A Public Health Legal Guide to Safe Drinking Water

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THE PROBLEM: DRINKING WATER CONTAMINATION

Clean drinking water is essential to public health. Contaminated water is a grave health risk and, despite great progress over the past 40 years, continues to threaten U.S. communities' health and quality of life. Our water resources still lack basic protections, making them vulnerable to pollution from fracking, farm runoff, industrial discharges and neglected water infrastructure.

In the U.S., treatment and distribution of safe drinking water has all but eliminated diseases such as cholera, typhoid fever, dysentery and hepatitis A that continue to plague many parts of the world. However, despite these successes, an estimated 19.5 million Americans fall ill each year from drinking water contaminated with parasites, bacteria or viruses. In recent years, 40 percent of the nation's community water systems violated the Safe Drinking Water Act at least once.[1] Those violations ranged from failing to maintain proper paperwork to allowing carcinogens into tap water. Approximately 23 million people received drinking water from municipal systems that violated at least one health-based standard.[2] In some cases, these violations can cause sickness quickly; in others, pollutants such as inorganic toxins and heavy metals can accumulate in the body for years or decades before contributing to serious health problems.

Public health officials play an important role in responding to drinking water contamination events and can play a vital role in preventing them. Health departments need to know about potential drinking water contamination because they are uniquely qualified to assess and respond to these risks. Put simply, drinking water contamination is a grave public health threat and public health officials should be part of the discussion on how to protect drinking water. The public health system has many opportunities to assist in protecting the nation's drinking water, including: investigation of any unusual patterns of illness, assessment of drinking water sources and contamination sources, dissemination of guidance to the public, engaging and informing citizen groups about health risks, obtaining and analyzing information from federal and state governments to inform the public, advocating for new water quality standards or strengthening existing standards, and preparing responses to contamination events.

This Guide reviews the primary federal laws that govern drinking water, highlights opportunities for increased public health involvement in protecting drinking water and provides recommendations on how public health officials can have a more meaningful impact on drinking water quality. The Guide uses two case studies—the West Virginia chemical spill and Lake Erie algal bloom—to illustrate existing problems. Finally, this Guide also discusses private wells and hydraulic fracturing or "fracking," which present concerns about drinking water quality, yet are largely unregulated. Public health officials can play a vital role at the local level educating the public about well water quality, protecting private well drinking water and informing proposed regulation of fracking.

OVERVIEW OF FEDERAL LAWS: SDWA AND CWA

The primary federal laws that protect drinking water are: The Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA). The SDWA sets drinking water quality standards and protects underground drinking water sources. The CWA protects surface waters which supply drinking water to 68% of the U.S. population.[3] The SDWA sets standards for municipal drinking water systems, but generally exempts private wells. While regulation of private wells is typically the province of state and local authorities, many jurisdictions lack effective laws or sufficient resources to ensure safe drinking water from private wells. In addition, the Emergency Planning and Community Right to Know Act (EPCRA) is an important law governing both emergency preparedness and response as well as the dissemination of information concerning threats to drinking water supplies, and is an important safeguard for drinking water contamination events as well as an information gathering tool.

MAJOR COMPONENTS OF THE SAFE DRINKING WATER ACT

- Applies to public water systems with at least 15 connections or serving at least 25 people
- Requires EPA to set standards for drinking water contaminants. Contaminant goals (MCGLs) are set at the "level at which no known or anticipated" adverse health effects occur. Enforceable contaminant levels (MCL's) are set as close to MCGLs "as is feasible" taking costs and benefits into account. §300g-1
- Allows for states to assume primary enforcement responsibilities. §300g-2
- Authorizes EPA to take enforcement actions if states fail to do so. Requires public water systems to notify customers of SDWA violations. §300g-3
- Requires EPA to establish minimum requirements for state underground injection control programs for wastewater. Hydraulic fracturing non-diesel fluid injection is exempt from such regulations. §300h
- Grants EPA emergency authority to address contamination that may present an imminent and substantial endangerment to public health. §300i
- Authorizes EPA to promulgate regulations for monitoring and record keeping. §300j-4
- Permits citizen suits against SDWA violators and against EPA for failing to perform duties required under the SDWA. §300j-8

THE SAFE DRINKING WATER ACT (SDWA)

The Safe Drinking Water Act (SDWA) is the key federal law for protecting public drinking water from harmful contaminants. Congress enacted the SDWA in 1974 after nationwide studies of community water systems revealed widespread water quality problems and health risks from poor operating procedures, inadequate facilities, and uneven management of public water supplies in communities of all sizes. Before the SDWA, 40 percent of the nation's drinking water systems did not meet basic health standards.[4] The SDWA primarily addresses: (1) the quality of drinking water from public water works; and (2) the protection of underground sources of drinking water (groundwater or aquifers).

Under the SDWA, the Environmental Protection Agency (EPA) oversees and sets national health-based standards to protect drinking water from naturally-occurring and man-made contaminants. These regulations apply to the roughly 168,000 privately and publicly-owned water systems (at least 15 service connections or at least 25 people) which serve 90% of Americans.[5] The SDWA does not regulate private wells. Regulation of private well systems is left to state and local authorities who often lack legal authority or resources to regulate private wells effectively. Generally, these private wells are located in rural areas and are most likely to be affected by hydraulic fracturing oil and gas exploration and production (hereinafter "fracking").

SDWA Drinking Water Standards

The SDWA requires the creation of health-based drinking water standards that limit drinking water contaminants for public water systems. States may adopt their own, more stringent standards with SDWA standards acting as a floor or minimum

requirement. SDWA §300(g)(1) directs the EPA to select contaminants for regulatory consideration based on occurrence, health effects, and meaningful opportunities to reduce health risks. A current list of contaminants and federal standards can be found here. The EPA sets primary drinking water standards through a three-step process:

- First, the EPA identifies contaminants that may adversely affect public health and occur in drinking water with a frequency and at levels that may pose a threat to public health. The contaminants are further studied in order to determine if they should be regulated.
- Once the EPA decides to regulate a contaminant, it determines a maximum contaminant level goal (MCLG). The MCLG is a nonenforceable level at which no known or anticipated adverse health effects occur and which allow an adequate margin of safety.
- Third, the EPA sets a maximum contaminant level (MCL) or Treatment Technique (TT). The MCLs are enforceable standards and are set as close to the MCLG as feasible taking treatment cost into account. When it is not economically or technically feasible to set an MCL or there is no reliable method to detect a contaminant, the EPA requires a specified Treatment Technique.

The SDWA also authorizes the creation of Secondary Maximum Contaminant Levels which are non-enforceable guidelines regulating contaminants that may affect drinking water taste, odor, or color, but are not considered to present a health risk. The levels for 15 common contaminants that can have these cosmetic effects are provided as guidelines for public water systems that can be found here.

Unregulated Contaminants

The SDWA also includes a process that the EPA must follow to identify and list unregulated contaminants which may require future national drinking water regulation. EPA must periodically publish the "Contaminant Candidate List" (CCL) and decide whether to regulate contaminants or determine that they do not pose a health risk. The current, draft fourth CCL can be found here and includes 100 chemicals and 12 microbial contaminants. The EPA uses this list to prioritize research and data collection efforts to determine whether a specific contaminant should be subject to regulation.

