

# A Poison Runs Through It

## *The Elk River Chemical Spill in West Virginia*

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In our culture we tend to view disasters as isolated, exceptional events. We need to instead view them as connected to one another along various social fault lines and as a direct product of socioeconomic processes that transcend traditional boundaries of time and space. By placing disasters back into the dynamic field of social processes and translocal boundaries, we gain a greater understanding of their origins.

Like the accounts of chemical contamination in other chemical corridors around the nation, such as the notorious Cancer Alley in Louisiana, the strip along the Gulf Coast of Texas, the chemical corridor in New England (a legacy of the Industrial Revolution), the chemical corridor in western New York and Ontario, Canada (stretching originally from the Niagara Falls area to the Great Lakes on both sides of the international border), as well as in other areas of the country including Silicon Valley, the 2014 Elk River chemical spill was not an isolated event bound by space and time. Rather, it was the manifestation of historical processes shaped by economic and political forces from as far away as India, France, Germany, Washington, DC, Tennessee, Michigan, and Atlanta, Georgia (Button 2015). Thus, the spill in the Elk River serves as a classic example of how disasters are unfolding processes contextualized deep into the past and richly configured in the present.

### The Spill

The year 2014 got off to an ill-fated start in West Virginia with what would become the state's fifth major industrial disaster in eight years (Gabriel and Davenport 2014). In the early morning hours of January 9, residents

in Charleston, West Virginia, awoke to the smell of black licorice in their tap water. The West Virginia Department of Environmental Protection (DEP) soon began receiving complaints about the disturbing odor. Before long, 300,000 people were without potable water. By midmorning, state investigators would discover that thousands of gallons of MCHM (4-methylcyclohexanemethanol), an organic solvent, had accidentally leaked into the Elk River.

Neither the state health department nor the Centers for Disease Control and Prevention (CDC) were familiar with MCHM, which was causing headaches, eye and skin irritation, and difficulty breathing. In their attempt to discern the potentially hazardous nature of the chemical, it became a case of the blind leading the blind. Before long, 168 people had been rushed to the emergency ward, with some twenty people ending up hospitalized. By the time the crisis was officially over, four hundred people sought medical help in emergency rooms alone. Within twenty-two hours, the chemical plume appeared six hundred miles away in Cincinnati via the Ohio River. The Cincinnati water department, serving well over a million people, closed its intake valves and switched over to its emergency water supplies. Unlike Cincinnati and Louisville, Kentucky (which were later affected by the spill), Charleston had no backup emergency water supplies to provide the public with a safe alternative (Peterson 2014).

At 10:30 A.M., state employees discovered the leak in a Freedom Industries' 48,000-gallon chemical storage tank along the Elk River, only 1.6 miles upriver from the intake pipe of the company that owned and operated Charleston's water supply, West Virginia American Water Company. In violation of Homeland Security regulations that require reporting of accidents within thirty minutes of their discovery, Freedom delayed reporting the leak of MCHM until 12:05 P.M.

When a Freedom Industries representative, Bob Reynolds, finally called the West Virginia Office of Homeland Security to report the spill, he was asked if the material was either hazardous or harmful, to which he replied, "No." When asked again about the nature of the chemical spilled, he replied, "It is not a hazardous substance," which later proved to be false (Youngren 2015). Reynolds also misled the operator by flatly stating that the leak was confined by a containment wall and was not entering the Elk River. In sharp contradiction, a report by the state DEP later stated that the inspectors discovered, around the time Reynolds called the hotline, a four-foot-wide crack in the containment wall leaking MCHM into the Elk River. The audio recording of Reynolds' misleading statements and other denials of wrongdoing by Freedom officials led to a U.S. Attorney's Office probe of the spill (Barrett 2014).

Governor Earle Ray Tomlin waited an unthinkable six hours before issuing a “Do Not Use” order for tap water used for drinking, cooking, washing, or bathing (Molenda 2014). Schools, restaurants, hotels, and other businesses were forced to close. Residents of the Kanawha Valley rushed to purchase bottled water, and supplies were quickly depleted. People were shocked and amazed that Charleston, the state capital, was paralyzed by the crisis. Perhaps even more surprising, at no time did an emergency broadcast system warn inhabitants of the unfolding disaster (Johnson 2014).

Hours later, the governor declared a state of emergency and deployed the West Virginia National Guard. As the national media, commentators, policy-makers, and public health officials broadcast news of the event, citizens across the nation were stunned that such a disaster could occur in one of the world’s richest nations. Near midnight, President Obama declared the spill a national emergency and directed the Federal Emergency Management Agency (FEMA) to provide assistance (Resnikoff 2014).

According to Freedom’s initial reports, only 2,500 gallons of MCHM had been released. Several days later, when evidence to the contrary surfaced, Freedom admitted that the leak was considerably larger. Almost a day after the leak was identified, approximately ten thousand gallons of the toxic chemical had entered the Elk and Kanawha Rivers, tributaries of the Ohio River. Two weeks after the initial spill event, Freedom informed government officials that a second toxic chemical, propylene glycol phenyl ether (PPH), had also been released into the Elk River. The delay in reporting thus raised further suspicions since, by Freedom’s own admission, they had immediately informed employees of the second chemical in an e-mail on the day of the spill (Associated Press [AP] 2014).

