SOCMA
SYNTHETIC ORGANIC CHEMICAL MANUFACTURERS ASSOCIATION

Testimony
of
Matthew Barmasse

Environmental, Health, Safety and Quality Director
ISOCHEM Inc.

On behalf of the

Synthetic Organic Chemical Manufacturers Association

Before the

Senate Committee on
Homeland Security and Governmental Affairs

On

"Chemical Facility Security: What is the Appropriate Federal Role?"

July 13, 2005

1850 M Street, NW ● Suite 700 ● Washington, DC 20036
(202)721- 4100 ● Fax (202) 296 - 8120

I. **Introductory Comments**

Madam Chair, members of the Committee, my name is Matt Barmasse. I am the Director of Environmental, Health & Safety and Quality for ISOCHEM in Lockport, New York. I am appearing today on behalf of the Synthetic Organic Chemical Manufacturers Association, known as "SOCMA".

I appreciate the opportunity to speak with you regarding the appropriate federal role in the security of America’s chemical facilities. My goal is to share with you some of the activities of SOCMA and its members with respect to chemical risk and security. I will also describe the unique nature of the batch and specialty chemical manufacturing sector of the U.S. chemical industry and our efforts working with the Department of Homeland Security (DHS) to ensure appropriate communication and information-sharing between the federal government and the chemical sector.

SOCMA is the leading trade association representing specialty and batch chemical producers. Approximately 90 percent of SOCMA’s members are small businesses, according to SBA definitions. While commodity chemicals make up most of the production volume in the global marketplace, specialty chemicals make up most of the diversity (or number of different chemicals) in commerce. As a condition of membership to SOCMA, chemical companies must subscribe to Responsible Care® and its security code. This self-imposed program requires conducting a security vulnerability assessment, developing a plan to reduce vulnerabilities and enhance security, and obtaining third-party verification that all of the actions in the plan have been carried out. My company, ISOCHEM Inc., has been an active SOCMA member for many years and I have been active in SOCMA’s Responsible Care Committee and Employee, Process & Safety Committee..

ISOCHEM Inc. is a small facility located in western New York, north of Buffalo, with 93 employees and approximately 25 million dollars in sales. ISOCHEM Inc.

manufactures mainly phosgene and phosgene derivatives serving many markets including: pharmaceutical, agrochemical, plastics, cosmetics, dyes, paints and coatings, sealants, photographic, and flame retardants.

I will focus my remarks today on four specific areas. First, I will explain the nature of batch manufacturing, the contributions of our industry sector, and the unique circumstances that demonstrate why a cookie-cutter approach will not achieve our nation's security goals. Second, I will provide information on how ISOCHEM, and SOCMA more generally, are addressing security and working with the Department of Homeland Security, as well as with local and state officials. Third, I will discuss the nature of the EPA Risk Management Program. And fourth, I will explain SOCMA's perspective on the engineering concept of Inherently Safer Technology, known as "IST," and why attempting to legislate this philosophical approach is not a panacea for securing America's chemical facilities.

II. The Unique Nature and Role of the Batch and Specialty Chemical Manufacturing Sector

Specialty chemicals are essential ingredients and building blocks for the manufacture of almost everything made in the United States. Specialty chemicals perform very specific functions, based largely on their molecular structures, which give them unique physical and chemical properties. Without these substances, nylon would not be strong enough to use for seatbelts, medicine would revert back to what it was in the 1800s, and our armed forces would not have the equipment and supplies necessary to defend our country.

Because of their complex chemistries and narrowly focused applications, specialty chemicals are typically produced batch-by-batch in reaction vessels. Batch processes are very different from the 24 hours a day, 7 days a week continuous operations that produce commodity chemicals. Since continuous processes employ continuous feeds and yields, the production volume is usually far greater than for batch processes. The main difference, however, is that a batch process and the chemical reaction (which yields the desired product) has a distinct beginning and end for each batch. In addition to processes having variable risk, the products that are stored onsite also change on a continual basis.

In addition to differences in processing, another distinct feature among specialty chemical producers is the variability of risk at production and storage sites. Batch producers are necessarily flexible and they can make many different products during any given production year. Their business is driven by customer demand, and many chemicals are made on short notice. As a result, the types of products onsite at a specialty chemical facility often change from week to week or even day to day, leading to similarly frequent changes in the risk profile of the facility. This ever-changing risk profile makes planning a successful attack difficult. This fact must be accounted for when looking at security and vulnerability.

