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U.S. Senate Committee on Environment and Public Works  
Oversight Hearing on Public Health and Drinking Water Issues

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Thank you for the opportunity to address the Committee on Environment and Public Works, Oversight Hearing on Public Health and Drinking Water Issues. I am Dr. Thomas Burke, Professor and Associate Dean at the Johns Hopkins Bloomberg School of Public Health. I am also Director of Johns Hopkins Risk Science and Public Policy Institute. I have served as a member of the National Academy of Sciences Board on Environmental Science and Toxicology, and am a Member of the EPA Science Advisory Board. I also served as Chair of the National Academy of Sciences Committee on Improving Risk Analysis Approaches Used by the U.S. EPA. Perhaps most relevant to today's topic, I served as Director of Science and Research at the New Jersey Department of Environmental Protection, and in response to tremendous concerns about the State's high cancer rates, led the first state efforts to monitor and reduce toxic chemical contaminants in drinking water. Later as Deputy Commissioner of Health for the State, I participated in the State efforts to implement the New Jersey Safe Drinking Water Act and to establish health-based standards for toxic pollutants.

It is also relevant to today's hearing to tell you that I grew up in Jersey City, in Hudson County New Jersey, the nation's center of chromate production during much of the past century. Later, I led the State Health Department efforts to investigate the public health impacts of the uncontrolled disposal of billions of pounds of chromium slag. I am all too familiar with our historical failure to act to control worker and population exposures to chromium 6. As you can see in the picture 1, I am also familiar with the great mobility of the water-soluble chrome 6 in the environment. This picture is shows the bright yellow chromium in a rain -flooded area near one of the hundreds of disposal sites throughout

the community. There were mountains of this slag known as the ‘chemical mountains’ throughout the county. My wife Marguerite even recalls learning to ice skate on the frozen yellow water near one of the chromate plants. Picture 2 shows the basement of a home near a disposal site after flooding. Those crystals are chromium, most likely with a high concentration of the carcinogenic chromium 6. This hazard touches many communities throughout the country, including my current home, Baltimore. Picture 3 show the remediation work underway at a former chromate plant in the Inner Harbor. Not a good place to try to contain a highly soluble carcinogenic pollutant.

The EPA standard for chromium in drinking water is outdated, and does not reflect current science. Our understanding of the public health hazards of chromium has been continually evolving over the past 70 years – from early recognition of the acute effects of high exposure on the skin, respiratory and digestive systems; to the epidemiological studies demonstrating high lung cancer rates in workers. Now, the findings of the National Toxicology Program of oral and intestinal cancers in laboratory animals from ingestion of water soluble chromium 6, coupled with epidemiological evidence from communities exposed through contaminated drinking water in China, provide a new perspective on the public health risks. In addition, the EPA has recently determined that hexavalent chromium is “likely to be carcinogenic to humans” via the oral route of exposure. (EPA 2010) Additionally, available evidence indicates that chromium interacts with DNA, resulting in DNA damage and mutagenesis. Based on the weight of the available evidence, hexavalent chromium is proposed to act through a mutagenic mode of carcinogenic action, These findings, coupled with the Environmental Working Group

(EWG 2010) report of the widespread presence of chromium 6 in the nation's drinking water supplies indicate it is time to act to understand and reduce population risks.

California has been leading the nation in the testing of drinking water supplies for chromium 6. The California Office of Environmental Health Hazard Assessment has proposed a Public Health Goal of .06 ppb. This is a sound public health approach and is consistent with the New Jersey's Safe Drinking Water Act, which specifies that drinking water standards for carcinogens be based on a health-based goal of one in one million. The recent guidance issued by EPA Administrator Lisa Jackson, also represents a step in the right direction in recognizing and addressing the hazards of chromium 6.

The public health challenges of chemical pollutants in drinking water go far beyond the current very narrow list of regulated pollutants. The nation is more dependent than ever on re-used water. With modern analytical methods we now know that the chemicals we flush down that drain are showing up in low levels in our tap water. From personal care products to fuel additives; pharmaceuticals to persistent toxic chemicals; we now know that our water contains a complicated mixture of chemicals with a broad range of potential yet unknown public health impacts. Our national biomonitoring efforts have also indicated that these chemicals are present in our bodies.

The Safe Drinking Water Act has been tremendously successful in monitoring the quality of our water supplies and reducing exposure to harmful pollutants. At both the state and national levels the compliance with monitoring and health based standards has been

excellent and continually improving. We witnessed great reductions in population exposure to organic solvents and disinfection by products. (This despite the fact that states and EPA faced an outcry of protests from industry claiming “it couldn’t be done, the costs would be prohibitive”!)

Now we face new challenges. The recent NAS report on risk assessment at EPA found that the system is “bogged down”. (NAS 2009) The timeframe for risk assessments is often decades long. The inherent uncertainties toxicology and epidemiology studies have made the risk assessments a convenient target for those who seek to avoid regulation or the costs of remediation. We have witnessed these battles over MTB, perchlorate, arsenic, and now chromium 6. Unfortunately, raising doubt about public health impacts has become a successful strategy for delaying action.

The NAS Report “Science and Decisions” (NAS 2009) recommends that EPA begin to move beyond the current single substance, single media approach to environmental decisions. From a public health perspective it is important that we begin to recognize and address the cumulative effects that constant low-level exposures to chemical may be having on our health. Consideration of the cumulative impacts should guide not only our assessment of public health risks, but also our enforcement strategies to prevent pollution and our engineering strategies to improve drinking water quality.

As a former state regulator, I am a realist. As a member of the EPA SAB I am also aware of the limitations of the Agency’s resources. There are no quick or solutions to removing

toxic chemicals from our drinking water. Our tap water reflects our way of life and all the benefits that chemicals have brought us. However, our current approach is outdated and needs to be more responsive to emerging science. If we are going to preserve our drinking water resource from emerging threats such as “fracking” for natural gas or the accumulation of nano-materials, we must aggressively move forward with improved monitoring, exposure evaluation, and assessment of public health risks. Lack of certainty about contaminants and their potential effects cannot continue to be an excuse for lack of action to protect public health.

I would like to conclude with a brief list of recommendations for the Committee to consider:

- Shift from reaction to contaminants to prevention of contamination of our drinking water
- Improve protection of surface and groundwater sources
- Expand regional and state water monitoring efforts to identify contaminants and their sources
- Recognize of the potential cumulative impacts of multiple contaminants with common health endpoints in the standards setting process
- Advance drinking water treatment technologies to better remove chemical contaminants and their precursors

Controlling pathogens in drinking water has been a cornerstone of our public health efforts to prevent infectious disease. Now we must also recognize that monitoring and

reducing chemical contamination of our drinking water is an essential component of our public health effort to prevent chronic disease.

Thank you for this opportunity to speak with you today on this important public health challenge.

### References

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