## **The History of Kanawha Valley**

As has been argued elsewhere, disasters are not isolated events bound by space and time, or even concept, but are set in motion by a set of preconditioned series of events and are followed by a series of cascading events that continue to unfold over time (Button 2010; Oliver-Smith 2009). In order to comprehend why the Elk River spill is not merely a discrete event, we need to first examine the historical circumstances in which it is contextualized.

Historically referred to as the Great Kanawha River Valley and later called simply Chemical Valley, this narrow gorge extends ninety-seven miles northwest from the Kanawha River origins at Gauley Bridge to the river’s confluence with the Ohio River at Point Pleasant, West Virginia

(Cantrell 2004; Davis 1946, 255). The Kanawha Valley surrounds Charleston, the state capital, where the Elk River joins the Kanawha River, and runs through the counties of Fayette, Kanawha, Putnam, and Mason, which are inhabited by over 300,000 people collectively, according to 2010 census data. The valley residents are predominately white, with percentages below the poverty line ranging from a little over 11 percent in Putnam County to over 21 percent in Fayette County. Kanawha County, which houses Charleston, is the most populated, with about 14 percent of the population living below the poverty line (Davis 1946; U.S. Census Bureau [USCB] 2010; Vincent 1984).

According to the 2010 census (USCB 2010), the city of Charleston is populated by 51,400 people and 23,453 households, with a population density of over 1,600 people per square mile. The inhabitants are predominantly white, comprising 78.4 percent of the population. African Americans make up 15.5 percent, Asians 2.3 percent, Latinos 1.4 percent, and Native Americans 0.2 percent. Slightly over half the population is female (52.4 percent) and about 16 percent of the populace is sixty-five years of age or older. Using data from the Gallup-Healthways Well-Being index, Health.com named West Virginia the most depressed state in the United States and proclaimed Charleston the “most miserable city in the nation” in 2013 (Ghabra 2014). More recently, the Well-Being Index ranked West Virginia last in their index (Witters 2015).

This geographic area has long been known for its raw materials and mineral resources, including timber, bituminous coal, oil pools, gas pockets, limestone, and brines. Comparing the region to one of the earliest industrial sites of England in an 1876 geological report (Carpenter 1968/69, 538), a doctor and entrepreneur of Kanawha wrote, “With cheap salt, cheap coal, sulpherets, timber, labor and transportation there is nothing lacking ... to make the Kanawha Valley the Tyne of America.” Markets and trade networks throughout the region preceded industrialization, but industrial development in the valley primarily occurred along streams and rivers and later along roads and railways. Raw materials extracted from the area passed through commercial hubs, such as Charleston, which were initially established at major transportation centers connected to broader regional and national markets (Davis 1946; Lewis 1998, 51).

Access to the Ohio River Valley, which has been a major artery for commerce since the early nineteenth century, facilitated resource development. Indeed, the Ohio River Valley’s 981-mile course ranging from Pittsburgh, Pennsylvania, to Cairo, Illinois, is itself a chemical corridor, which in 1965 alone carried 6.7 million tons of chemicals (Wrathall 1969, 426). Currently, in addition to the numerous industrial plants along its shores, there is considerable controversy surrounding the fracking indus-

try's proposal to move waste down the Ohio River, which, according to the U.S. Environmental Protection Agency (EPA), is the most polluted river in the United States (Schack 2015) with heightened risk levels to the river system and its inhabitants (Koff 2013).

Even though West Virginia is a rural state, much of the state has long been intensely industrialized (High and Lewis 2007). Like other areas of the Appalachian South, the abundance of resources in West Virginia has not always translated into improvements in the well-being of the citizenry (Lewis 1998, 50–51). West Virginia has long suffered from what author Michael Harrington famously described as “grinding poverty” in his path-breaking 1962 book, *The Other America: Poverty in the United States* (Harrington 2012, 42). From the floods resulting from early timber extraction, to the fires, explosions, and contamination brought about by the coal and chemical industries, residents have long dealt with the externalized costs of industrial production. The state has suffered from some of the nation's worse disasters, such as the 1907 coal mine explosion in Monongah that killed 362 men (Mine Safety and Health Administration [MSHA] 2015) and the 1972 Logan County Buffalo Creek disaster, resulting from the collapse of the Pittston Coal Company's coal slurry dam, which killed 125 people, injured 1,124 residents, and destroyed more than four thousand homes (Erikson 1976; Stern 1976). More recently, in 2010 the Massey Coal Company's Upper Branch mine explosion killed twenty-nine miners working in the mine.

In Kanawha Valley in particular, the risks and hazards imposed by the chemical industry have differential impacts. Studies show that African Americans and people living below the poverty line are especially vulnerable to the risks and hazards of the chemical industry (Perlin, Sexton, and Wong 1999; Perlin, Wong, and Sexton 2001). Additionally, a report by the Center for Effective Government asserts that over 90 percent of school-age children in Putnam and Kanawha Counties attend schools in zones near high-risk chemical facilities (Frank and Moulton 2014).