Batch and specialty chemical producers also vary widely in appearance, which often makes them difficult to recognize as a chemical facility at all. In many cases, batch processing equipment is located either inside of building structures or contained in areas out of view from the road. Often, the sites are located in non-descript industrial or office parks and contain few features that would make them stand out as having anything to do with chemicals. Recognizability and location of equipment can greatly hamper surveillance efforts and make the facilities less attractive as targets. This attractiveness concept also must be considered when looking at vulnerabilities and potential countermeasures, and it is a fundamental part of the current DHS approach to the chemical sector..

Does this mean that my company and other SOCMA members feel that we do not have to consider the security of our facilities? Absolutely not. However, it does mean that when we apply our limited resources to security, we do it in ways that make sense and that actually reduce vulnerability or enhance security. Based upon the unique differences between large continuous chemical manufacturing facilities and small batch manufacturing facilities, it should be clear that a cookie cutter approach or one-size-fits-all approach is neither appropriate nor feasible for the variety of sites that make up the chemical manufacturing sector. Instead, SOCMA and its membership support an approach to security that focuses on actual risks identified by a vulnerability analysis. These risks should be addressed in a written, site-specific security plan that is kept onsite and made available to DHS upon request. This approach also should be tiered so that it imposes escalating requirements on those sites that pose higher levels of risk.

III. <u>How SOCMA and Specialty Chemical Firms are Addressing Security</u>

SOCMA's security activities started long before there was a Department of Homeland Security, even before September 11, 2001. In February 2001, SOCMA formed a partnership with the American Chemistry Council and The Chlorine Institute to proactively address site security. Together, we co-authored a guidance manual on site security for the chemical industry and distributed it to members and non-members alike. After the terrorist attacks in September 2001, SOCMA and its members cooperated with multiple federal agencies and began to develop additional tools and approaches for companies to identify their particular vulnerabilities and enhance security. SOCMA co-hosted a series of workshops throughout the country in late 2001 and early 2002. These included a workshop in Arlington to teach the fundamentals of vulnerability analysis in October 2002.

In addition, we created the concept of a Chemical Security Summit and partnered with the American Chemistry Council to develop what is now is now an annual conference attended by hundreds of chemical industry representatives. SOCMA also developed a unique vulnerability analysis model that is geared for variable risk facilities; the model has been downloaded from the SOCMA web site by more than a thousand different entities. All of SOCMA's security products and services are available to any firm that manufactures, handles or stores chemicals.

ISOCHEM and other individual SOCMA members are taking aggressive steps to secure their facilities. Since 9/11 ISOCHEM has instituted an integrated approach to security management using voluntary programs, such as the Responsible Care Security Code, as a guideline. Our security management plan includes enhancements to physical security, personnel security, surveillance, communication and threat assessment, vulnerability assessments, emergency response planning, transportation, supply chain and customer security, and cyber security.

To expand upon this without specifically identifying sensitive security information, ISOCHEM has spent over $750,000 since 9/11 on fencing, surveillance systems, access control, background checks, security guards and infrastructure, transportation security enhancements, community alert siren, and closure of a local road. Our security plan now includes response to terrorism, homeland security threat level changes, cyber security, communications and threat information, local law enforcement coordination, analysis of threats and vulnerabilities, and third-party verifications of security plans.

SOCMA supports DHS's request for additional authority to enhance security in the chemical sector, and we recommend that any such authority require covered facilities to take the following steps:

- Perform a risk screen based on potential consequences of an attack and attractiveness as a target
- If found to be at risk, perform a detailed vulnerability analysis
- Develop plans to enhance security, according to the risks and vulnerabilities that have been identified
- Develop a site security plan that contains the plans for enhancements and includes standard operating procedures and policies pertaining to security

IV. <u>DHS Efforts to Secure Chemical Facilities</u>

Since the inception of the Department of Homeland Security, SOCMA has forged a strong working relationship with DHS. DHS provides regular security briefings and outreach to the chemical sector, has addressed our Board of Governors and member committee meetings, and is generally available whenever we have questions or need its perspective. It is not a one-way relationship, however. Because the specialty chemical industry is unique and diverse, SOCMA staff and member company experts are routinely consulted by DHS on various topics related to chemicals. SOCMA staff also participates on DHS work and issue groups, such as Risk Assessment and Management for Critical Asset Protection (RAMCAP) and the Chemical Sector Coordinating Council, which have been discussed in earlier testimony before this committee..