The EPA must publish an updated CCL once every five years. The EPA recently removed six contaminants and added two contaminants (manganese and nonylphenol) from the third CCL. Once the final fourth CCL (CCL 4) is published, the EPA must make regulatory determinations for at least five contaminants from the list. Each decision (whether to regulate or not) is subject to notice and comment from the public as is the decision to add contaminants to the CCL. For example, the draft CCL 4 was published on February 4, 2015 and EPA allowed public comment on the list until April 6, 2015 through which members of the public could provide information to the EPA to add or

remove chemicals from consideration or prioritize chemicals on the list. Those comments are available here.

State & Local Authority

States play a crucial role in successfully administering federal drinking water programs. Once the EPA sets MCLs and/or Treatment Techniques for particular contaminants, the states adopt drinking water programs. SDWA §300(g)(2) authorizes states to assume primary oversight and enforcement responsibility (primacy) for public water systems. To assume primacy, states must: (1) adopt regulations at least as stringent as federal requirements; (2) develop adequate procedures for enforcement (monitoring and inspection); (3) adopt authority for administrative penalties; and (4) maintain records and issue reports per EPA rules. States must also develop a plan for providing safe drinking water under emergency circumstances. Currently, all states and territories, except Wyoming and the District of Columbia, are the primary regulatory authority governing public drinking water. While the EPA reviews and approves new state standards, states have broad discretion enforcing the SDWA with little federal involvement.[6]

OPPORTUNITIES FOR PUBLIC HEALTH OFFICIALS TO SET NATIONAL DRINKING WATER POLICY

Public Health Officials can play a crucial role in notice and comment periods for EPA regulatory decisions such as:

- Making Contaminant Candidate List decisions prioritizing contaminants for review and whether to regulate specific contaminants;
- Setting water quality standards for contaminants EPA decides to regulate;
- Establishing minimum standards for Underground Injection Control programs and public water system monitoring and reporting requirements.

The SDWA requires public water systems to self-monitor water quality and report monitoring data.[7] The monitoring requirements are crucial because they enable the identification and correction of public health risks. States, in turn, make sure the public water systems are providing monitoring data and generally focus their efforts on compliance: instituting preventative measures, conducting sanitary surveys, and providing technical assistance and operator certification and training. The EPA maintains a database of local water quality reports by state as well as a list of public water systems that can be accessed here.

Under SDWA §300(j)(13), a state must also adopt a Source Water Assessment Program, subject to EPA approval. Source Water Assessment Programs differ by state, but they share a common goal: to identify potential sources of contamination. These assessments include a delineation of drinking water sources, a contamination source inventory, and the risk these contamination sources pose. States must make these assessments available to the public.[8] More information on source water assessments.

To obtain copies of source water assessments in your area, contact your state's Source Water Assessment Program administrator or EPA Regional contact found here.

Consumer Confidence Reports (CCRs) are a vital source of public information about drinking water quality. Every public water system must provide an annual report to consumers on the quality of local drinking water. CCRs describe a system's water sources (incorporating important information from Source Water Assessments noted above), risks to the water system, contaminants detected in the water supply that violate EPA's health standards, and the potential effects

of any violations. The reports also provide educational information about water contaminants. The EPA maintains a database of these reports here[9].

Finally, the SDWA regulates the underground injection of fluids for storage and disposal through the Underground Injection Control (UIC) Program. Nationwide, there are over 650,000 underground injection disposal systems that include shallow storm water drainage wells, large septic system leach fields as well as deeper wells used for industrial waste water. Typically, hazardous waste is disposed into isolated geologic formations deep within the ground with multiple layers or casings protecting groundwater. Non-hazardous waste such as storm water discharge wells and large septic systems and can be above groundwater drinking sources. UIC programs are run by state authorities who may permit underground injection wells "by rule" (no need for a permit) for non-hazardous waste injection, provided state rules meet minimum federal requirements and well operators satisfy those minimum standards.[10] Importantly, as discussed below, fluids injected into the ground for hydraulic fracturing (fracking) oil and gas wells are excluded from the SDWA and the Underground Injection Control Program.

The Public Health Official Role

Public health officials can have an important impact by informing federal and state regulators about the risks certain contaminants pose to the drinking water supply. Moreover, public health officials can play a pivotal role at the local level by analyzing information in the various reports and databases noted above, interpreting them, and providing meaningful information to the public about the safety of their drinking water supply and potential risks to it. The following are some of the current problems that can be addressed by public health officials.

Limits on Private Wells. In many rural jurisdictions, private wells are the primary source of drinking water but the SDWA excludes them from regulation. Unlike public water systems, private wells are not regulated by the EPA so there are no testing or reporting requirements. In many rural areas, hydraulic fracturing ("fracking") may pose substantial risks to private wells. Moreover, those served by private wells may not have the necessary resources to obtain individual monitoring. In some areas, vulnerable populations are served by wells. These may be migrant workers renting a home on the employer's property who are unlikely to complain about drinking water quality. Those issues are exacerbated if the renters are immigrants; regardless of legal status, immigrants are less likely to report code violations or other problems. Local public health officials can play a vital role in assessing groundwater sources and contamination risk, and providing those served with testing information (results of tested wells, how to obtain testing, and resources available). Local officials can notify state officials of existing or emerging public health threats and engage in policy advocacy to secure testing, particularly for rental properties.

Small Public Systems. Small Public Water Systems (by statute, systems serving fewer than 3,300 people) face challenges in complying with the

SDWA and ensuring water quality. Many of the small and very small public water systems have little or no money for system improvements, and little expertise on staff, some without full-time operators. Even where there are local operators, in some cases they are not technical experts or properly trained. This is a significant and widespread problem as small systems account for 87% of all community water systems, but serve only 11% of the population, typically in rural areas.[11] Public health officials can provide much needed support and expertise to these small systems.

Lack of Enforcement & Uniformity. Public water systems frequently violate enforceable contaminant levels (MCLs), yet these violations go unnoticed or unpunished. The difficulty enforcing the SDWA is the public nature of water entities – punishing the water entity through enforcement and fines saps resources that could be put toward compliance and providing healthy water. Moreover, punishing the public water utility ultimately punishes the consumers through increased water service rates to cover fines.[12] Therefore, state and local regulators focus more of their scarce resources as well as public water work resources on compliance.[13] However, due to the number of facilities, the lack of practical enforcement options and the technical nature of many violations, often public drinking water violations go unaddressed with regulatory compliance efforts reserved for more serious or chronic problems. Public health officials can help regulators prioritize public system violations and supplement their efforts to address more violations and bring systems into compliance more quickly.

Lack of Awareness & Education. Many local health officials and consumers are not aware of the resources available or the problems associated with contaminated drinking water sources. Even though the Consumer Confidence Reports have been instrumental in notifying consumers on the quality of local drinking water, the reports have been criticized for being overly technical, complex, and difficult for the general public to understand or act upon. Local health officials, potentially in collaboration with public health researchers with expertise in translation, can be instrumental in educating the public on concerns and potential solutions.

Unregulated Contaminants. There are many contaminants that are not regulated and the SDWA does not recognize emerging contaminants in a timely fashion. At the current rate of analyzing one contaminant per year, it will take 100 years to analyze the Candidate Contaminants List (CCL 4 noted above). The process for adding contaminants is a slow, cumbersome process that is not utilized primarily due to a lack of EPA resources. We are far better off keeping our water from being contaminated in the first place than worrying about how to treat it after an acute or chronic event has occurred. State and local public health officials could instigate quicker federal response through citizens' petitions or by incentivizing local researchers to take on the testing of contaminants.