Settlement, trade, and land surveying began in the valley in the eighteenth century and the town of Charleston was founded by the early nineteenth century. The birth of the chemical industry in the valley is often attributed to early brine pumping and salt brine production (an essential component in the production of many chemicals), which was initially done by indigenous inhabitants in the area (Cantrell 2004). The first salt furnaces of the valley date back to the late eighteenth century, but the Ruffner brothers are often credited with launching the commercial salt economy along the Kanawha River. In an area near Charleston referred to as Kanawha Salines, the brothers drilled their first brine well in 1808, reaching nearly sixty feet below the surface. Tremendous growth in the

industry followed, and the valley became a top supplier of salt throughout the country (Cantrell 2004, 2; Crawford 1935, 1111). By 1828 sixty-five salt wells existed along ten miles of the Kanawha River. Almost three thousand laborers, including over a thousand slaves brought in from the Deep South and Virginia, were working in salt production by 1835 (Dunaway 1996, 177; Stealey 1974, 108). Production peaked between the mid-1840s and mid-1850s, followed by decline due to increased competition as well as the Civil War (Compton and Crawford 1938, 306).

While the salt industry, as well as the production of bromides and potassium salts, during the 1800s contributed to the growth of chemical facilities, the chemical industry in the valley did not take off until the early twentieth century. At the turn of the century, the alloy manufacturing Wilson Aluminum Company was bought by the Electro Metallurgical Company (later referred to as Electromet), which not only became a dominant force in the global market for alloys, but also was the predecessor of the Union Carbide and Carbon Corporation, later known just as Union Carbide. Prior to World War I, Germany had been the world's leading chemical manufacturer, but the emerging demands of war paved the way for the production of chlorine and caustic soda from the salt brines of Kanawha, as well as the manufacturing of power for explosives (Cantrell 2004).

By the 1930s the chemical industry had become the fastest-growing industry in the nation, and the Kanawha Valley was one the major centers of this growth industry (Whitehead 1968, 146). Federal investment in the region during World War I and World War II led to the development of an industrial infrastructure that enabled the birth of numerous chemical companies during postwar eras. By the end of World War II, Union Carbide's sales alone totaled \$522 million, second only in the chemical industry to DuPont's sales of \$783 million (Ross and Amter 2010, 25).

Before U.S. involvement in World War I, the major powder producer was DuPont, but as demands increased, an explosives plant was constructed just outside of Charleston in an area that would eventually become known as Nitro; plans were made for a mustard gas plant in Belle, although it was repurposed before completion for the production of chlorine and other chemicals. The growth was spurred again during World War II. With the Japanese occupation of much of Southeast Asia, access to raw materials for the manufacture of rubber, which was essential to the war effort, became impossible to procure. The U.S. government's response was to create artificial rubber, the ingredients for which were already available in West Virginia. To meet growing demands for rubber, the federal government built a rubber factory in Institute, West Virginia, and later sold the plant to Union Carbide (Cantrell 2004, 2–6). After World War II a number of the chemicals produced in the valley became in great

demand and required production quotas higher than could be produced within the valley, so the major corporations constructed larger facilities along the Gulf Coast of Texas to meet the demand. The Kanawha Valley chemical plants began to concentrate more on producing plastics and agricultural chemicals (Denham 2013).

Over the decades the buying and selling of companies placed some of the largest chemical companies in the world throughout the valley at various points in time, including DuPont, Union Carbide, Monsanto, BF Goodrich, Bayer, and Dow. By 1985 there were twenty chemical plants along a twenty-mile stretch of the valley (Bukro 1985). While the concentration of chemical facilities placed the valley at the center of research and development in the state for much of the twentieth century, it has also produced a number of industrial disasters and threats to public health and the environment.

The manufacturing of war-related products did not end with World War II. In the town of Nitro, the production of the herbicide commonly referred to as Agent Orange at the town's Monsanto plant not only connects the valley to the poisoning of millions of people during the Vietnam War, but also led to a class action suit over local contamination in the valley (Brady 2012). The suit was filed on behalf of thousands of residents who were adversely affected by Monsanto operations and was settled in 2012 (Kaskey 2012).

One of the valley's first major industrial disasters in the twentieth century, known as the Hawk's Nest Tunnel Disaster, has been regarded by many as "America's worst industrial disaster." That term was the subtitle of a seminal book, *The Hawk's Nest Incident*, by Yale University epidemiologist Martin Cherniack (1986). Because many deaths went unreported, it is conservatively estimated that at least 764 men died in the short term. In the long term, no doubt many more died of prolonged illness (Cherniack 1986). Despite the enormity of the tragedy, the disaster has been relegated to almost obscurity in the minds of the nation.

On the brink of the Great Depression, Union Carbide's subsidiary, Electromet, began work on a three-mile tunnel through the Gauley Mountain. The purpose of the tunnel was to construct an aqueduct that would provide power to a Union Carbide chemical plant in Alloy. The tunnel was dug through a vein in the mountain that was almost pure silica; aside from the few men who died from the typical tunnel digging accidents, the majority died of acute silicosis. The disaster has long been surrounded by controversy, including cover-ups and the exploitation of migrant southern black workers who composed 75 percent of the work force. It has been alleged by Spangler (2008, ix) and others that the tunnel's diameter was greatly expanded—not to facilitate the aqueduct, but rather to enrich Union Car-

bide's metal alloying processing activities, since silica was an essential chemical element in the manufacturing of the alloy. The workers were never informed of the dangers of silica dust nor provided with the proper respirators to guard against silicosis (Markowitz and Rosner 2003, 160).

