

**TESTIMONY of Michael P. Wilson, Ph.D, MPH
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**before the United States Senate
Committee on Environment and Public Works**

**Senator James M. Inhofe, Chairman
Senator James Jeffords, Ranking Member
the Dirksen Senate Office Building, Washington, D.C.**

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Mr. Chairman and members of the Committee, thank you very much for inviting me to the hearing today on chemicals policy and the Toxic Substances Control Act. I am Michael Wilson, an assistant research scientist with the Center for Occupational and Environmental Health at the University of California, Berkeley and the lead author of a report regarding chemical problems in California and the steps the California Legislature can take to respond to those problems. I will speak briefly about the report, entitled *Green Chemistry in California: A Framework for Leadership in Chemicals Policy and Innovation*, which was published by the University of California in March of this year. I would like to acknowledge co-authors Daniel Chia and Bryan Ehlers and the Advisory Committee of experts that provided technical guidance and rigorous review of the document over a two-year period.

The report responds to three questions posed to the University by the California Legislature:

- What are the key chemical challenges facing California?
- What are the causes of those challenges?
- How might the Legislature respond to those challenges?

In answering these questions, we found that California, like other U.S. states, is facing an array of problems with chemicals. These problems are experienced in different ways by the businesses in our state that purchase and use chemicals, by our government agencies, and by consumers and workers. But three themes emerged out of our investigation. First, there is insufficient information in the marketplace to make informed decisions about chemicals. Second, government is overly constrained in its capacity to protect public and environmental health from chemicals.

And third, more needs to be done to motivate investment in safer chemical technologies, known as “green chemistry.”

While the focus of the report is on the challenges that exist in California, the report finds that the root cause of these challenges can be traced to longstanding deficiencies in federal regulation, particularly with the Toxic Substances Control Act, or TSCA. The report illustrates that the weaknesses of TSCA have produced a Data Gap, a Safety Gap, and a Technology Gap in the U.S. chemicals market. I would like to briefly explain these three Gaps and their relevance to chemicals policy in the U.S.

The first of these, the Data Gap, is perhaps the most fundamental. As you have heard from other witnesses, TSCA does not require chemical producers (U.S. or foreign) to generate and disclose robust information on the toxicity of the vast majority of chemicals in commercial circulation. Markets cannot function without good information, and the chemicals market is no different. We found that California businesses that *use* chemicals are unable to identify and choose the safest chemicals for their needs. This leaves them with uncertainties and liabilities arising from the potential effects of these chemicals on their workers, on their customers, and in the environment. Even large firms, such as those in California’s electronics industry, are finding it very difficult and expensive to identify and replace hazardous chemicals in their supply chains. These firms simply do not have the right kind information to identify safer chemical alternatives. Of course, small business owners, workers, and consumers are affected even more acutely by the lack of appropriate information in the chemicals market.

This pervasive lack of information also poses a barrier to the competitive advantage of innovative companies that are investing in green chemistry. In the current chemicals market, customers, investors and others are unable to efficiently differentiate between conventional chemicals and safer alternatives. The report finds that green chemistry will become commercially viable only when the market allows these entities to make informed purchasing decisions. It is one of the proper roles of government to ensure that the market has sufficient information to function properly, and in this regard, TSCA has come up short.

The second challenge recognized in the report is the Safety Gap. It is also a proper function of government to ensure that the production and use of goods does not come at the expense of public and environmental health. Here again, TSCA has fallen short. It is well recognized that U.S. EPA has been greatly constrained in its ability to *assess* the hazards of chemicals in commercial circulation and to *control* those of greatest concern. This has allowed hazardous chemicals to remain competitive in the market, and it has unnecessarily put the public at risk. It is also costly. For example, the EPA expects that if production and regulatory practices remain the same, 600 new hazardous waste sites will appear in the U.S. each month of every year over the next 25 years; clean-up costs are estimated at over \$250 billion. The CDC reports that about half of the top 50 chemicals at existing waste sites can cause birth defects; others are toxic to the human nervous system.

Other social costs of chemical exposures are more subtle. There is evidence that hundreds of chemicals are accumulating in the human body. Some of these – including flame retardants, wood preservatives, and stain repellants – have been identified in the umbilical cord blood of newborn babies. Of course, the effects of chemical exposures during the uniquely sensitive period of human development are of great concern. Furthermore, chemical exposures in the workplace continue to produce a substantial burden of occupational disease in the U.S. In California, about 23,000 workers each year are diagnosed with chronic diseases that are attributable to chemical exposures on the job. The Safety Gap created by TSCA is allowing real problems to continue unchecked, problems that will likely expand as global chemical production doubles over the next 25 years.