Funding Concerns. State drinking water officials have expressed concern that while their responsibilities have grown, federal funding to support

these efforts have not. Many water systems lack the funds to upgrade and maintain compliance. Since 1997, the State Revolving Fund has distributed more than $26 billion in grants and loans to improve water treatment and delivery systems. However, the EPA has estimated that about $384 billion is needed through 2030 to meet infrastructure needs. Many water mains are 50 to 100 years old.[14] If communities lack proper infrastructure, state and local health officials are severely limited in completing their duties to ensure safe drinking water.

PROTECTING THE SOURCE: THE CLEAN WATER ACT (CWA)

The objective of the Clean Water Act (CWA) is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters."[15] According to the EPA and the Center for Disease Control (CDC), 68% of community water system users receive their water from surface waters – lakes, rivers, and reservoirs.[16] The CWA is a comprehensive law designed to protect surface waters from "point source" pollution through state-administered permit programs. As with the SDWA, the authority to regulate surface waters under the CWA is a shared federal (standard setting) and state (enforcement and compliance) responsibility. It is important to note that the CWA generally excludes "nonpoint source" pollutants, such as agricultural and storm water run-off, from its permitting program.

NPDES Permits and Effluent Limits

The CWA requires "point sources"[17] to obtain a permit to discharge pollutants into surface waters. The National Pollution Discharge Elimination System (NPDES) is the primary CWA permit program that protects surface waters. State authorities issue NPDES permits that set limitations on pollutant discharges, typically from industrial sources. The limitations are based on the pollutant and the designated uses of the receiving water, such as drinking water. Several activities are exempt from the NPDES program, including discharges of sewage from vessels, discharges from some agricultural activities, and discharges into publicly owned treatment works.[18]

There are two types of effluent (pollution discharge) limits: technology based and water quality based standards. Technology based standards are employed to minimize pollution to the extent it is economically feasible to do so, regardless of the status of the receiving water and provide the foundation for CWA pollution reduction. Water quality based effluent limits are put in place for waters that are impaired, i.e. a water body is too polluted to support a designated use, or to prevent deterioration of waters that meet a water body designated use(s). States have flexibility in determining the designated uses for a water body, but are required to classify the waters within the state based on the intended use(s) of the water, such as recreation, fishing, propagation of wildlife, and drinking. Each state develops effluent limits and NPDES permits based on the designated use(s) of the water body and federal water quality criteria that support specific designated uses. The EPA has established water quality criteria for more than 150 pollutants. These criteria are guidelines for

states in establishing their water quality standards. EPA's water quality criteria can be found here.

States are free to set standards that are based on the particular needs of the water body in question, even regulating pollutants not on the federal list. For most of the CWA permitting requirements and standard setting mechanisms, states are given deference as long as the standards they apply are at least as stringent as the national standards. However, EPA can still approve state water quality standards that are weaker than the federal criteria, as long as the state standards support designated uses and are scientifically defensible. Once states have established designated uses for a water body and adopted water quality standards, then state NPDES permit writers develop specific discharge limits for a pollution source and those limits are written into the permit. Forty six states currently have the delegated authority to issue and enforce NPDES permits.[19]

The NPDES permitting process is an excellent point of entry for public health officials to advocate for more stringent standards to protect the quality of drinking water. NPDES permits are periodically revised and those revisions are open for public comment. Public health officials working with concerned citizen groups can help inform state officials in setting pollution limits and advocate for more stringent standards. Citizen groups, armed with public health expertise can also bring lawsuits ("citizen suits") against violators or state officials if they are not properly administering or enforcing the CWA. Participation in litigation may not be possible, however, for local health officials in states with a unified public health system.

The primary failure of the CWA to protect drinking water quality stems from the lack of controls on nonpoint sources of pollution. As noted above, the CWA permit system applies to "point sources" or discrete pollution discharge points. Nonpoint source pollution is diffuse water pollution, typically associated with storm water run-off, i.e. there is not a discrete source. Nonpoint source pollution is one of the primary factors contributing to nonattainment of water quality standards in rivers, lakes and estuaries. A 2013 EPA assessment determined that roughly half of our nation's waterways are impaired (cannot support designate uses). Pollutants associated with nonpoint source pollution (nitrogen and phosphorous) are the leading cause of impairment and agriculture is the leading source of nonpoint source pollution.[20] There are currently no effective mechanisms in place to control agricultural runoff that would be comparable to other pollution abatement programs. Most states merely employ "best management practices" to control agricultural runoff and enforcement of these practices is often limited or non-existent. In other instances, states fail to include limits for certain pollutants in permits. By implementing limits on pollutants in permits, such as nitrogen or phosphorous, pollutant dischargers are forced to adopt measures to limit these discharges. Put simply, without a permit limit, there is no standard by which to hold a polluter accountable and enforcement becomes far more difficult.

The Lake Erie case study below is an excellent example of how excess

nutrients from agricultural runoff can accumulate in a water system, leading to toxic algal blooms and impaired drinking water quality.

Chronic Drinking Water Problem: The Lake Erie example

Lake Erie serves as a drinking water source for millions of Ohio residents, including the cities of Cleveland and Toledo. The lake suffers from huge growths of algae (known as Harmful Algal Blooms or HABs). In August 2014, a three-day drinking water ban was imposed due to the high levels of microcystin—a byproduct of HABs and a liver toxin. Microcystin levels in Lake Erie have caused beaches to close; residents were ordered not to drink or boil the water and advised not to bathe in it. The drinking water ban affected nearly 500,000 residents in the western Lake Erie basin, including Toledo. In response to the August 2014 event, the National Guard trucked water into the city, and Ohio had to convert a milk-bottling plant to package drinking water. To address this HAB contamination, Toledo spent an additional $200,000 per month and Columbus spent nearly $10,000 per day in 2014 to mitigate the effects of this algal bloom event. Spending trends like this were present in Akron, Clermont County, and Celina and Carroll Townships as well.[21]

Harmful Algal Blooms are excessive growths of toxin-producing algae and a major environmental problem that occur in every state. Algal blooms can have severe impacts on human health, aquatic ecosystems, local economies and drinking water sources. The most pressing issue currently facing Lake Erie is the presence of high levels of Microcystis. This is a type of blue-green algae that produces microcystin. Though these algal blooms are naturally occurring, their presence has been steadily increasing since the mid-1990's. The dangers presented by HABs are production of toxins (this presents a direct danger to people and animals); creation of dead zones in the water where dissolved oxygen cannot support aquatic life; and increased cost to treat the water thereby harming businesses and industries that are dependent on clean water.

There are several factors that contribute to the presence of HABs, most importantly warm temperature and excess nutrients, particularly phosphorous. Levels of dissolved reactive phosphorous (phosphorous that is bioavailable as food for algae) have increased dramatically in Lake Erie and its tributaries since the 1990's. Pollutants from human sources contribute significantly to the HAB problem.[22] Sources of phosphorous pollution include agricultural stormwater runoff, waste water treatment plant discharges, malfunctioning septic systems, and products with phosphates like dishwasher detergent or lawn fertilizers. According to the Ohio Lake Erie Phosphorous Task Force 2010 Final Report, the most significant contributor to phosphorous loading in Lake Erie is agricultural stormwater runoff.[23] In 2011, more than one-half of the phosphorus loading into monitored tributaries of the Lake were located in agricultural communities.[24] The most significant amount of loading occurs during spring time, when snowmelt and heavy rain transports agricultural waste via water runoff into the Lake. Once the temperature rises in the summer, conditions are ripe for algal blooms.