Both Union Carbide and the community of Institute, West Virginia, loomed even larger in the public's eye in 1984 when they were directly connected to one of the worst disasters of the twentieth century and arguably one the worst industrial disasters of all time. In December of that year, there was an accidental release of forty tons of methyl isocyanate (MIC) at a Union Carbide plant in Bhopal, India. MIC is a chemical used to produce carbamate pesticides, and, according to the EPA (2015a), it "is extremely toxic to humans from acute (short-term) exposure."

The toxic cloud left thousands of people dead. The poisonous gases that spread over the city of 800,000 people created an unprecedented tragedy unlike any that the world has previously experienced. While the Indian government claimed that approximately 3,900 people perished and another 3,900 were severely injured, others have alleged that perhaps as many as 8,000 people were killed and another 300,000 were affected by exposure to the chemical (Mukerjee 2010, 61; Shrivastav 1987). The U.S. EPA estimates that the chemical accident had "adverse health effects in greater than 170,000 survivors." Deleterious effects include decreased lung function, blindness, and disorders of the reproductive system (EPA 2015a).

Union Carbide has long maintained that the disaster was an act of sabotage, while community activists and the Indian government have argued that the tragedy was the result of poor management and shoddy equipment maintenance. In an attempt to avoid liability for the accident, Union Carbide became a wholly owned subsidiary of Dow Chemical Company located in Midland, Michigan. Despite denials of liability, the Union Carbide/Dow merger made Dow the object of civil and criminal liability in ongoing litigation surrounding the Bhopal disaster (Amnesty International 2013).

Among other things, the tragedy turned the world's attention to Union Carbide's plant in the valley community of Institute, West Virginia, where MIC was manufactured. It was not the first time, nor the last, that critical attention was focused on the West Virginia facility. Several times in the past, Union Carbide had been fined for its unlawful release of toxic chemicals into the Kanawha River. These releases generated a considerable amount of concern among the local residents, many of whom knew friends and neighbors who had died of cancer (Cantrell 2004). As early as the 1970s, epidemiological studies demonstrated that Kanawha Valley residents had a 20 percent higher rate of diagnosed cancers than the national average. Moreover, a study conducted by the state's department of health that res-



idents living downwind of Institute had twice as many cancerous tumors as the national average (Lapierre and Moro 2002, 49–50).

In the immediate wake of the Bhopal disaster, a Union Carbide official assured concerned Institute residents that an accidental release of toxic gas could not occur at the Institute plant. Later they went so far as to state unequivocally that their detection system would guarantee that any accidental release of gas would never drift beyond the plant campus. The horrific tragedy in Bhopal generated considerable public debate in Institute. While many residents felt threatened and wanted to rid their community of the chemical plant, a number of Union Carbide employees and supporters demonstrated in defense of the corporation (Cantrell 2004, 9).

In August of 1985, less than a year after Bhopal, Union Carbide was responsible for the release of a gas cloud of aldicarb oxime in Institute, which led to the hospitalization of over 130 people who experienced burning sensations in their eyes, nose, throat, and lungs. Echoes of Bhopal haunted the community as \$5 million worth of newly installed safety equipment failed and plant operators waited twenty minutes to alert authorities after the release. The chemical release manifested after a series of mechanical and human errors occurring over several days. Following the discharge, the six employees on duty were confined by the vapors in a control room where they shared an oxygen hose until they were rescued. East and northeastern winds carried the toxic plume through communities and over a mountain ridge (Baron, Etzel, and Sanderson 1988; Cantrell 2004, 9).

Residents' concerns increased when they were warned that food grown in the nearby area should not be eaten. The U.S. Occupational Health Administration (OSHA) later cited the company for "willful neglect" and the violation of a number of safety procedures at the plant (Weir 1987, 120–121). Ironically, even though Union Carbide had gone to great expense to install a warning system, albeit faulty, they had failed to develop an evacuation plan. Ed Hoffman, a local resident and activist briefly described the community's vulnerability in an interview recorded in Appalshop's video documentary, *Chemical Valley* (Pickering and Johnson 1991). As he stood overlooking the community, he stated the challenges that the residents faced in evacuating the area in a timely manner (Pickering and Johnson 1991): "Right in front of us here is the campus of West Virginia State College. Over there is the West Virginia rehabilitation center and that is a place where most of the residents are physically handicapped and would have great difficulty in moving out. The inter-state [seen in the distance] runs along over there but you cannot get on the inter-state without going by the Carbide plant." Shortly after the incident, Union Carbide sold the plant facility to Rhone-Poulenc, a French chemical manufacturer.

Later, in 1999, the plant merged with the German firm of Hoeschst AG (part of a large conglomerate with which Bayer Chemical is also affiliated) and changed the facility's name to Aventis CropScience and later to Bayer CropScience (Cantrell 2004, 6; GMWatch 2015).