Together, the Data Gap and Safety Gap are contributing to stagnant conditions in the U.S. chemicals market. This is producing what we characterize in the report as a U.S. chemical Technology Gap. Only 248 new chemicals introduced since 1979 have reached High Production Volume status in the U.S., about 8% of the High Production Volume chemicals in commercial circulation today. In its 1996 *Vision 2020* report, the U.S.-based Council for Chemical Research, together with the American Chemical Society, the American Institute of Chemical Engineers, the American Chemistry Council, and the Synthetic Organic Chemical Manufacturers Association, wrote that the vast majority of chemical products are manufactured in the U.S. using technologies developed 40 to 50 years ago and that new technologies are needed that incorporate

economical and environmentally safer processes, use less energy, and produce fewer harmful byproducts. Ten years after the *Vision 2020* report, the websites of the 50 largest U.S. chemical companies all contain a statement of commitment to achieving sustainability goals, but their spending on research and development has decreased or remained flat since 2000, according to the National Science Foundation.

It is not surprising, therefore, that the *Committee on Grand Challenges for Sustainability in the Chemical Industry*, convened by the National Academy of Sciences, concluded in its December 2005 report that in “going forward, the chemical industry is faced with a major conundrum—the need to be sustainable (balanced economically, environmentally, and socially in order to not undermine the natural systems on which it depends)—and a lack of a more coordinated effort to generate the science and technology to make it all possible.” The committee included academic scientists as well as representatives of Dow, PPG Industries, ConocoPhillips, and Agraquest.

The U.S. private sector is simply not investing vigorously enough in cleaner technologies, such as green chemistry, that are likely to mark the next era of innovation and growth in the global chemicals market. It is a reflection of the current state of the chemicals market (and the Technology Gap in particular) that with very few exceptions one can still earn a Ph.D. in chemistry at U.S. universities without demonstrating even a rudimentary understanding of how chemicals affect human health and the environment. U.S. chemistry graduate students are not required to gain an understanding of the principles of toxicology. This is a serious problem not only for public and environmental health but for the long-term competitiveness of the U.S. chemical industry itself, as noted last year by the NAS *Grand Challenges* committee.

So what is to be done? First, our report acknowledges that the U.S. chemical industry generates important benefits for society in the form of an extraordinary array of substances serving all sectors of the economy. At the same time, our report finds increasing evidence that many of these substances can adversely affect human health and disrupt the biological systems on which life itself depends. This is precisely what makes chemicals policy so difficult. Some of the properties that make chemicals *useful* to society also make them *hazardous* to people. Once we acknowledge this paradox, however, we can begin to think about how to re-design the production and regulatory systems so that they amplify the *positive* contributions of chemicals to

society while steadily *reducing* their negative impacts. This represents a system that is founded on the principles of green chemistry. It essentially introduces the toxicity of chemicals into the market on an equal footing with price and function, and in doing so it moves the market steadily toward the design, production, and use of chemicals that are inherently safer for people and ecological systems.

In short, a fundamental overhaul of the federal Toxic Substances Control Act is needed. A modern U.S. chemicals policy will need to put in place the market conditions that advance the technical and commercial viability of green chemistry. These new market conditions will begin to motivate the chemical industry to focus its enormous talent and technical capacity on innovating green chemistry at a level commensurate with the scale and pace of chemical production. It will open new market opportunities for green chemistry entrepreneurs. It will not, however, be achieved through voluntary initiatives by the industry, nor will it be achieved by piecemeal approaches to chemicals policy, or by providing occasional funding to universities to conduct green chemistry research. While these can help identify best practices, for example, they are not sufficient – even collectively – to correct the uneven playing field in the chemicals market that has been engendered by TSCA. The UC report recommends that correcting these market flaws will require a *comprehensive* approach to chemicals policy that closes the Data Gap, the Safety Gap and the Technology Gap.

This is the key challenge of chemicals policy for California and the nation, and I think it is reasonable to conclude that it is a fairly formidable challenge. Meeting this challenge, however, will deliver real value to the American people. It will build the foundation for an economically and environmentally sustainable chemical industry in the U.S; it will solve a host of costly chemical problems that are affecting public health, businesses, and government; and it will support our industry leaders in becoming globally competitive in green chemistry and other cleaner technologies.

Mr. Chairman and members of the Committee, thank you very much for your attention today, and thank you again for inviting me to this important hearing. I would be pleased to answer any question you might have.

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