The Ohio EPA administers the Clean Water Act (CWA), manages the National Pollutant Discharge Elimination System (NPDES) permit program and sets water quality standards. As noted above, two key factors determine the limits of phosphorous discharges from point sources regulated by NPDES permits: (1) technology based standards by source category; and (2) the water quality standards of the receiving water body. If bodies of water are "impaired," i.e. cannot achieve a designated use due to excess pollutants, then more stringent water quality standards are set for point sources and the state must develop a plan to reduce pollution from nonpoint sources. Since a majority of water bodies in the Lake Erie basin are impaired by phosphorous, Ohio has strengthened its water quality standards and made permits more stringent for phosphorous. However, this permitting system only applies to "point sources" and does not address the biggest problem: nonpoint source agricultural runoff.

The biggest issue currently facing Lake Erie is pollution from nonpoint sources. Nonpoint source pollution is not regulated under federal law, and states are given full discretion to set standards. Ohio imposes few enforcement requirements on nonpoint source polluters.[25] Generally, nonpoint source pollution for impaired waters is controlled by "best management practices" which are often difficult to implement and sporadically enforced.

On April 2, 2015, Ohio Governor John Kasich signed Senate Bill 1 into law, which takes effect in July 2015 and tightens requirements on fertilizer, manure and sewage sludge application and requires publicly owned treatment works to test for phosphorous under new NPDES permits. These new requirements apply to farmers and treatment plants in eleven watersheds in the Lake Erie Western Basin and expand the number of farms that must comply. While the legislation is a step toward mitigating agricultural fertilizer runoff, it still suffers from difficulties in enforcement: regulators are not granted automatic access to inspect, but must receive complaints of violations. Even then, a landholder may deny access for inspection, requiring a government agent to obtain a search warrant to investigate. University of Toledo College of Law has noted numerous problems with best management practices enforcement procedures.[26] Furthermore, there are still many "best management practices," such as limiting fertilizer application based on soil testing or nutrient needs, buffer strips between crops and waterways, or prohibiting fertilizer application near waterways, that remain unimplemented.

Public Health Role in Addressing Nonpoint Source Pollutant Threats to Drinking Water

The Lake Erie case is an example of a chronic problem that took decades to develop and may take as long to resolve. This, like many chronic water quality problems, is difficult to address because there are not readily identifiable, discrete causes. Rather, a multiplicity of factors—some discrete, some diffusecaused the problem and addressing those causes is daunting. The most effective way to deal with such problems is to address them before crisis develops by monitoring the health of watersheds used for drinking water, identifying emerging threats and addressing them. Fortunately, there are many

public interest groups already taking on this task at the local level, for example the Lake Erie Waterkeeper. While these local public interest groups can be the eyes and ears at the watershed level, they almost always could use public health expertise to show the connection between watershed health and human health during public comments on proposed legislation, rule-making and permit proposals and, if need be, in court.

Beyond the local level, public health input is needed at the state and national level. At the state level, providing public comments on permits and proposed regulations can provide critical support for strengthening pollution standards and enforcement. The same holds true for federal regulations. For example, there is no federal standard for microcystin – the toxin that made Lake Erie's water undrinkable for 500,000 people. With a federal standard, specific protocols for testing, monitoring and prevention could be developed and implemented at the state level. Moreover, Senate Bill 2785 (113th Congress), the Safe and Secure Drinking Water Protection Act of 2014, directing EPA to establish safe microcystin levels in drinking water, passed the Senate unanimously in December 2014, but has stalled in the House of Representatives. Local officials could consider reaching out to their Representatives in support of the legislation.

Sources of information for surface water assessments include each state's biennial water quality assessment and impairment reports (§§305(b) and 303(b) reports).

The EPA has also gathered several different data sources for its Watershed Assessment, Tracking and Environmental Results System (WATERS) and several tools, including a mapping function to assist in analyzing water quality information.

STATE REGULATORY TOOLS TO CONTROL AGRICULTURAL STORMWATER RUNOFF

- Promulgate numeric water quality criteria for nutrients (nitrogen and phosphorous).
- Adopt nutrient management plans for agricultural fertilizer application based on soil conditions and crop uptake.
- Impose comprehensive best management practices that include: limited fertilizer application in winter or during/prior to rain events, requiring vegetative buffer strips along waterways to absorb excess nutrient runoff and banning fertilizer application and plowing in these vegetative buffer zones.
- Develop comprehensive enforcement tools to ensure compliance with nutrient management plans and best management practices.

Check with your state environmental agency, if they do not have such standards, urge their adoption!

Unregulated and Under-regulated: Private Wells, Fracking, and Chemical Spills

The above discussion of federal laws broadly outlines the federal laws designed to protect our drinking water supplies and the holes that leave them unprotected if states do not act. The following discussion focuses on pressing problems that have emerged which are not adequately covered by federal laws and regulations, specifically private well drinking water sources, fracking and chemical spills. These examples highlight the limits of federal laws which exempt private wells and fracking from regulation as well as the limits of emergency response when information is either not required to be disclosed or not effectively communicated when it is provided.

PRIVATE WELLS AND FRACKING

As discussed above, the SDWA does not regulate private wells and the Clean Water Act does not regulate underground water sources. Put simply, private wells are not regulated by federal

statutes, under-regulated by state laws and rarely regulated at the local level. This is a serious public health challenge as approximately 15% of Americans are served by private wells, often in rural areas. The U.S. Geological Survey (USGS) sampled 2,167 private wells throughout the country and found that 23% of wells had at least one contaminant at concentrations greater than health-based standards.[27] The most common excess contaminants included radon (and radioactive trace elements), nitrates, and fecal indicator bacteria (coliform and E coli). Some of these contaminants had regional patterns: radon occurred more frequently in the northeast, Appalachia and Colorado. Nitrate contamination occurred most frequently in agricultural areas. Other contaminants, such as coliform and E coli were more widespread: a study focused on waterborne disease outbreaks from drinking water from 1999 to 2002 attributed 20 to 40% of such outbreaks to private wells.[28] A 2010 follow-up USGS study concluded that there were increases in chloride concentrations (43% of aquifer networks), dissolved solids (41%), nitrate concentrations (23%) and the number of samples exceeding health-based standards since their study covering 1991-2004.[29] In short, the problem of private well contamination is getting worse.

For example, in California approximately 12,000 private wells provide drinking water in Monterey County. These private wells have experienced acute contamination, forcing communities to rely on bottled water for years at a time primarily due to intensive agricultural activities. A 2011 investigation by the State's Groundwater Ambient Monitoring & Assessment Program Domestic Wells Project sampled 79 private wells in Monterey County and found 50 wells had at least one contaminant above recommended water quality standards, with thallium, coliform bacteria, nitrate and percolate the most common excess pollutants.[30]

Added to the stresses of private wells is the recent, huge increase in oil and gas hydraulic fracturing and the unknown risk to private wells due to the lack of regulation of hydraulic fracturing operations. Several studies have documented the risks fracking poses to well water as well as evidence of actual contamination of well water.[31] In June 2015, the EPA released its draft *Assessment of the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources.* The report, done at the urging of Congress, synthesized available scientific literature and data to assess the relationship between fracking and drinking water contamination. The EPA concluded that, while there is no evidence of "widespread, systemic impacts on drinking water resources," there are numerous incidents "where one or more mechanisms led to impacts on drinking water resources, including contamination of drinking water wells."[32] These mechanisms include: water withdrawals in areas with low water availability, spills of hydraulic fracturing fluids and wastewater, fracturing conducted directly into underground drinking water resources, below ground migration of liquids and gases from inadequately cased or cemented wells and inadequate treatment and discharge of wastewater into drinking water resources.[33]

Fracking involves pumping large volumes of water, chemicals, and sand into a well to create cracks in the rock formation to allow oil and gas inside the formation to flow to the surface. Fracking has generated controversy due to complaints of well water contamination. These complaints are compounded by the fact that oil and gas exploration is largely exempt from federal laws protecting safe drinking water—including the Safe Drinking Water Act, the Clean Water Act, and the Emergency Planning and Community Right-to-Know Act - placing the burden of regulating fracking on state and local authorities.