While the disaster at Bhopal and the chemical release in Institute pushed Congress to pass the Emergency Planning and Community Right to Know Act (or EPCRA; EPA 2015b), which included a provision for industries to complete a toxic release inventory, the calamities continue. In 2008 an explosion at the same plant, then owned by Bayer CropScience, left two dead and several injured. Bayer bought the plant to manufacture pesticides, and, according to the Chemical Safety Board (CSB), the disaster could have been prevented with adequate training and proper start-up protocols. Had the exploding tank launched in a different direction, the Board also noted, debris could have pierced a holding tank of MIC, the same chemical responsible for the Bhopal atrocities (CSB 2011b).

Public concern was amplified just two years later as the legacy of Bhopal once again rippled through the valley. In a 33-hour period beginning on January 22, 2010, three serious leaks occurred at DuPont's 700-acre facility in Belle, just eight miles east of Charleston. A leak of two thousand pounds of methyl chloride was discovered when an alarm sounded. Investigators eventually learned that the leak had begun three days prior to alarm going off. An additional leak unfolded the following day when a pipe leaked a cloud of sulfur trioxide. Later the same day a phosgene leak also occurred. Two workers died as a result of exposure to the chemicals. The CSB attributed all three leaks to "preventable safety shortcomings" (CSB 2011a).

This historical backdrop not only reveals that the Elk River spill represents one of many preventable catastrophes in the valley, but it also suggests that the production of vulnerability and hazards in the valley has systemic underpinnings. Like the catastrophes preceding it, numerous uncertainties and questions over health and safety emerged in the wake of the spill, as the next section will illustrate.

## Health Concerns Amidst Scientific Uncertainty

As in the wake of many disasters, conclusive scientific evidence is often lacking, especially in the initial stages of a crisis. Scientists and public officials struggle to obtain reliable information on which to base decisions and the public often feels confused and uncertain about the difference between real and perceived risks (Button 2010). After state officials discovered the Elk River spill, emergency responders and the public struggled to obtain credible information about MCHM. Troubling questions persisted

for months after the spill and the slow and ponderous response of Freedom, the state, and the CDC raised both concern and questions in the public's mind. Uncertainties persisted when, three months after the spill, the CDC still had not released a report analyzing the medical records of people who had sought hospital treatment (Ward 2014b). Among the many questions that lingered in the public's mind was, How long did the leak exist before it was detected? Some residents claimed they had smelled the licorice odor as long as two to four years before the spill was discovered. A statement by Karen Bowling, West Virginia's secretary of Health and Human Resources, was less than reassuring when she declared, "There are unknowns" (Shogren 2014). During the first two weeks of the crisis, the West Virginia Poison Center received 2,302 calls concerning the chemical (Kersey 2014).

Because there was limited information about the chemical, the most prominent questions in the minds of scientists and the public were, What exactly is MCHM? and What potential harm, if any, does it pose to the public? Making matters far more complicated, there was only one relevant study on the chemical: a non-peer-reviewed study conducted by the Tennessee-based Eastman Chemical Company. Based on their laboratory tests, Eastman gave the chemical an OSHA rating of "hazardous" on their materials data sheet (Osnos 2014). Jeff McIntyre, the president of West Virginia American Water, made a startling statement that added to the level of confusion and uncertainty, "We don't know that the water is not safe. But I can't say it is safe" (Ward 2014k).

Officials later learned that the MCHM that spilled into the river was referred to as "crude" MCHM, which contains six other ingredients, including 4-methoxymethyl, water, methyl cyclohexanecarboxylate, dimethyl 1,4-cyclohexanedicarboxylate, and 1,4-cyclohexanedimethanol (Ward 2014a). This revelation made the assessment of the chemical even more problematic since the West Virginia American Water system originally tested only for MCHM, leaving the toxicity of the other components in question. The CDC had also based its level of safety only on the assessment of MCHM, not on the six additional chemicals, thereby raising considerably more uncertainty about the potential deleterious effects of the spill on humans and the environment.

Equally disturbing, within the first three days of the disaster Freedom Industries had no contact with McIntyre's association. Since the CDC did not have a previously prepared safety standard for MCHM, it could only rely on the manufacturer's material data sheet. Based on what little was known from the Eastman study, the CDC and the West Virginia Department of Health and Human Resources set a safety limit of one part per million. Many were perplexed because neither agency offered an expla-

nation for the basis of the standard (Ward 2014k). By January 10, water testing had detected 1.7 parts per million. Concern increased when almost two weeks later Freedom informed health officials that another chemical, PPH, was also released in the spill (Mattise 2014).

Almost a week after the spill was detected, the water restrictions were gradually lifted for most residents. Many people affected by the ban were suspicious and reluctant to use the tap water again. Controversy arose around several issues, including how long residents should flush their water systems before resuming their consumption. Estimates ranged from ten minutes to twenty-four hours. Uncertainty was further elevated when Scott Simonton, a Marshall University professor and member of the state Environmental Quality Board, announced that he discovered traces of the carcinogen formaldehyde in the water he tested. Menthol is one of the main components of MCHM and breaks down into formaldehyde. Simonton warned that residents taking a hot shower were probably inhaling the carcinogen (McCauley 2014).

