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Myths and Facts about the West Virginia Chemical Spill

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Misinformation abounds related to the recent chemical spill in Charleston, West Virginia, much of it driven by opportunistic environmental activists who are using this unfortunate event as an excuse to push legislation that is largely unrelated to the spill. In particular, some say the federal government needs to strengthen the federal Toxic Substances Control Act (TSCA), because the spill underscores the need for more information about chemicals.¹

TSCA is one of a number of federal laws regulating chemicals that are used in both consumer products and industrial operations. According to the U.S. Environmental Protection Agency (EPA), TSCA governs “reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures.” A TSCA reform bill (S. 1009), introduced by Republican Senator David Vitter of Louisiana and Democratic Senator Frank Lautenberg of New Jersey just weeks before Sen. Lautenberg passed away in spring 2012, would expand the EPA’s authority to demand data about thousands of chemicals that have been used safely for decades.

But whatever politicians in Washington propose, if we want to minimize the probability of accidents like this one in the future, it is important to keep the issue in perspective, learn from it, and avoid legislation advanced by media-generated hysteria. Many of the details of the spill will only be settled after a complete investigation. However, there is enough information available to address some of the myths generated by media and activist hype and offer some practical ways to deal with similar incidents in the future.

Myth: This spill is a major environmental catastrophe!²

Fact: Emergency planning failures are evident, but we need to place the scope of this problem in perspective.

The chemical spill in West Virginia presents serious issues and concerns about chemical risks and emergency planning failures. It created hardships within the local communities that include stress, short-term health effects, and adverse economic impacts, but fortunately, the health risks were short term and limited in scope.

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Consider some facts about the case. On January 9, 2013, officials from the West Virginia Department of Environmental Protection discovered that one of Freedom Industries' chemical tanks at the Charleston, West Virginia-based Etowah River Terminal was leaking a chemical mixture called Crude MCHM, which was blended with a small amount of a chemical called PPH. The tank had released an estimated 10,000 gallons of the chemical, which entered a nearby waterway that leads down to the intake point for the city's local water supply facility, located 1.5 miles downriver.

After traveling downriver, the chemical reached the intake port for the community's water supply facility and then was piped out to residences before water utility officials realized what had happened. As soon as they learned about the spill, local officials quickly issued water advisories and provided bottled water to the community. Thanks to their swift action, there were no serious illnesses among a population of 300,000 people, but a number of people suffered short-term health effects such as skin and eye irritations. Although official numbers are not yet available, Ken Ward of *The Charleston Gazette* reported that public officials placed that number at between 450 and 500 cases.³ If that is true, the spill resulted in short-term health effects among 0.17 percent of the population. However, we do not yet have an official, final case count.

The water utility flushed its system and within days it no longer posed a significant threat to the local tap water, as the levels dropped considerably. By February 1, the state had tested water in the area's 107 schools, and only six had detectable levels—higher than 10 parts-per-billion (ppb)—but were far below the 1 part-per-million level deemed safe by the U.S. Centers for Disease Control and Prevention (CDC).⁴ By February 2, all but one school has tested at the no-detection level.⁵

In the environment, the chemical will break down quickly, according to Rolf Halden, professor of engineering at Arizona State University and Adjunct Association Professor at Johns Hopkins School of Public Health. He explained on National Public Radio that the chemical would disappear from the water within a couple weeks and from the soil within a month. "I would not be terribly concerned about long-term contamination of the environment with this chemical," he said.⁶

Although the situation is not the catastrophe the media hype suggests, it reveals some serious problems and failures associated with local emergency planning. These warrant further investigation and the possible implementation of measures to reduce the probability of such accidents. Apparently, not only did the company tanks fail, so did their containment systems, and there was no spill plan in place. News reports also indicate that the tanks had not been inspected in decades. Local officials and Freedom Industries may have avoided this accident had they implemented emergency planning measures that included site inspections.