I have been very impressed from my personal experiences working with DHS by their efforts to develop a framework for enhancing security at U.S. chemical facilities. SOCMA staff and several member company representatives and I attended the DHS tabletop security exercise in February at the Maritime Training Institute in Jessup, Maryland. This conference facilitated networking with DHS personnel and other industry experts on the perceived threats and best practices in security at chemical facilities, making it easier to enhance security at our sites. DHS also conducted a site assistance visit at our facility, which led to an outstanding third-party assessment of our security practices. The auditors provided extremely helpful suggestions for improvement of our security plans and practices. In addition, state and local law enforcement conducted a buffer zone protection assessment at our facility. that looked at potential vulnerabilities outside the facility boundaries, allowing the local authorities to apply for federal grants to enhance the security outside facility boundaries. And finally, we are participating in a pilot project being conducted by New York's Office of Homeland Security in August to assist in testing the DHS RAMCAP methodology for comparing security risks across the chemical sector.

DHS does not just work with the chemical industry, however. The Department has met with leaders from other critical infrastructure and business sectors that handle or store hazardous materials. They also coordinate closely with other federal agencies and experts. For example, DHS has been coordinating with EPA to use existing EPA data on chemicals and facilities, rather than trying to reinvent the wheel. Not all of the data are particularly well-suited for security purposes, but EPA's data have provided a rational starting point to help identify potentially vulnerable sites. Also, several representatives from U.S. national laboratories are members of the DHS RAMCAP team, which is developing a standard approach to screening and prioritizing critical infrastructure according to risk. Additionally, DHS has consulted with the FBI on theft and diversion issues and how RAMCAP could be modified to help identify potential vulnerabilities in those areas.

As you can see, DHS is working with other federal agencies, trade groups and individual companies to secure America's chemical facilities. However, I think there are other efforts underway that are equally pertinent here and should not be discounted. State and local authorities, from law enforcement to fire departments and other emergency services, are often in the best position to ensure the security of our nation's infrastructure. There are many efforts underway within the chemical sector that have enhanced security and this coordination will continue because at the local level, we all have a mutual interest in mind. None of us wants our communities to be affected by terrorism. I am active in my community and have family, friends and neighbors who I care deeply about. My children go to local schools. The same holds true for others who work at chemical facilities around the country. At the local level, we have incentives that are stronger than just complying with regulations.

V. <u>RMP Facilities</u>

Under the Clean Air Act Amendments of 1990, EPA requires facilities possessing certain listed chemicals above threshold amounts to develop risk management plans that include an assessment of the worst-case scenario in the event of a release from a single chemical process. These worst-case scenarios include estimates of the population potentially at risk, based on the application of very conservative EPA criteria and guidelines. Roughly 15,000 facilities submitted plans under this RMP program, and the data they submitted have been routinely misinterpreted ever since. Nevertheless, the RMP list provides a legitimate starting point for any discussion of facilities that should be covered by an expanded DHS program.

Recent witnesses before this committee have suggested that not all RMP facilities are covered by the 16 associations that make up the Chemical Sector Coordinating Council and that there may be outliers that are unwilling or unable to secure their facilities. While there may be some outliers, I will not be easily convinced that those outliers, which are primarily small-scale chemical users rather than manufacturers, are very attractive targets to terrorists. In fact, if you study the RMP list closely, you will find that only about 10 to 12 percent of facilities on the entire list are even involved in chemical manufacturing. Simply put, the figures often cited by the press—15,000 chemical facilities that put thousands or even millions of people at risk—are just not an accurate depiction of reality. In fact, the RMP database, especially the worst-case scenarios under RMP, were never designed to be realistic.