While it is difficult to know how many people began drinking the water after the lifting of the ban, one interesting fact emerged when Dr. Rahul Gupta, the executive director of the Kanawha-Charleston Health Department, revealed that a month after the spill, he conducted a survey (Savoia 2014) at a community meeting of approximately two hundred people and discovered that only two people were once again drinking the tap water (Cogan 2014). A number of residents reported that even after they flushed their water system, the smell of licorice lingered. Gupta reported that there was deep distrust, even among public health officials, about the limited data the CDC had used to establish safety standards for MCHM (Zucchino 2014). Dr. Richard Dennison, a scientist with the Environmental Defense Fund echoed similar skepticism about the federal government's reliance on Eastman Chemical's single study saying that the methodology employed to set the standard was flawed. He criticized the government for relying on the lethal dose in rats as the basis of their calculations for the potential harmful effect on humans (Gabriel 2014).

Criticism emerged when the CDC failed to advise pregnant women to hold off drinking the water. Eventually, they issued a statement that an abundance of caution should apply to pregnant women. Many believed that the agency had waited too long to issue this warning. Furthermore, others believed that until MCHM could no longer be detected in the water, infants and children should also continue to use bottled water. A senior scientist with the Natural Resource Defense Council, Jennifer Sass, recommended infants and children be included in the warning (Ward 2014e).

In late January, the CDC, the EPA, and the West Virginia American Water Company, as well as other federal and state agencies, fell under further

scrutiny and criticism for their lack of transparency throughout the early days of the crisis. The Society of Environmental Journalists (SEJ; 2014) wrote a letter to the EPA accusing both federal and state officials for “stonewalling” and a “lack of openness” and for “feeding people’s fear and distrust of government credibility.” In the letter to Gina McCarthy (the EPA administrator), the executive director of the society criticized the EPA (the federal agency primarily responsible for safe drinking water) for failing to comment about the spill “for almost a week” after the emergency was declared. The letter also condemned the CDC for failing to respond to requests from the media to discuss the basis on which they made their advisory recommendation. While the letter focused on the EPA and the CDC “for being AWOL during the emergency,” it also criticized West Virginia American Water for refusing to take questions directly from reporters during the crisis (Davidson 2014; SEJ 2014).

Things came to a head at the CDC in March when Dr. Tanja Popovic resigned from her post as director the CDC’s Disease Control National Center for Environmental Health. Popovic was the center of controversy for what many people perceived as her failure to respond properly to the call for investigation into the cancers surrounding the ongoing water contamination controversy at the Marine Corp’s Camp LeJeune. She has additionally been criticized for her role in assuring Kanawha Valley residents that the Elk River water supply was safe for consumption and for the agency’s delay in providing information to the public in a timely manner (Ward 2014c).

The unfolding fiasco in the immediate aftermath of the spill highlights failures of both government agencies and Freedom Industries to effectively respond in the face of crisis. In fact, the disaster has been characterized as “a case study in what not to do in terms of risk communication,” by health director Rahul Gupta (Manuel 2014). Although the CSB recommended that the state establish a Hazardous Chemical Release Prevention Program in Kanawha Valley following the 2008 Bayer incident and the 2010 explosion in Belle, the spill demonstrates persistent problems in emergency planning and crisis communication in the valley.

Gupta stated that the recommendations have been on the books for years and that, back in 2011, he noted that development of the program would not be difficult. “The real question is,” he commented, “are people going to play” (Ward 2014j). He was referring to the obstacles that frequently emerge alongside new regulatory proposals. In years past, industry groups openly opposed the CSB recommendations, arguing that they imposed unnecessary economic burdens on businesses and the state (Ward 2014j). But what industry groups and their political allies fail to mention is how companies like Freedom operate without consideration of the

socioeconomic and ecological burdens that they shift onto communities by externalizing costs, as a look at Freedom Industries illuminates.

## Freedom Industries

The events described above and the broader history of chemical valley illustrate that West Virginia is no stranger to chemical calamities and breakdowns in emergency planning and response. Considering the state's failure to heed repeated recommendations from the CSB, it is not surprising to learn that Freedom was knowingly storing corroded and improperly inspected tanks of MCHM in the valley (CSB 2014).

According to a Federal Bureau of Investigation (FBI) document released in federal court, Freedom knew about problems in the tank prior to the spill. The document stated that Freedom was aware of state and federal permit protocols to protect ground, surface, and storm water from pollution, which require a spill analysis for stored substances, pollution prevention training, inspections, and preventive maintenance, and an impervious dike or wall for protection in the advent of a leak. In 2008 a company hired by Freedom to inspect the storage tanks documented damage to the dike wall near tank 396 (the culprit of the spill), yet Freedom did not repair the dike. Additionally, the FBI report said Freedom not only failed to properly inspect tank 396, but also intentionally excluded tank 396 and a few other tanks from the 2008 tank inspection because they had been tagged to be taken out of service. Freedom, however, never retired the old tanks. The company, as the document stated, also did not appreciate the warnings about MCHM provided by the manufacturer (Ward 2015c).