In addition, lacking a spill and emergency management plan, local officials were not fully prepared to communicate the risks associated with this particular chemical. As a result, they contributed to confusion about the risks and generated excessive fear and anxiety by suggesting they lacked information about the risk.⁷ Had the local government developed an emergency

management plan related to this facility, it should have been ready to effectively communicate risks to the public, without generating undue fear and confusion.

Myth: The spill offers evidence that regulation of the chemical industry is not strict enough.

Fact: Myriad regulations exist, but state and local officials failed to implement them correctly.

Overlapping and complementary federal, state, and local laws apply in this case, including the federal Emergency Planning and Community Right to Know Act (EPCRA); the Clean Air Act's section 112r risk management planning provisions; Clean Water Act; Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980; Oil Pollution Act of 1990; and various state and local laws and regulations. In addition, the Department of Homeland Security sets emergency planning standards for chemical facilities that could be at high risk for terrorist attacks and the Chemical Safety Board, a federal independent agency, is charged with investigating chemical accidents and providing guidance and advice to communities and businesses on how to prevent future accidents.⁸

In this case, Freedom Industries did at least disclose the existence of this chemical to the EPA, in compliance with Toxics Release Inventory (TRI) mandates. TRI is part of the EPCRA, under which states and local governments organize emergency plans to prepare for accidental releases. State and local emergency planners should have used this information in their emergency preparedness plans, but they apparently failed.

This particular chemical is also subject to the federal Occupational Safety and Health Act (OSHA), which is designed to govern the handling of the chemical to protect workers by limiting exposure and ensuring safe handling. To that end, OSHA requires that manufacturers provide material data safety sheets (MSDS). The chemical is also regulated under the Toxic Substances Control Act, under which EPA has authority to study it, demand more data from industry, and regulate its use.

In testimony to Congress, attorney Richard O. Faulk, an expert in environmental litigation and representing himself, and R. Peter Weaver, representing the International Liquid Terminals Association, both detailed these and other laws and government programs that could have prevented the spill, if only parties obeyed them.

“Like many tragedies, the failure cannot necessarily be blamed on the absence of a law, but rather on human error,” explained Faulk.⁹ He pointed out that state and local regulation may offer the best solution. “The West Virginia Senate has already passed legislation addressing the issues raised by the spill,” he explained. “Given the intense interest in West Virginia, it is likely that this law, when passed, will broadly address the circumstances that led to this tragedy. Other states may then review the law, consider it and adapt it to their own concerns and needs.”¹⁰

Weaver struck a similar note. “Even with an expansive net of regulatory requirements, anomalous circumstances exist in which an incident such as this can occur,” he explained.¹¹ Before applying yet another layer of regulation, he wisely recommends an investigation into the compliance with existing laws. “If Freedom Industries disregarded existing regulations, company

operating procedures, and/or industry standards, the most effective response would be stronger enforcement rather than the promulgation of new legislation and subsequent regulation.”¹²

Myth: The MSDS provides little useful information about the chemical.

Fact: The MSDS contained enough information to ensure proper and safe handling of the chemical, which is what it is designed to do.

Some news accounts portrayed the MSDS for Crude MHCH as being grossly inadequate because it does not detail all the potential risks, particularly the potential long-term risks and complete toxicological data, to consumers or workers. But it is inappropriate to use this document as “evidence” that we do not know enough about this chemical, because the MSDS is not designed to contain all that information. Rather, it is designed to communicate imminent hazards to workers and provide guidelines for chemical handling to minimize both short- and long-term health risks. The MSDS covering the chemicals in the Crude MCHM mixture does in fact provide information about the hazards and clear guidelines on the risks to workers and methods to control them, including controlling exposure to prevent any problems. It is true that some lines in at least one version (there are several formats for these forms) of the MSDS say, “no data available,” but that does not mean no data exists about the mixture’s components or that we need to worry when exposure is controlled according to the guidelines in the data sheet.

Myth: We do not have enough information about the risks associated with this chemical.

Fact: We do know that limited and short-term exposure to Crude MCHM poses little to no long-term public health risk.