The one area where federal laws regulate fracking is managing fracking wastewater ("flowback" or "produced water") as the discharge of wastewater into surface waters is regulated by the Clean Water Act NPDES permit system noted above and disposal through underground injection is regulated by the SDWA Underground Control Injection Program. The EPA estimates that, on average, each well uses 2.3 million to 3.8 million gallons of water – a total of 70 to 140 billion gallons of water for 35,000 wells every year. However, the amount of water needed per well varies greatly, from less than 1 million up to 13 million gallons.[34] A 4 million gallon fracking well uses an estimated 80 to 330 tons of chemicals.[35] The water used in fracking, along with the chemical added to the water, returns as flowback water; the remnants of the process. This wastewater is managed through storing and recycling the wastewater, sending the wastewater to specialized industrial wastewater treatment facilities, or disposal by injecting it underground.

Congress rescinded the federal government's ability to regulate fracking production (as opposed to waste disposal noted above) when it passed the Energy Policy Act of 2005 (Pub. L. 109-58), which largely exempts hydraulic fracturing from the Safe Drinking Water Act and its regulations governing underground injection control programs[36] and expands stormwater exemptions for fracking under the Clean Water Act.[37] So while the disposal of fracking wastewater through underground injection is regulated under the SDWA, the injection of fracking fluid to produce oil and gas is not so regulated. Moreover, the chemicals used in fracking production do not have to be disclosed under EPCRA[38] and, since fracking involves underground injection, it is not covered by the CWA which only protects surface waters. Because fracking fluid is treated as a "non-hazardous waste" under the Resource Conservation and Recovery Act (RCRA) Subtitle D (rather than hazardous waste under Subtitle C), fracking wastewater storage, treatment, transportation and disposal are subject to a host of less-stringent requirements such as no requirement to line wastewater storage pits designed "to prevent any migration of wastes … to adjacent subsurface soil or ground water or surface water" as Subtitle C would require.[39]

In March 2015, the Obama administration made its most significant move yet toward regulating fracking, issuing its first safety regulations. The Department of Interior announced new rules that require companies to disclose the chemicals used to the Bureau of Land Management (BLM) within 30 days of drilling on federal lands, as well as submit detailed geological information about existing

wells.[40] This final rule is effective on June 24, 2015. The regulations will also allow government inspectors to validate the safety of the wells and impose new standards on chemical storage. While the Interior rules apply only to tribal and federal lands, the new rules could potentially serve as a model for state regulators.

While fracking waste water is subject to some regulation, the production phase (injecting fracking fluid into the ground) is poorly regulated at this point. Although some states are moving toward comprehensive fracking regulation, state regulation varies widely and none have achieved comprehensive fracking regulation.

- Pennsylvania, for example, regulates the waste under waste management laws. These provide detailed standards for storing and transporting waste and procedures for spills or accidental discharges.
- Recently enacted regulations in Ohio require fracking waste water haulers to install and use electronic transponders to monitor their shipments.
- Vermont is the only state that has banned the treatment, disposal, or storage of fracking waste, although Connecticut and New Jersey have considered similar bills.
- New York has banned fracking and Maryland currently has a fracking moratorium in place pending further study of fracking risks.

The combination of the lack of fracking regulation and lack of private well protections or regulation is a problem for many rural communities. There are multiple entry points for drinking water contamination from fracking. Weakened well casings may permit leaks into the surrounding soil and geologic structures, with eventual penetration into groundwater aquifers. Polluted flowback water from drilling is most often stored in surface impoundments which not only contain chemicals, but also contaminants brought up from beneath the ground, such as heavy metals and radioactive materials. Leaks from poorly constructed impoundments can run off into surface waters, seep into groundwater aquifers, or both and can overflow from severe rain events. Moreover, abandoned fracking wells can provide pathways for water contamination. For example, in Pennsylvania private wells are neither licensed nor inspected by a state or local government. As of August 2014, there have been at least 240 cases of private well contamination events from fracking activities.[41] There have been numerous studies assessing fracking risks to groundwater and actual contamination of groundwater from fracking activities.[42] While some research points to concerns about fracking, other studies conclude the risks are modest and manageable. There is no clear answer to the question of the risk posed by fracking. But there is a sufficient basis for concern over contaminated drinking water to gain the attention of federal, state and local regulators and health officials.

EPCRA's chemical storage reporting requirements apply only to chemicals deemed hazardous by the Occupational Safety and Health Administration

(OSHA). Fracking chemicals need not be reported if they have not been studied or if hazard studies have not yet been completed. Moreover, OSHA hazard rules focus on the types of concerns likely to arise in a workplace context, such as acute exposure to a chemical in an accident. Chemical contents of fracking fluids remain, like chemicals used in other oil and gas exploration and production activities, exempt from EPCRA.[43] The most complete information concerning fracking fluid and its chemical constituents is the FracFocus website, a voluntary fracking information dissemination project, including chemicals used, location of wells and state law surveys. The FracFocus project is jointly sponsored by the Ground Water Protection Council (a consortium of state regulators) and the Interstate Oil and Gas Compact Commission.

Since 2005, there has been fracking activity in at least thirty-two states. Of these, ten have no rules requiring the public disclosure of fracking chemicals. The remaining twenty-two states with fracking have some disclosure requirements.[44] However, these state rules vary widely in their scope, substance, and in the exemptions they grant for claims that information is a trade secret. A number of states with fracking operations have adopted their own fracking fluid disclosure requirements, but approximately half have not. Of the states that do require both disclosure of some of the substances and public access to the information, none require comprehensive disclosure. Health professionals and emergency responders may need information on all fracking chemicals—including the identity of those withheld as a trade secret—to diagnose and treat patients, or to respond to an accident or emergency. Alabama, Arkansas, California, Montana, and West Virginia provide health professionals access but not emergency responders. Seven other states provide access, with varying limits, to health professionals and emergency responders. Ten states provide no access to trade secret information to either emergency responders or health professionals.[45]

Public Health Recommendations

State and local health officials can advocate strengthening fracking regulations. Measures to mitigate the risks fracking pose to drinking water supplies include:

Industry Best Practices. Developing and enforcing industry best practices for fracking operations can minimize fracking risks. Best practices include requiring well-pad linings to prevent spills from leaking into the ground, wastewater impoundment storage linings and monitoring devices to detect leaks, cement casings for production wells to prevent migration of gas or fracking fluid into water sources, and mechanisms to adequately seal inactive wells which can be a pathway for pollutants to migrate into groundwater sources.

Polluter Pays. Public health officials can advocate for policies that hold well operators and their contractors financially responsible for cleanup and remediation.[46] Requiring oil and gas companies to conduct baseline testing of private wells in the vicinity before fracking commences and periodic

monitoring thereafter can provide vital information as to impacts of fracking on drinking water. Laws that presume fracking caused contamination of private drinking water well within a specific area of fracking sites shifts the burden on gas producers to show their activities were not the source of pollution and can be a powerful financial incentive for companies to adhere to best practices. Imposition of fees on well operators to be used toward mitigating fracking pollution can provide an important source of funding for government oversight, investigation, data collection, testing, enforcement, and remediation.