Freedom Industries, which owes millions of dollars to creditors and in taxes, filed for bankruptcy soon after the disaster. The filing not only placed numerous lawsuits against the company on hold, but also stifled investigations into whether the company has any recoverable money that could be used for debt repayment or possibly for clean-up efforts (Ward 2014f). Freedom has since been negotiating with the West Virginia DEP to allow the company to apply for a voluntary remediation program, which would make clean-up standards less rigorous (Ward 2014g).

The federal investigation launched in the aftermath of the spill eventually led to charges against Freedom Industries and six individuals affiliated with the company for Clean Water Act violations. Three company officials were indicted in December of 2014. Former president of Freedom, Gary Southern, was also charged with over a dozen other crimes, including bankruptcy fraud and lying under oath, and was indicted in late January of 2015 (Ward 2015d). While these charges, as well as the recent rejection

of Freedom’s bankruptcy plan by a West Virginia judge (AP 2015) are steps toward holding the company accountable, the underlying political and economic arrangements that allowed the disaster to unfold have not been addressed.

## Water, Politics, and the Coal Connection

When it comes to water contamination, numerous industries share culpability throughout West Virginia. In many areas of the state, catastrophes and contamination are so commonplace that inadequate access to clean and safe drinking water has become a normalized part of everyday life. Citizens from both coal and chemical communities interviewed by various media outlets in response to the spill made statements such as “We’ve never been able to drink our water” (Fassinger 2014), or “I don’t drink anybody’s water. Not in this state” (Parker 2014).

Although a diversity of industries, including timber, chemical, and petroleum, have a history in the state, West Virginia is more commonly known for its coal economy; studies show that Appalachian coal communities have elevated health problems, including increased mortality, birth defects, cardiovascular disease, and cancer (Ahern et al. 2011; Epstein et al. 2011; Esch and Hendryx 2011; Hendryx 2013; Hendryx and Ahern 2009; Hitt and Hendryx 2010; Luanpitpong et al. 2014; Zullig and Hendryx 2011). As the Elk River debacle unfolded, so did a criminal case involving a field technician from Appalachian Laboratories, Inc., who—under pressure from coal companies in West Virginia—knowingly falsified coal discharge water quality test results. In October 2014 this technician pleaded guilty to diluting water samples in an effort to “maintain the business with the coal companies” (Ward 2014h). He was charged with Clean Water Act violations and sentenced to twenty-one months in federal prison and three years of probation (Ward 2015a).

Because it is a coal-washing agent, the MCHM held by Freedom Industries highlights the juxtaposition between two hazard-prone industrial forces operating in West Virginia. Once coal is extracted, it is washed to remove impurities, often with chemicals such as MCHM, and prepared for transport. The leftover waste, referred to as slurry, is typically stored in large impoundments; sometimes, though, it is injected into abandoned underground mines, posing risks for abrupt disasters like the impoundment failure at Buffalo Creek or threatening water supplies through slow-moving seepage and contamination (Burns 2007, 39–42).

Kanawha Valley communities also have a history with coal slurry. A 2009 *New York Times* exposé on toxic water showcased a West Virginia

community near Charleston, highlighting the water that was “sometimes gray, cloudy, and oily” that emerged in homes around the same time coal companies began injecting and dumping millions of gallons of slurry in the surrounding area. According to the report, residents also began experiencing a variety of health problems, yet state officials explained that no action was taken because regulators did not examine pollution records submitted by companies until after the statute of limitations expired (Duhigg 2009).

Although Freedom is a company that deals with specialty chemicals, investigations following the spill revealed that J. Clifford Forrest, owner of Rosebud Mining Company, is also owner of Chemstreams Holdings, Inc., the parent company of Freedom Industries (Aupperlee 2014). Soon after the disaster, a western Pennsylvania news source reported that the MCHM from the Elk River site had been transported to a Rosebud Coal facility in Pennsylvania (Erdley and Aupperlee 2014), raising concerns not only in Rosebud Mining’s home in Pennsylvania, but also in Carroll County, Ohio, where the company has plans to set up operations. A group called Carroll Concerned Citizens has requested that West Virginia’s Department of Natural Resources put a hold on permits with the company until a number of measures are in place to protect the community (Baker 2014).

Despite the company’s connection to the coal industry, the West Virginia governor was quick to state, “This was not a coal-company incident. This was a chemical-company incident” (Biggers 2014). Perhaps Governor Tomblin attempted to downplay the spill’s link to coal because of his own relationship with the coal industry. The governor’s political campaign has benefited from the generous donations from the coal industry and energy sector (National Institute on Money in State Politics [NIMSP] 2015). Such corporate-state relationships are familiar throughout Appalachian states, especially in areas heavily dependent on extractive economies. Like many other public officials throughout the region, Tomblin openly expresses his allegiance to coal and disdain for the EPA’s regulatory structure as illustrated by his statement, on January 8, 2014, just a day before the Elk River spill, in which he stated, “I will never back down from the EPA’s misguided policies on coal” (Youngren 2015).