EPA and DHS officials have made this point repeatedly, and this has just been reaffirmed by the Congressional Research Service, which noted in a June 27 memo to Rep. Edward Markey of Massachusetts that “[s]ince the population potentially affected under an EPA worst-case scenario release is calculated in a circle around the facility, it is unlikely that this entire population would be affected by any single chemical release, even if it is a worst-case accident.”. In spite of these frequent caveats and clarifications, I repeatedly see RMP data used to scare people into thinking that the chemical industry is putting the nation at risk. This is both irresponsible and inaccurate, and it is unfair to both the chemical industry and to DHS and the local authorities with whom we work closely.

Consideration of the RMP numbers demands more perspective than the media and other alarmists give them. The EPA models used to estimate affected populations under worst-case scenarios for RMP assume that gases will spread out in a perfect circle. In reality, gases usually form plumes that drift in a specific direction. In effect, this reduces the potentially affected population to a small fraction of what the RMP data tell us. That is why historically, when catastrophic releases have occurred in this country, you do not see the kinds of numbers that the media are claiming for injuries and fatalities.

Another factor to consider that greatly diminishes injuries and fatalities is our nation's emergency response system. The United States has what are arguably the best systems in the world to handle chemical emergencies. For instance, there are national-level mutual aid networks for specific chemicals that can provide on-site experts and equipment to help mitigate emergency situations. Areas with concentrations of chemical facilities have Local Emergency Planning Committees, known as LEPCs, which conduct exercises and drills to test response capabilities. We have community-wide procedures for sheltering in place and, when necessary, evacuation.

Our emergency response capabilities, residential and industrial building codes and the realities of how hazardous materials behave when released, explain why we don't see Bhopal-like incidents occurring in the United States. That is not to say that RMP data cannot be useful. While we believe that most facilities falling under the Risk Management Program are not attractive terrorist targets, the list does provide a reasonable universe of sites to begin screening and prioritizing according to risk.

VI. <u>The Philosophy of Inherently Safer Technology (IST)</u>

Inherently safer technology or IST is probably the most misunderstood and controversial aspect of chemical site security. While it seems self-explanatory, the term as used in chemistry and engineering may be misleading to non-scientists. IST is an approach to chemical processing that considers procedures, equipment and the use of less hazardous substances in these processes.

Many non-scientists have been led to believe that the only way to achieve inherent chemical safety is by reducing the amount of hazardous substances used in chemical manufacturing and processing. Application of IST, however, is bound by the laws of physics and nature; a simple reduction in the use of hazardous chemicals is often not possible within the confines of a particular reaction or process. Such reductions often result in transferring risk to other points in a chemical process or the supply chain, without actually reducing it. To place the current IST debate in context, I will begin with an illustration of the limitations of chemical substitutes, then discuss the difference between a hazard and a risk, and finish with an explanation of why reducing a hazard in a process does not necessarily reduce the overall risk.

Most natural processes involve chemical reactions in one form or another, but chemistry is bound by the laws of physics and nature. These physical laws place restrictions on what can and cannot be done when trying to make a chemical. For instance, a molecule (i.e., a chemical) is made up of atoms (e.g., sodium, carbon, chlorine, etc.) that are in specific locations or positions on the molecule. In organic chemistry, the goal is to take the atoms from one molecule and move them to locations on another, different molecule so that it takes on a specific function or behavior.

The laws of physics and nature dictate if, how and when those atoms can be moved. To achieve certain critical structural changes, reactive chemicals must be used, and many are by their very nature hazardous, i.e., toxic, flammable, etc. In light of these constraints, scientists seeking to achieve certain chemical changes are often left with few alternatives. Where hazardous chemicals are used, they are highly regulated by EPA and appropriately managed by chemists in universities, government and industry. The fact of the matter is that scientists usually cannot produce the materials that make our standard of living possible without using very specific chemicals. Making medicine is a good example.

Often, to make medicine it takes multiple steps. Each step in the process carefully moves atoms from one molecule to locations on another molecule. Eventually, the scientist will obtain the desired chemical that performs a precise medicinal function. The movement of these atoms, from one molecule to another, is a chemical reaction and can only take place using certain materials. The chlorine atom, for instance, when it is located on a specific part of a molecule, allows these steps to take place. One common misconception, though, is that any chlorine atom will do. That is not the case. Chlorine atoms take on different behaviors, or physical properties, depending on the atoms to which they are attached.