MAJOR COMPONENTS OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT-TO-KNOW ACT

- Applies to hazardous and toxic chemicals at industrial facilities.
- Requires local governments to prepare chemical emergency response plans and to review the plans annually. State governments oversee and coordinate local planning efforts. Facilities that maintain Extremely Hazardous Substances (EHS) must cooperate with emergency plan preparation. §§301—303
- Facilities must immediately report accidental releases of EHS to state and local regulators. Information about accidental releases must be made available to the public. §304
- Facilities must submit Material Safety Data Sheets (MSDS) to state and local regulators as well as local fire department(s). Facilities must also report their inventories of all chemicals for which MSDSs exist and must make MSDS and inventory information available to the public. §311
- Creates Toxics Release Inventory (TRI), which tracks the management of over 600 chemicals. Facilities must submit a report (Form R) for each TRI chemical annually. §313
- Allows facilities to withhold the specific chemical identity from the reports filed under §§303, 311, 312 and 313 if the facilities submit a "trade secret" claim. §322
- Authorizes citizen suits against EPCRA violators, state governments and EPA (but not local governments) for failing to perform EPCRA duties. §326

Strengthen State Disclosure. The public has a right to know what chemicals are being transported, stored and injected near their homes, schools, hospitals, and drinking water sources. Comprehensive chemical information is important to formulating emergency response plans, and it allows first responders to protect themselves and the public when acting to address accidents and emergencies. Health professionals need information on what patients may have been exposed to, and how much, for diagnosis and treatment. Therefore, advocating for robust chemical disclosure requirements at the state level is an important, basic need that is unmet in many localities: the right to know.

At The Local Level. Public health officials can start with assessing the impact of fracking at the local level. The FracFocus website identifies well locations – currently, there are almost 100,000 wells reported on FracFocus, but that is a small percentage of the 1 million reported oil and natural gas wells nationwide. Fracking activities may be regulated through local zoning decisions that limit industrial activity to certain areas within a community. Public health officials in fracking-intensive areas should be involved in local zoning and permitting decisions and can provide important input for local zoning board decisions. Local officials should also be aware of any efforts at the state level to preempt local regulation of fracking and related activity.

The lack of regulation, information, and enforcement of existing regulations are much broader than just fracking. In practice, there are many loopholes in federal and state regulations that can place drinking water supplies in jeopardy. For example, while federal law empowers the EPA to regulate underground storage tanks, there are no similar provisions for above-ground storage tanks. The January 2014 West Virginia chemical spill that contaminated the drinking water for 300,000 people is an example of the limits of federal regulatory authority combined with lax state oversight leading to a drinking water crisis.

Managing an Acute Drinking Water Crisis: The West Virginia Chemical Spill

On January 9, 2014, an estimated 10,000 gallons of an industrial chemical used for washing coal, 4-Methylcyclohexanemethanol (MCHM), spilled into the Elk River, just 1.5 miles upstream from the Kanawha County municipal water intake in Charleston, West Virginia. This municipal water system serves nearly 580,000 people. The spill affected drinking water for 300,000 people.[47] Public health officials, left guessing due to the lack of MCHM information, scrambled to assess the potential for harm among exposed residents.[48] This case presents an instructive example of the informational challenges public health officials can encounter when responding to an acute drinking water contamination event.

Background

Every year since 2008, Freedom Industries, Inc. reported its storage of up to 1 million pounds of Crude MCHM at its Elk River facility to West Virginia Division of Homeland Security and Emergency Management, the state Department of Military Affairs and Public Safety and local officials according to the Emergency Planning and Community Right to Know Act (EPCRA). The EPCRA filings were forwarded to the State Emergency Response Commission to assist in emergency planning. Freedom was required to file chemical inventory reports for chemicals for which OSHA requires employers to keep a Material Safety Data Sheet (MSDS) on hand—MCHM among them. However, MCHM does not belong to a smaller set of chemicals classified for purposes of EPCRA as "extremely hazardous," that require emergency planning. As a result, after Freedom Industries reported its inventory of chemicals, the inventory list was filed pursuant to EPCRA, but Freedom Industries never followed-up by filing an emergency management plan for those hazards as the law did not require them to do so.

However, MCHM's absence from the Extremely Hazardous Substance list does not place it beyond the reach of regulation. State and federal law both give state governors the authority to add facilities to the emergency-planning list. State and local officials should already have been aware of the Freedom Industries facility's potential to contaminate the drinking water source via source water assessments that were mandated by 1996 amendments to the federal Safe Drinking Water Act (SDWA). The SDWA directs states to map watersheds that supply drinking water, identify potential contamination threats near drinking water intakes and provide this information to water utilities and the public. They do not mandate any further action; the EPA merely "suggests" measures such as creating protection plans. West Virginia hired contractors to conduct the required assessments between 2001 and 2003; the Kanawha Valley system was completed in 2002 but has not been updated since and the report does not list specific contamination sources.

The EPA generally does not regulate aboveground storage tanks, though facilities with permits to discharge chemicals into water are required to have spill prevention plans for those chemicals. Freedom Industries had only a

ELK RIVER SPILL TIMELINE

- January 9, 2014 - Chemicals leak from a storage tank into the Elk River. The initial MCHM volume estimate is 2,000 to 5,000 gallons.
    1. 8:15 am - Citizens complain of a black licorice odor.
    2. 10:30 am – Freedom Industries, Inc. employees discover leak.
    3. 11:15 am – State officials find crude MCHM tank leaking at the Freedom Industries facility.
    4. 5:00 pm - Governor Earl Ray Tomblin declares a State of Emergency, and the local water company, West Virginia American Water (WVAW), issues a "Do Not Use" order for nine counties.
- January 10, 2014 – Sampling Begins: Initial water testing shows 1.04-3.25 ppm MCHM at the WVAW intake on the Elk River and 1.02 to 1.56 MCHM in treated drinking water. The Centers for Disease Control (CDC) declares that 1 ppm in drinking water is "unlikely to be associated with adverse health effects."
- January 11, 2014 – Spill estimate is revised upward to 7,500 gallons.
- January 13, 2014 - WVAW begins lifting their "Do Not Use" order and instructs some households to flush their pipes.
- January 18, 2014 – "Do Not Use" order is lifted for all residents.[49]
- January 21, 2014 - Freedom Industries reports that a second chemical, a thinner for MCHM containing propylene glycol phenyl ether (PPh) and di-propylene glycol phenyl ether (diPPh) was also released from the tank in the spill.
- January 23, 2014 – Water testing begins for PPh and diPPh. All samples fall below the CDC's 1.2 ppm screening limit.
- January 27, 2014 – Freedom Industries revises spill estimate to 10,000 gallons of crude MCHM/PPh blend.
- February 05, 2014 - CDC gives all clear for everyone to resume using public water supplies, including pregnant women.[50]

permit to discharge storm runoff into the Elk River; the permit did not allow the company to discharge chemicals. The West Virginia Department of the Environment (DEP) never exercised its existing authority to inspect the Freedom Industries site under the company's state-issued storm water runoff permit.