The dose truly makes the poison. Public exposure to crude MCHM is too low to pose any long-term health risks, and worker exposure is managed by proper work practices regulated under OSHA. The only time the public experiences any exposure to this chemical—which is designed for industrial use only—is in the case of spills. And as this case shows, such exposure was short-term, temporary, and quickly managed. There are no long-term risks from these exposures since health effects like cancer require relatively high, long-term exposures. It is also worth noting that this chemical has been used safely for decades without any evidence of serious health effects, which offers some indication that its risks can be managed and the chemical used safely.

Myth: There is no toxicological data on Crude MCHM.

Fact: Both the federal government and the manufacturer have conducted numerous tests that indicate low toxicity.

Simply because the EPA did not demand more data on crude MCHM under TSCA, that does not mean no such data exists. Both public and private entities have conducted toxicological studies. The manufacturer, Eastman Chemical, voluntarily submitted 13 studies on Crude MCHM during the 1990s to the EPA.¹³ The company explains on its website that it did not originally release this data to the public because it was proprietary and it did not want to provide it to competitors for free.¹⁴ Eastman shared this data with public officials and in fact had communicated and explained it all to the local officials immediately when they were contacted after the release was discovered.¹⁵

After the spill, Eastman made all of its studies available on its website after media hype wrongly suggested the company had done little to no research. However, this information is very technical and not particularly helpful to consumers anyway. It is worth noting that at any point in time, the EPA could have demanded more information on Crude MCHM under the TSCA, but it did not bother to do so, perhaps because of its relatively low risk and because it is only used inside industrial operations.¹⁶

The federal government has also conducted research on the main chemical in the mixture, 4-methylcyclohexanemethanol, which makes up 68 to 89 percent of the mixture. The U.S. National Library of Medicine lists the results of 86 tests, of which 78 found no significant toxicological effects on animal test subjects and the rest were inconclusive, underscoring the relatively low hazard associated with this chemical.¹⁷ A summary of toxicological data is also available on the Library of Medicine's Hazardous Substances Data Bank.¹⁸

Myth: Crude MCHM is grandfathered—along with 62,000 other chemicals—from the Toxic Substances Control Act.

Fact: Crude MCHM is not grandfathered from the entire Toxic Substances Control Act.

This chemical is regulated under TSCA as an existing chemical and is therefore exempt *only from the provision covering “new chemicals”*—chemicals introduced into the marketplace after the law was enacted in 1976. When TSCA passed, there already were tens of thousands of chemicals on the market. These products all had a long history of safe and beneficial use. Years of experience with these chemicals tells us a great deal about their risks: They are low and manageable. Calling for more testing and data on them is unlikely to reveal much of anything new, and the cost is substantial. Any investment in the research of these tried-and-true products would need to be prioritized, with the EPA focusing on those it deems to pose a higher risk.

Accordingly, the law empowered the EPA to set priorities and call for more data on any existing chemical if the agency found that the chemical “may present an unreasonable risk of injury to health or the environment” or if the public is exposed to high levels of a chemical.¹⁹ In either case, the EPA must also show that it needs more data to fill in data gaps. The agency can conduct testing on its own and it requires companies to submit data when they conduct new tests under Section 8 of the law.

Now environmental activists are using the chemical spill to build pressure for TSCA reform that would mandate more research and data collection for tens of thousands of chemicals. They use the European Union's chemical regulation law, called REACH, as a model. REACH, enacted in 2008 by the European Commission, stands for Registration, Evaluation, and Authorization of Chemicals.

The tests employed to meet REACH regulations commonly involve injecting high doses of concentrated chemicals into the stomachs of lab animals that are bred to be highly susceptible to tumor formation. These animal studies have little to no relevance to humans who are exposed to chemicals on a short-term basis at trace levels. Like with REACH, we are likely to learn very little from these tests. Yet, green activists in the U.S. seek to adopt and expand these under TSCA.

REACH will require 13 million to 54 million animals for tests conducted between 2009 and 2018, according to the European Coalition to End Animal Experiments, and REACH testing will continue beyond 2018.²⁰ Sometimes animal testing is necessary for scientific discovery and to ensure both safety and efficacy of drugs and consumer products. But policies that demand such excessive and unnecessary animal testing are simply inhumane, because these studies unlikely to reveal useful information about human health risks.