Table salt consists of the sodium (Na) and chlorine (Cl) atoms, which make up the chemical sodium chloride (NaCl). The chlorine atom used to make medicine, on the other hand, often comes from phosphorous trichloride (PCl_3). PCl_3 has one phosphorous and three chlorine atoms. The sodium atom that is attached to the chlorine atom in table salt gives the chlorine a different nature than the one attached to the phosphorous atom in PCl_3. The very specific nature of the chlorine atom in PCl_3 is critical to its fundamental role it pharmaceutical manufacturing. By contrast, to use the chlorine in table salt in the drug manufacturing process would require the application of electric energy to the salt, resulting in the formation of chlorine gas, which is corrosive and poisonous by inhalation. At that point, it is no longer table salt; it has been converted into a compound with similar hazards to the $PCl_{3.}$ The complex chemistry associated with making medicine has well-defined physical boundaries and requires the use of reactive chemicals. That is why, generally, medicine is not made from table salt.

For several years, people have debated the hazards and risks of certain chemicals. Part of the length and intensity of these debates may be due to how people define hazard and risk. In the sciences, hazard and risk take on different meanings than the typical dictionary definitions. Before a coherent discussion of IST can take place, it is important to understand the definitions used by scientists so that chemical information is not misinterpreted. In essence, a hazard is part of a certain chemical's nature, while risk depends on the circumstances in which the chemical is stored, used or handled.

When discussing chemicals, a hazard is a characteristic of a substance that gives it the *potential* to produce an undesirable consequence *under certain conditions*. The inherent hazard of a chemical does not change and does not depend on circumstance. Risk, on the other hand, can vary with conditions. It is related to the *likelihood* that an undesirable event could take place and the consequences the event can produce; in other words, the likelihood that a hazardous thing would cause harm.

For instance, a car has hazardous properties (i.e., heavy weight, flammable fuel) that *under certain conditions*—high speed, bad road conditions, driver intoxication, etc.—can produce serious damage. The weight of the car and the flammability of the fuel that propels it—two of its hazards—do not change. Operated under proper speeds and conditions, however, cars are considered to be at a reduced (and acceptable) degree of risk because they are less likely to be involved in an accident. Furthermore, we as society accept the risks inherent in automobile use because they are outweighed by the benefits.

Chemicals can also have hazardous characteristics. Just as conditions affect the risk posed by operating a car, the risk a specific chemical presents depends upon the conditions of how and where the chemical is stored, used or handled. These conditions are as important as the chemical's hazardous properties when trying to determine its degree of risk. For example, household oven cleaners and drain openers are corrosive—a hazard—and can cause severe burns on skin and permanent blindness if splashed into the eyes and not treated immediately. Despite these hazardous characteristics, they are used in most households because of their grease-cutting properties. When these products are clearly labeled, which is required by law, and used with adequate precautions, they do not pose a significant risk. In fact, anything can be handled safely with the right precautions. Consumers accept that and use hazardous products accordingly.

As noted earlier, IST is a conceptual and often complex framework that covers procedures, equipment, protection and, when feasible, the use of less hazardous chemicals. Its premise is that if a particular *hazard* can be reduced, the *overall risk* associated with a chemical process will also be reduced. In its simplicity, it is an elegant concept; however, reality is not always simple. A reduction in hazard will reduce overall risk if, and only if, that hazard is not displaced to another time or location, or does not magnify another hazard. If the hazard is displaced, then the risk will be transferred or increased, not reduced. Here are several examples of how factors related to likelihood affect overall risk when attempts are made to reduce hazard:

Reducing the amount of a chemical stored on site

A manufacturing plant is considering a reduction in the volume of a particular chemical stored on site. The chemical is used to manufacture a critical nylon additive, which is sold to another company and used to make seat belts stronger. Because it is a critical component for nylon strength and seatbelt production cannot be disrupted, the production schedule cannot change. If the amount stored on site is reduced, the only way to maintain the production schedule is to increase the number of shipments to the site. This leads to more deliveries (an increase in transportation risk), more transfers of chemical from one container to another (an increase in transfer risk) and, since there is now a greater chance that production could be disrupted by a late shipment, there is an increase in economic risk. This analysis only accounts for the risk to the manufacturer and does not include the risk to the customer making the seat belts or those using seat belts.