Local emergency officials charged by law with chemical accident planning did not appear prepared for this type of incident, despite warnings that toxic chemicals were being stored near the drinking water intake serving the Kanawha Valley and surrounding region. The U.S. Chemical Safety Board urged the state to help the Kanawha Valley create a new chemical accident prevention program, after its extensive investigation of an August 2008 explosion and fire that killed two workers at the Bayer CropScience plant in Institute, West Virginia. The state Department of Health and Human Resources (DHHR) has not submitted a response to the Chemical Safety Board regarding the recommendation, and never provided the Kanawha-Charleston Health Department with the legal authority to start the program.[51]

The Response and Aftermath

After the leak, the DEP acknowledged air quality inspectors had visited the Elk River spill site many times in the last twenty years, but the inspectors never examined the tanks.[52]

Officials knew the smell of MCHM and little else, such as possible carcinogenic effects, specific organ toxicity, mutagenic effects, developmental toxicity, nor the bioaccumulation potential. The Centers for Disease Control and Prevention/Agency for Toxic Substances and Disease Registry (CDC/ATSDR), a federal public health agency, provides assistance to local and state authorities concerning chemical risks. They developed a short-term screening level for MCHM which was approved by a federal interagency workgroup and recommended a screening level of 1 ppm for drinking water as "not likely to be associated with any adverse health effects."

Between April 8 and 10, 2014, officials from DHHR's Bureau for Public Health, the CDC and volunteers from the WVU School of Public Health conducted a Community Assessment for Public Health Emergency Response (CASPER) in a door-to-door format to gather information on the household level about public health concerns in neighborhoods affected by the spill.[53] In an effort to ease public distrust, Governor

Tomblin directed the WVBPH, in partnership with local and state health officials, to conduct an in-home testing project, West Virginia Testing Assessment Project (WVTAP) for residences in the affected nine-county area.[54] The initial assessment for testing water at the tap in homes included different types of plumbing material found in homes, followed by an analysis to determine the odor threshold for MCHM (at what ppm level can you smell MCHM in water). WVTAP then established an independent panel of experts to evaluate the safety factor for MCHM.

The disruption of drinking water had a significant economic impact. In April 2014, FEMA approved Governor Tomblin's request to allow first responders, public agencies in the nine affected counties (including public health departments), and certain nonprofit groups to apply for grants to recoup costs incurred during the chemical spill. As a result, 35 entities in five counties were awarded reimbursements totaling $1.4 million. In addition, the West Virginia National Guard was awarded more than $420,000. These expenses only account for direct costs to respond to the emergency and do not include larger costs such as lost wages, lost profits and loss of business transactions due to business closures.[55]

In an ongoing federal prosecution, the Department of Justice charged Freedom Industries and six of its owners, managers and employees with criminal violations of the Clean Water Act related to the chemical leak.

Legislation

Legislation expanding regulation of above-ground chemical storage tanks and enacting stronger emergency preparedness took center stage in the weeks following the Freedom Industries chemical spill. West Virginia enacted Senate Bill 373 (2014), also referred to as the "spill bill," which establishes annual inspections of aboveground chemical storage tanks, requires water utilities to create source-water protection plans that include information about nearby hazards, and requires utilities to develop emergency response plans. The law also directs the state Bureau for Public Health to pursue ways to conduct health monitoring over time for those affected by the spill.[56] A state survey found 50 tanks near waterways that should not have been in service and therefore were drained. Unfortunately, less than a year later, in March 2015, the West Virginia legislature passed a bill rolling back many of the provisions in the "spill bill," reducing the number of regulated above-ground storage tanks from 49,000 to 13,000. That number could be reduced further due to a provision that allows tank owners to opt out of the regulations if they are regulated by a different permit system. For those tanks that remain, inspections are reduced from every year to every three years.[57]

Recommendations

The need for public health officials to step in when state and local emergency planning officials cannot or will not act upon information regarding a threat to drinking water quality is especially great in states like West Virginia, where there is no online database for the public to access facilities' EPCRA filings.

Instead, citizens must use a Freedom of Information Act request to access the records on paper. Public health officials can aid citizens with their "right to know" about threats to drinking water and help obtain information. In addition, public health officials can explain seemingly contradictory information, such as the "Do Not Use" order that first applied to all citizens, then only to pregnant women and then lifted for all citizens. The confusion caused by the unexplained order created public distrust, as citizens questioned why the state was advising pregnant women against water deemed to be "safe" for others. This damaging overabundance of caution is explained by the paucity of data—available studies were few, and none had human subjects. Public health officials could also:

- Conduct emergency preparedness exercises with local water utilities
- Identify hazards upstream
- Gather toxicity data on chemicals used and stored in the watershed and interpret and disseminate this information to citizen groups
- Advocate for government and private sector research

Concerned public health officials can partner with citizen groups to help identify risks, such as chemical storage tanks near drinking water sources, and work with state and local officials to address these threats.

CONCLUSION: A Public Health Action Plan to Protect Drinking Water

A. RESEARCH

- Know your water supplier and obtain their Consumer Confidence Reports. The EPA maintains a database of local water quality reports by state as well as a list of public water systems that can be accessed here.
- Assess the source of local drinking water. To obtain copies of source water assessments in your area, contact your state's Source Water Assessment Program administrator or EPA Regional contact found here.
- Understand source water assessments.
- Review your state's biennial assessment. Sources of information for surface water assessments include each state's biennial water quality assessment and impairment reports (§§305(b) and 303(b) reports).
- Review EPA data on WATERS. The EPA has also gathered several different data sources for its Watershed Assessment, Tracking and Environmental Results System (WATERS) and several tools, including a mapping function to assist in analyzing water quality information.
- Learn about fracking fluid. The most complete information concerning fracking fluid and its chemical constituents is the FracFocus website.

- Reference water quality standards and contaminants, regulated and unregulated, and the levels regulators deem safe. Each state develops effluent limits generally based on the federal water quality criteria for more than 150 pollutants which can be found here.
- Know the regulated contaminants. A current list of regulated contaminants and federal standards under the SDWA can be found here.
- Know the contaminants with cosmetic effects. The levels for 15 common contaminants that can have these cosmetic effects on drinking water are provided as guidelines for public water systems that can be found here.
- Track the CCL-4. The current, draft fourth CCL which lists contaminants that are not yet regulated under the SDWA can be found here.

B. ENGAGE

- Find local public interest groups working on water quality issues. The River Network provides an interactive database of non-profits working on water quality issues.
- National organizations involved in protecting water quality can be found here.
- Contact state officials in charge of enforcement and operators of regulated entities and ask questions:
  - o EPA regional coordinators of water quality standards.
  - o State contacts concerning NPDES permitting.
  - o State Emergency Response Commissions contacts are listed here. The Governor of each state has a designated State Emergency Response Commission (SERC) that is responsible for implementing EPCRA provisions within its state. To find the SERC contacts in a particular state, click on the state name.
  - o State Tier II Hazardous Chemical Reporting Requirements and Procedures. To obtain Tier II reporting procedures and requirements for your state, please click on the state name where the reporting facility is located.
- Engage your community; educate them on the quality of their drinking water and threats to it. Public Health officials are trusted and respected by the community at large—get the word out regarding threats and solutions to local drinking water problems which can mobilize citizen action and pressure government officials.
- Identify interested researchers who may have funding to conduct testing in critical areas, particularly of private wells in vulnerable communities. A database of federal funding sources for watershed protection can be found here.

- Track funding opportunities to secure testing and other resources from governmental or philanthropic sources. Funding for projects under the SDWA can be found here.

C. ADVOCATE

- Contact state officials; find out how the state publishes regulatory decisions and public comment periods for permits and rules. Inform these important state regulatory processes by providing comments.
- Provide expert testimony for implementing state laws that are more protective of drinking water than existing federal baselines.
- Support citizen groups focused on water quality issues. Public health officials' expertise can be useful to citizen groups and their efforts to improve water quality. However, government health officials must be cautious with involvement in citizen suits.