Myth: Government officials cannot say that the public safe after the spill.

Fact: Public officials failed to place risk in perspective and emphasize the fact that long-term health effects are negligible.

Much of the media hysteria about the chemical spill and its risks are partly the result of a communication failure among public officials. In a politically charged situation, officials failed to place this risk in perspective. Moreover, cautious researchers always qualify their findings by acknowledging the reality of uncertainty. Nothing is 100 percent safe, and uncertainty in every aspect of life is unavoidable. In this case and others, the best we can expect is relative safety. Unfortunately, media and activists have not focused on *relative safety*, and instead harped on the qualifiers and uncertainties, blowing the risk out of proportion and generating needless fears.

To its credit, the CDC moved quickly to determine what level of the chemical in the drinking water would pose negligible risks. It set a 1 part-per-million standard as safe based on rodent tests applying numerous safety factors akin to EPA standards for other drinking water contaminants.²¹ It then applied additional safety factors to come up with a level that is likely hundreds or thousands of times lower than what is actually “safe.”

But rather than emphasize the low risks, CDC researchers, who want to be scientifically accurate, also communicated the unavoidable reality of uncertainty—and that is where the media and greens placed emphasis. For example, National Public Radio reported that CDC chief medical researcher Vikas Kapil acknowledged, “that there was very little information to go on.’ Still, he says, drinking water that meets the CDC guideline of one part per million is ‘generally not likely to be associated with any adverse health effects.’”²²

CDC’s qualifications and caution were misconstrued yet again after agency officials wrote to the West Virginia Department of Health updating officials on their research.²³ While they considered their 1 part per million standard sufficiently protective, CDC officials said they were reviewing some additional studies. They commented further that “out of an abundance of caution,” the state “may wish to consider” advising pregnant women to stick with bottled water until the chemical was completely eliminated from the tap water.

The resulting state advisory created more confusion, with the news media suggesting that CDC suddenly decided the chemical was dangerous to these women, which was not the case. *Charleston Gazette* reporter Ken Ward proclaimed on NPR: “[B]oth [CDC and the state government] issued this warning saying, oops, by the way, pregnant women shouldn’t drink the water at all, even after their do-not-use order is lifted.” A headline in *The Nation* exclaimed “CDC: Pregnant Women in West Virginia Should Not Drink Contaminated Tap Water”²⁴ and

Time pondered, “If West Virginia’s Water Isn’t Safe for Pregnant Women, Is It Safe for Anyone?”²⁵ But none of these explosive comments accurately reflect CDC’s letter or suggestion that the state simply “may wish to consider” advising women to stick with bottled water, even though CDC considered the risks to be acceptable.

The lesson here is that public health officials need to find a way to communicate relative risks in the case of such accidents. It is not productive to create panic simply because uncertainties exist—because they always exist. This goes back to emergency planners’ lack of an emergency management plan—which is already mandated for chemical spills under federal law. Officials were caught off guard and some made foolish statements, often poorly timed, about what they the unknowns rather than focus on what is known about short-term exposure and generally low hazards. Emergency management plans should include guidance on how to best communicate risks and uncertainties in these situations to improve understanding about relative risk without igniting unwarranted fear.

West Virginia Secretary of State Natalie Tennant complained about such confusing communications at a recent Senate hearing. Her frustration is understandable.²⁶ However, she has contributed to the communication problem by continuing to complain about the lack of information where sufficient information does exist. For example, she urged the CDC to provide more information on how it set its standard for the chemical, even though CDC explains in detail on its website how it calculated the standard.²⁷ Tennant also is calling for a 10-year study on the long-term health effects of the spill. Given the short-term exposure, such a study is likely to provide nothing of value, although it will cost taxpayers lots of money. Such expensive, largely symbolic studies offer politicians an opportunity to appear proactive to their constituents and their local government agencies’ budgets. In addition, the research effort may try to “link” unrelated health effects to the chemical, facilitating attempts by trial lawyers to file tort claims. Not surprisingly, the public officials who would receive this funding have proposed this study, and they have the support of the trial lawyers’ representative—Erin Brockovich.²⁸

Myth: West Virginians may also be exposed to dangerous levels of the cancer-causing formaldehyde, which is a byproduct of MCHM.