It is thus unsurprising that several citizens and media sources called attention to the state’s slack environmental policies as not only a factor in the chemical spill, but also as a key factor connecting pollution across industrial sectors. Speaking with reporter Omar Ghabra, a former employee of the coal industry in West Virginia aptly stated, “The same loose regulatory environment that produced Upper Big Branch, that poisoned my well water growing up, that poisons the air surrounding these surface mines everyday also gave us the Elk River spill” (Ghabra 2015).



A survey taken soon after the chemical spill revealed that seven out of ten people in the affected area believed that government regulations of the environment were inadequate (Savoia 2014). Because the state has been historically dependent on the coal economy, much of the discourse and policy processes concerning the environment are bound up with coal. With the decline of the coal economy in core mining areas of Appalachia, the governor, DEP officials, and other bureaucrats frequently point to federal environmental regulators as the culprit in the “war on coal jobs,” ignoring several key factors that contribute to the loss of coal jobs, including decades of mechanization, competition with other coal regions and other sources of energy, depletion of reserves, and increased production costs (McIlmoil and Hansen 2010).

By reducing the narrative to a “jobs versus the environment” framework, industry-friendly legislators attempt to legitimize the state’s relaxed stance on environmental protections in the context of economic uncertainty. In late February of 2015, to illustrate, a number of House delegates in the state voted to pass the industry-backed Coal Jobs and Safety Act of 2015 (Senate Bill [SB] 357) that reevaluates a list of mining regulations. Supporters of the bill claim it will improve technology, cut red tape, and save money that can be used to create jobs. Opponents state that despite the bill’s misleading title, it actually rolls back existing mine safety laws and environmental protections, specifically by altering current protocols for water quality standards in the pollution permit process (Johnson 2015; Ward 2015b).

Although much of the discourse on over-reaching regulations in the state centers on the coal economy, the sentiment has also shaped legislative processes since the chemical spill. Under tremendous pressure from citizens and activists, state legislators approved Senate Bill 373, which contains the Aboveground Storage Tanks (AST) Act and the Public Water Supply Protection (PWSP) Act. Governor Tomblin signed the bill on April 1, 2014; his signature was perceived as at least a step in the right direction by citizens and activists (West Virginia River Coalition [WVRC] 2014).

Prior to SB 373, regulators were uncertain about the number of aboveground storage tanks in the state; thus, the AST Act required an inventory and registration of tanks. By mid-December of 2014, more than 40,000 tanks had been registered. Additionally, the Act requires tank owners to conduct inspections and develop spill prevention response plans and leak detection systems, as well as to provide financial assurance that they can effectively respond in the event of a spill. The PWSP Act is an effort to locate potential contamination sources within zones of critical concern, which are areas near streams and upstream from drinking water intakes (Hansen et al. 2015a).

Alongside the new bill, state DEP regulars began working on a proposal to reclassify a 72-mile stretch of the Kanawha River. For decades, this stretch has been exempt from water protections associated with drinking water sources. Extension of the more stringent Category A standards for drinking water sources would provide opportunities to develop new water intakes and back-up water supplies, which would have proven useful during the Elk River catastrophe (Ward 2014d). The coal and manufacturing associations of West Virginia expressed opposition to the proposal, and in December one delegate sought to attach an amendment to the proposal that would remove Category A applications statewide (Ward 2014i).

In late February of 2015, in the midst of debacle over a derailed oil-train disaster in the area, the DEP rule to extend Category A protections along the Kanawha River advanced through the House Judiciary Committee without counter-amendments (Ward 2015e). Considering the affected population's concerns about regulations expressed in the aforementioned survey, these protections may be welcomed throughout the valley. But the struggle over water protections and other environmental policies in West Virginia is ongoing. Industry-friendly lawmakers have also introduced bills (House Bill 2574 and Senate Bill 423) designed to gut major protections established in SB 373, which they say are burdensome. If successful, the bills would eliminate regulations on thousands of tanks (Hansen et al. 2015b; Ward 2015b).

## Conclusion

The events surrounding the chemical spill into the Elk River highlight Freedom Industries' callous disregard for safety and the ongoing legacy of government's failure to protect the citizenry and the environment. Moreover, both the private and the public sectors were responsible for producing an informational vacuum, which thwarted an immediate and effective response and had a confounding effect on the public's ability to assess the threat. As much of the history of the broader Appalachian South reveals, such failures repeatedly occur in a political economic landscape where public officials are beholden to industry and industries are operating in an economic system characterized by destructive human-environmental relationships.

In the contemporary political climate, efforts to regulate polluting companies face tremendous obstacles. At best, regulatory mechanisms tend to minimize damage rather than address deeper systemic problems that produce vulnerability and hazards. In Kanawha Valley, some of these problems are intimately connected to the broader historical path of develop-

ment in the region, characterized by a heavy reliance on industries that have fueled the nation at large with Appalachian resources made profitable and “cheap” through the processes of externalization.

In Appalachia, this too often means that communities, already disempowered by historically uneven political-economic processes, are frequently left to deal with the unwanted burdens of contamination and catastrophe. The events surrounding the Elk River disaster, as well as the decades of other disastrous events in the state of West Virginia, provide a classic example of how disasters are the outcome of translocal, sociopolitical, and economic processes that are deeply embedded in the past and broadly entangled in the present.

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