that do not use hydrofluoric acid, the chemical that is now putting New Orleans at risk. Some plants that once used chlorine, such as the Blue Plains wastewater treatment plant in Washington, D.C., have switched to safer alternatives.

“3. Reducing quantities of dangerous chemicals An important reason that chemical facilities make such tempting targets for terrorists is the enormous quantity of chemicals they have on hand. The industry should be encouraged, and in some cases required, to store and transport dangerous chemicals in smaller quantities.

“4. Limiting chemical facilities in highly populated areas Many chemical facilities were built long before terrorism was a concern, and when fewer people lived in their surrounding areas. There should be a national initiative to move dangerous chemical facilities, where practical, to low-population areas.

“5. Government oversight of chemical safety The chemical industry wants to police itself through voluntary programs. But the risks are too great to leave chemical security in private hands. Facilities that use dangerous chemicals should be required to identify their vulnerabilities to the Environmental Protection Agency and the Department of Homeland Security, and to meet federal safety standards.

“A bill being developed by Senator Jon Corzine, a New Jersey Democrat, and Susan Collins, a Maine Republican, could go a long way toward making these facilities safer. But it could be watered down, or outflanked by an industry-backed alternative sponsored by James Inhofe, an Oklahoma Republican, that would leave many of the biggest risks in place.

“Those who live near one of the 15,000 chemical facilities scattered across the country - that is, most Americans - have an important stake in this fight. They should urge their senators and representatives to pass a tough law that keeps America safe from the weapons of mass destruction hidden in its own backyard.”

On May 23rd the Senate Environment and Public Works voted along party lines in rejecting an amendment by Senators Jeffords (I-VT) and Boxer (D-CA) to provide grants to convert high hazard water treatment plants to safer technologies based on a bill by Senator Joseph Biden (D-DE), the Community Water Treatment Hazards Reduction Act of 2005 (S.2855).

However, this year there was some good news. The New York Times reported on April 24th, “225 industrial plants in this country have switched to using less dangerous chemicals since the 2001 terrorist attacks, lowering the risk that people nearby would be injured or killed by toxic plumes...” This was based on an analysis of EPA RMP data by the Center for American Progress.

When Senator Susan Collins (R-ME) the chair of the Homeland Security and Governmental Affairs Committee introduced a chemical security bill (S. 2145) last year she acknowledged the role of safer technologies in preventing disasters. However, she refused to support making the most dangerous plants convert to safer technologies. Fortunately, Senator Lieberman (D-CT), a cosponsor of her bill, plans to offer an amendment on June 14th when the Homeland Security Committee has scheduled votes on chemical security legislation.

However, safer technology legislation is opposed by the Bush administration and the chemical and oil industry. In fact, DHS Secretary Chertoff called it “mission creep” at a March 21, 2006 news conference co-hosted by the chemical industry lobbying arm, the American Chemistry Council. Chertoff, asserted that eliminating chemical hazards at chemical plants was not a security measure. Instead he echoed the industry mantra that safer technology legislation is really about preventing accidents and environmental contamination. Chertoff added, *“if one approach is to say we’ll do a little less on prevention but we’ll have much more on [disaster] response and mitigation, I think that’s worth weighing as part of the total mix.”* Chertoff also embraced the industry’s agenda on prohibiting states from setting stronger security standards than the federal government.

Immediate Next Steps on Regulations and Legislation

In addition to requiring facilities to assess and use safer technologies, a multi-stakeholder process should be convened immediately to bring together plant workers, owners, communities, first responders, company leaders, government, academics and other experts. This could be sponsored by a multi-agency task force charged with assessing priority facilities, cities, chemicals, populations at risk and safer alternatives.

Given the prevalent use and distribution of chlorine at chemical facilities and in the transportation sector it clearly deserves prioritization. The substitution of chlorine with safer available technologies will serve as a model for the replacement of other inherently dangerous substances and technologies. A rational approach would prioritize the top hazardous chemicals as well as the plants near the largest population centers.

Without enacting new legislation, the Bush administration could take immediate steps to:

--- Use existing EPA authority under the Clean Air Act’s “general duty clause” (section 112 r) to require chemical plants to prevent disasters, as the EPA proposed in 2002. This should include the immediate issuance of “guidance” by the EPA, followed by enforceable regulations to encourage the use of plant design changes, safer technologies and buffers zones if necessary to prevent catastrophes.

-- Use existing Department of Transportation authority to prohibit the shipment of large quantities of the most dangerous hazardous substances through highly populated areas or other high priority risk zones. The impact on commerce would be minimal. According to the Argonne National Laboratory risk assessment, only 10 of the 150 most often shipped hazardous substances are TIH.

Given the refusal of the Bush administration to implement new safety standards since 9/11 to prevent chemical plants and trains from being turned into weapons of mass destruction, new legislative authority is urgently needed to require federal agencies to at a minimum:

>>> Enact an emergency program requiring high priority facilities, to go beyond fence line security efforts to safer available technologies. Where ever available, safer technologies should be used to *eliminate risks* not simply reduce them. Legislation introduced by Representative Frank Pallone's (D-NJ) "Chemical Security Act of 2005" (H.R. 2237) and Senator Frank Lautenberg "Chemical Security and Safety Act of 2006" (S. 2486) represent an essential first step in making this a reality.

>>> Enact legislation to re-route ultra-hazardous cargoes around large populations centers as Senator Biden's (D-DE) Hazardous Materials Vulnerability Reduction Act of 2005 (S. 1256) and Representative Edward Markey's (D-MA) Extremely Hazardous Material Transportation Security Act of 2005 (H.R. 1414) legislation would do.

>>> Appropriate federal funds to convert high hazard water treatment facilities, currently using chlorine or sulfur dioxide gas, to safer technologies, such as ultra-violet light as outlined in Senator Biden's (D-DE) Community Water Treatment Hazards Reduction Act of 2005 (S. 2855).

>>> Prohibit the siting of any new facilities that store, make or use large quantities of ultra-hazardous chemicals (chlorine, hydrofluoric acid, vinyl chloride) in populated areas.

>>> Provide community and worker participation and training in safer technologies, security planning procedures and emergency response planning, including evacuation planning and drills.

>>> Extend the EPA's community right-to-know and Risk Management Programs to the transportation sector to require routine reporting to first responders and communities on the nature and quantity of hazardous materials shipments going through their communities.

>>> Study safer alternatives to shipping extremely hazardous materials by rail, including the use of smaller, possibly 1-ton containers by rail, using secondary containment devices.

For more information: www.greenpeaceusa.org

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