Fact: There is no evidence that MCHM breakdown had led to any significant release of formaldehyde.

West Virginia Environmental Quality Board vice-chairman Scott Simonton has claimed that final traces of crude MCHM are breaking down and exposing residents to dangerous levels of formaldehyde. “I can guarantee that citizens in this valley are, at least in some instances, breathing formaldehyde,” Simonton told legislators at a public hearing.²⁹ Simonton claimed to have found formaldehyde in three water samples from a restaurant in Charleston. But West Virginia’s Bureau for Public Health Commissioner, Dr. Letitia Tierney, called these claims “totally unfounded,” as well as “misleading and irresponsible,” for good reason.³⁰ As she explained to reporters, Simonton is not part of any official investigation related to the spill, and she cannot validate his tests. In any case, she noted that the MCHM would need to be heated to 500° Fahrenheit before it would break down into formaldehyde.³¹

In any case, traces of formaldehyde are not alarming or particularly risky. Humans produce it simply by breathing because it is a byproduct of respiration. It is also released through cooking and is relatively high when one cooks some foods, such as Shiitake mushrooms. Competitive Enterprise Institute Adjunct Scholar Dana Joel Gattuso points out in her 2011 study on chemicals and cosmetics that Shiitake mushrooms contain 100-400 parts per million of formaldehyde, some of which is released as a gas when mushrooms are cooked.³² But no one is sounding alarms about Shiitake mushrooms as a source of formaldehyde!

Some studies show that formaldehyde produces relatively mild acute symptoms—such as eye irritation—at about 800 ppb, while others indicate that extra sensitive individuals might experience such effects when exposed to 100 ppb.³³ In comparison, Simonton said he found water in the West Virginia restaurants with levels of 32 and 33 ppb, which is hardly worrisome.³⁴ Prolonged exposure to relatively high levels of the chemical may have health effects, which is an issue for workers using concentrated amounts of formaldehyde. But it has nothing to do with this chemical spill and any trace levels of formaldehyde found in drinking water.

Myth: This is another example of “greedy” chemical companies profiting while exposing consumers to dangerous chemicals.

Fact: Chemical companies profit when they provide products that are *safe and beneficial to a large number of consumers*.

The idea that somehow people who work in chemical industries or “for-profit” firms do not care about the impact of their products is absurd and is belied by the fact that they and their families are exposed to these chemicals, too. Ultimately, no company profits from harming its customers. Businesses have strong incentives to ensure their products are safe. Nor do firms want to claim bankruptcy or risk toxic torts related to their products. Unfortunately, sometimes negligence can produce accidents, as apparently happened in this case. But it is not reasonable to use such instances to characterize an entire industry as reckless.

We also should not ignore the value these technologies deliver. Crude MHCM provides society with important benefits that outweigh the risks. In this case, Crude MHCM is used because it helps make the coal burn cleaner, producing less air pollution, and more efficiently, saving energy. We should not lose perspective of the value that chemical technologies provide when an accident happens. Instead, we need to turn our attention to finding ways to better manage the risks so we can continue to enjoy the benefits.

Conclusion. The chemical spill in West Virginia points out the need for improved emergency planning and communications, mostly at the local government level. Laws were already in place that should have prevented this accident or at least better prepared officials to address the risks and communicate those risks. And unfortunately, accidents may happen even when public officials do a good job. Public officials should work to minimize those risks and be better prepared to address potential spills. The focus on unrelated debates, such as reforms to the Toxic Substances Control Act, will do nothing to improve the public’s safety.