Substituting a Reactant in a Chemical Reaction

Phosgene is a key building block for an important starting material in pharmaceuticals. The structure of phosgene allows for a transfer of atoms that is clean, meaning that it does not allow side reactions to take place that would contaminate the compound with potentially toxic by-products. Using phosgene helps ensure the safety of medicines used to treat diseases such as multiple sclerosis .

Substituting Sodium Hypochlorite for Chlorine

Some people point to the Blue Plains water treatment plant in Washington, DC, as a prime example of how easy it is to substitute sodium hypochlorite solution for chlorine gas as a wastewater disinfectant. Unfortunately, several important facts are usually missing from these explanations. First, the conversion was not an overnight process; in fact, the substitution began prior to September 11 and included retrofitting the plant to accommodate the substitution. Second, the District of Columbia is in a different situation financially than other municipalities, in that it often receives federal funding to make such expensive changes possible. Also, it takes a large amount of sodium hypochlorite to achieve the same sanitizing effects as chlorine. But the most important fact that is missing from this story is that it takes chlorine to make sodium hypochlorite. The facilities producing the hypochlorite must now use and store vast quantities of chlorine in very few locations to keep up with the increased demand for hypochlorite. There are only a handful of sodium hypochlorite producers in the United States, which means that more and more chlorine will have to be concentrated in a few locations to keep up with demand. The ultimate result of this is a huge increase in risk at chemical facilities that produce hypochlorite, but a modest reduction in risk at the water treatment plants, which typically use 1-ton cylinders of chlorine.

In science, risk is dependent on the circumstances and surroundings of a hazard. A simple reduction in hazard will not necessarily result in a reduction of overall risk. IST decisions, therefore, are and should be based on risk, not simply on inherent hazards.

Scientists support the concept of using inherently safer technologies whenever possible. They have one major motivating factor: their own safety. Scientists spend hours each day in laboratories and manufacturing facilities that use and produce chemicals. It is difficult to imagine that any scientist would not want to work under the safest conditions possible. In addition, at most chemical companies, executive offices are in the same buildings, or very close to the same buildings that contain the processing, storage and laboratory areas.

There are also important economic incentives for companies to use the safest and least hazardous chemicals possible. These incentives include reduced accidents among laboratory and processing workers, cheaper transportation and disposal costs, cheaper insurance rates and fewer government regulatory requirements. In addition, the lost productivity caused by a system that is out of operation or by the absence of lost raw materials can put a company out of business.

With all of these incentives in place, the question becomes: Why do chemical companies still use hazardous materials? The simple fact is that the laws of physics and nature are a much larger determining factor in selecting process materials than anything else. No federal program mandating IST will change how these processes are run in any significant way. Instead, such a program would result in government micromanagement of the decision making process at individual facilities, would impose burdensome paperwork requirements on the regulated community, would duplicate certain key requirements of other federal and state regulatory programs, could slow chemical production activities, and could lead to manufacturers moving production overseas.

VII. Conclusion

As you can see, chemical facilities are extremely diverse, as are the chemistries that take place within the manufacturing plants. Because of this diversity, a one-size-fits-all approach to security with prescriptive standards will not work, nor will attempting to mandate inherently safer technology.

SOCMA supports programs that promote enhanced security in the chemical sector based on an evaluation and prioritization of risks, threats and vulnerabilities. Given the broad range of processes and operations that are part of the chemical sector, these programs should focus first on facilities most likely to present the highest risks. Any federal oversight of security in the chemical sector needs to account for the significant voluntary efforts already undertaken, factor in the diversity in operations and risks presented, and use performance-based fundamentals that provide the flexibility needed to implement effective, site-specific programs.

SOCMA supports DHS in its push for greater authority over our sector, assuming that the any future program adopts a tiered, risk-based approach to security at America's chemical facilities. Key elements of such a program include:

- A clear definition of covered entities and any exemptions
- Recognition of past efforts and voluntary programs that are substantially equivalent to DHS requirements
- Flexibility in achieving compliance
- Compliance assistance for small facilities
- Risk screening for prioritization across covered facilities
- DHS-approved security vulnerability assessments for higher-priority sites
- Federal preemption authority for DHS
- Retention of security plans onsite, with availability to DHS upon request
- Recognition of efforts by the regulated community under other security programs

Madam Chair, members of the Committee, thank you for your consideration of SOCMA's perspective on these important issues. I am happy to answer any questions you may have about my testimony.