Notes

¹ For example, see Richard Denison, “‘Epic fail’ in West Virginia Chemical Spill: Poor Information, Poor Communications, Poor Decisions,” Environmental Defense Fund website, January 26, 2014, <http://blogs.edf.org/health/2014/01/26/epic-fail-in-west-virginia-chemical-spill-poor-information-poor-communications-poor-decisions/#sthash.ZD5SphwO.dpuf>.

² Many of the details surrounding the chemical spill are not 100 percent clear and press coverage has presented conflicting accounts. This section provides an overview of the basic parameters that are available. A formal investigation by the Chemical Safety Board will hopefully deliver more complete details.

³ Ken Ward, “How Industrial Chemical Regulation Failed West Virginia,” “Fresh Air,” National Public Radio, January 29, 2014, <http://www.npr.org/2014/01/29/268201454/how-industrial-chemical-regulation-failed-west-virginia>.

⁴ Caitlin Cook, “MCHM Found in Water at 6th School,” *Charleston Gazette*, February 1, 2014, <http://www.wvgazette.com/News/201402010043>.

⁵ David Gutman, “More Testing Finds No MCHM at 5 Schools,” *Charleston Gazette*, February 2, 2014, <http://www.wvgazette.com/News/201402020002>.

⁶ Elizabeth Shogren, “The Big Impact Of A Little-Known Chemical In W.Va. Spill,” National Public Radio, January 13, 2014, <http://www.npr.org/2014/01/13/262185930/mysteries-persist-surrounding-west-virginia-chemical-spill>.

⁷ Ken Ward Jr., “Why Wasn’t There a Plan? Key Players Knew of Potential for Elk River Spill,” *Charleston Gazette-Mail*, January 11, 2014 <http://www.wvgazette.com/News/201401110085>.

⁸ For more details see “About the CSB,” Chemical Safety Board website, accessed January 29, 2014, <http://www.csb.gov/about-the-csb>.

⁹ Testimony of Richard O. Faulk before the Committee on Environment and Public Works United States Senate, February 4, 2014, http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=3d4eb468-2288-4373-9605-b06a91dfae72.

¹⁰ Ibid.

¹¹ Testimony of R. Peter Weaver, Vice President of Government Affairs International Liquid Terminals Association Before the Senate Committee on Environment and Public Works Subcommittee on Water and Wildlife, Examination of the Safety and Security of Drinking Water Supplies Following the Central West Virginia Drinking Water Crisis, February 3, 2014, http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=eb8f431e-b5cc-4005-8e96-96d7d7177c9d.

¹² Ibid.

¹³ Eastman Chemical, Questions and Answers Regarding Eastman’s Assistance in the Emergency Response to the Spill of Crude MCHM in Charleston, West Virginia, updated January 31, 2014, http://www.eastman.com/literature_center/misc/Q_and_A_West_Virginia_Spill.pdf.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Despite claims to the contrary, it is not impossible or overly difficult for the EPA to demand additional data under TSCA for existing chemicals. All the law requires is for the agency to show that a chemical “may” pose a risk the public health or the environment before it demand expensive data development and submission from industry. For more details see Angela Logomasini, “The Real Meaning of ‘TSCA Modernization’: The Shift from Science-Based Standards to Over-Precaution,” *Issue Analysis* 2012 No. 2 (Washington, D.C.: Competitive Enterprise Institute, 2012), <http://cei.org/sites/default/files/Angela%20Logomasini%20-%20The%20Real%20Meaning%20of%20TSCA%20Modernization.pdf>.

¹⁷ These are available on the website of the National Center for Biotechnology Information, U.S. National Library of Medicine, where the summary shows that the bioactivity outcome of these 78 tests is “inactive”—that is, it has had no biological effects on animal subjects, <http://pubchem.ncbi.nlm.nih.gov/assay/assay.cgi?cid=118193>.

¹⁸ Library of Medicine, 4-Methylcyclohexanemethano, CASRN: 34885-03-5, Hazardous Substances Data Bank, website accessed February 4, 2014, <http://toxnet.nlm.nih.gov/cgi-bin/sis/search/r?dbs+hsdb:@term+@DOCNO+8182>.

¹⁹ 15 U.S.C. § 2603(a).

²⁰ For more details see: The European Coalition to End Animal Experiments, “The Truth About REACH Animal Testing,” website, accessed February 3, 2014, <http://www.eceae.org/en/category/latest-news/311/response-from-the-eceae-to-the-reach-review>, and Angela Logomasini, “Hazardous to Your Health: The Dangers of Regulatory Over-

REACH, National Review Online, September 24, 2009, <http://www.nationalreview.com/articles/228289/hazardous-your-health/angela-logomasini>.

²¹ U.S. Centers for Disease Control and Prevention, “2014 West Virginia Chemical Release,” CD website, updated February 3, 2014, <http://emergency.cdc.gov/chemical/MCHM/westvirginia2014/index.asp>.

²² Shogren.

²³ Thomas Frieden, Director of the U.S. Center for Disease Control and Prevention, Letter to Secretary Karen Bowling, West Virginia Department of Health and Human Resources, January 15, 2014, <http://www.wvdhhr.org/CDCGuidance.pdf>.

²⁴ Steven Hsieh, “CDC: Pregnant Women in West Virginia Should Not Drink Contaminated Tap Water,” *The Nation*, January 16, 2014, <http://www.thenation.com/blog/177968/cdc-pregnant-women-west-virginia-should-not-drink-contaminated-tap-water>.

²⁵ Bryan Walsh, “If West Virginia’s Water Isn’t Safe for Pregnant Women, Is It Safe for Anyone?” *Time*, January 17, 2014, <http://science.time.com/2014/01/17/if-west-virginias-water-isnt-safe-for-pregnant-women-is-it-safe-for-anyone>.

²⁶ Testimony of West Virginia Secretary of State Natalie E. Tennant, U.S. Senate Committee on Environment and Public Works, Subcommittee on Water and Wildlife hearing entitled, “Examination of the Safety and Security of Drinking Water Supplies Following the Central West Virginia Drinking Water Crisis,” February 4, 2014, http://www.epw.senate.gov/public/index.cfm?FuseAction=Files.View&FileStore_id=9e1211ae-136f-45cb-928f-f18ce5ecc464.

²⁷ U.S. Centers for Disease Control and Prevention, “2014 West Virginia Chemical Release,” CDC website, updated February 3, 2014, <http://emergency.cdc.gov/chemical/MCHM/westvirginia2014/index.asp>.

²⁸ Matt Murphy, “Gupta, Brockovich Call for Long-Term Health Surveillance,” *Daily Mail*, January 29, 2014, <http://www.charlestondaily.com/News/201401290248>. For some additional insight on Erin Brockovich see: Angela Logomasini, “Politicized Science: The ‘Erin Brockovich Chemical,’” Pajamas Media, February 1, 2011, <http://cei.org/op-eds-articles/politicized-science-%E2%80%98erin-brockovich-chemical%E2%80%99>.

²⁹ Jonathan Mattise (AP), “West Virginia Official Says He ‘Can Guarantee’ Some People Inhaling Formaldehyde After Chemical Spill,” Huffington Post, January 29, 2014, http://www.huffingtonpost.com/2014/01/29/west-virginia-chemical-spill-formaldehyde_n_4688419.html/.

³⁰ Ibid.

³¹ Ibid.

³² Dana Joel Gattuso, “The True Story of Cosmetics: Exposing the Risks of the Smear Campaign,” *Issue Analysis* 2011 No. 6 (Washington, D.C.: Competitive Enterprise Institute, 2011), <http://cei.org/sites/default/files/Dana%20Joel%20Gattuso%20-%20The%20True%20Story%20of%20Cosmetics.pdf>.

³³ “Formaldehyde Exposure in Homes: A Reference for State Officials to Use in Decision-making,” undated publication available on the U.S. Centers for Disease Control and Prevention website, http://www.cdc.gov/nceh/ehhe/trailerstudy/pdfs/08_118152_compendium%20for%20states.

³⁴ Mattise.