The Association of State Drinking Water Administrators has developed, through the Source Water Collaborative, a "Call to Action" and a "Call to Action Resource Document" which can be found here highlighting advocacy goals to improve drinking water quality and provide an array of additional resources to that end.

NOTES

1. Charles Duhigg, *Clean Water Laws Neglected, at a Cost in Suffering*, N.Y. Times (Sept. 12, 2009) http://www.nytimes.com/2009/09/13/us/13water.html?pagewanted=all&_r=1&

2. *Id.*

3. *Public Water Systems*, Centers for Disease Control and Prevention (Apr. 7, 2014) http://www.cdc.gov/healthywater/drinking/public/ (explaining that while ground water wells supply 78% of community systems, the larger, urban public water systems are typically supplied by surface water).

4. Gina McCarthy, EPA Administrator, Remarks Celebrating the 40th Anniversary of the Safe Drinking Water Act (Dec. 9, 2014) http://yosemite.epa.gov/opa/admpress.nsf/8d49f7ad4bbcf4ef852573590040b7f6/21a0a07494e97f3985257da9006ad9d0!OpenDocument

5. Mary Tiemann, Cong. Research Serv., RL31243, Safe Drinking Water Act: A Summary of the Act and Its Major Requirements 4 (2014) https://www.fas.org/sgp/crs/misc/RL31243.pdf; *Public Drinking Water Systems Programs*, Environmental Protection Agency (Apr. 15, 2015) http://water.epa.gov/infrastructure/drinkingwater/pws/index.cfm

6. One area of enforcement over which the EPA maintains direct oversight is the issuance of *variances* and exemptions. 42 U.S.C. § 300g-4 authorizes states to grant a public water system variances if the system cannot achieve MCL using EPA published Treatment Techniques, it is a "small system" (serving fewer than 3,300 people) and there are no affordable compliance technologies. In such instances the EPA must publish a "variance technology" small systems can employ. To date, the EPA has found that there are affordable compliance technologies for small systems for all regulated contaminants and therefore no need for variances. 42 U.S.C. § 300g-5 authorizes states to grant public water systems temporary *exemptions* if a system cannot comply for compelling reasons, including cost, provided the exemption does not create an unreasonable health risk. A public water system may receive an exemption for up to three years and systems serving fewer than 3,300 people may receive up to three additional two-year extensions. In order to grant an exemption, a state must hold a public hearing, take public comments and ultimately determine that an exemption does not pose "an unreasonable risk to health." Because this process is complicated, time consuming, must be done for every system, and the implied message is terrible—the state cannot afford to provide certain communities with clean water—exemptions have rarely been used.

7. States must provide EPA reports regarding a variety of public water system administration information on either a quarterly or annual basis, including: violations, enforcement actions, variances and exemptions, new public water systems, special monitoring and reporting requirements for particular public water systems, inspection reports and monitoring data according to the requirements in 40 C.F.R. §142.15.

8. Under this program created by the SDWA 1996 amendments, states should have completed all assessments by 2005. As some of these assessments were created a decade ago, some information, such as contamination sources, may need updating. Office of Inspector General, 2005-P-00013, *Source Water Protection and Assessment Programs Show Initial Promise, But Obstacles Remain* (2005) http://www.epa.gov/oig/reports/2005/20050328-2005-P-00013.pdf

9. The EPA database contains some CCRs, particularly for larger public water systems. Many of the smaller systems do not provide the report to the EPA and more still do not maintain the links provided to the EPA to access the report. The EPA database does list all of the public water systems required to provide a CCR and provides contact information to request a CCR.

10. See 40 CFR §144 (describing federal rules governing underground injection).

11. Betsy Devlin, EPA Office of Enforcement and Compliance Assurance, *Protecting Drinking Water Quality Through the Clean Water Act and the Safe Drinking Water Act* at the Fourth International Conference on Environmental Compliance and Enforcement (April 1996) http://www.inece.org/4thvol2/devlin.pdf

12. *See* Michael Olexa & Sean Crisafulli, Handbook of Florida Regulation: Safe Drinking Water Act, EDIS document FE587, Food and Resource Economics Department, UF/IFAS Extension, Gainesville, FL (2015), available at http://edis.ifas.ufl.edu/fe587; Charles Duhigg, *Clean Water Laws Neglected, at a Cost in Suffering*, N.Y. Times (Sept. 12, 2009) http://www.nytimes.com/2009/09/13/us/13water.html?pagewanted=all&_r=1&

13. Tellingly, on the EPA's webpage for "Safe Drinking Water Act Enforcement," the only link is "Compliance Monitoring and Assistance." http://www2.epa.gov/enforcement/water-enforcement#drinkingwater

14. Press Release, U.S. EPA, EPA Survey Shows $384 Billion Needed for Drinking Water Infrastructure by 2030 (June 4, 2013) on file at http://yosemite.epa.gov/opa/admpress.nsf/0/F72C2FDC7D61F92085257B800057655F

15. 33 U.S.C. §1251(a).

16. *Water Sources,* Centers for Disease Control and Prevention (Apr. 10, 2009) http://www.cdc.gov/healthywater/drinking/public/water_sources.html.

17. 33 USC § 1362(14) ("[A]ny discernible, confined and discrete conveyance, including […] any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged").

18. 40 C.F.R. § 122.3.

19. Currently, Washington DC, New Hampshire, New Mexico, Massachusetts, and Idaho do not have authority to issue permits. In these states, EPA remains the NPDES permitting authority and permits are issued by EPA regional officials. EPA can withdraw state permitting authority if the state fails to follow EPA guidelines, though EPA has never done so. *State NPDES Program Authority*, U.S. EPA (Apr. 7, 2015) http://water.epa.gov/polwaste/npdes/basics/upload/State_NPDES_Prog_Auth.pdf

20. *National Rivers and Streams Assessment 2008-09: A Collaborative Survey*, EPA 841-F-13-004, U.S. EPA (Feb. 2013). *See also* Robert Percival, *Environmental Regulation: Law, Science and Policy*, (Aspen Publishers 7th ed. 2013) at 793-94; Chesapeake Bay Total Maximum Daily Load for Nitrogen, Phosphorus and Sediment, U.S. EPA Region 3 (Dec. 29, 2010) at 4-29.

21. *Our Lake Erie Water,* Lake Erie Water Keeper (Oct. 23, 2014) http://www.lakeeriewaterkeeper.org/wp-content/uploads/2012/04/lew-cleve-conf-2014-bihn.pdf

22. J. Heisler et al., *Eutrophication and harmful algal blooms: A scientific consensus*, 8 Harmful Algae, 3-13 (2008) http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1169&context=usepapapers

23. *Ohio Lake Erie Task Force Final Report*, Ohio Environmental Protection Agency (April 2010) at 73 http://epa.ohio.gov/portals/35/lakeerie/ptaskforce/Task_Force_Final_Report_April_2010.pdf

24. *A Balanced Diet for Lake Erie: Reducing Phosphorus Loadings and Harmful Algal Blooms*, Report of the Lake Erie Ecosystem Priority, International Joint Commission (April 2012) http://www.ijc.org/files/publications/2014%20IJC%20LEEP%20REPORT.pdf

25. Kenneth Kilbert, Tiffany Tisler & M. Zach Hohl, *Legal Tools for Reducing Harmful Algal Blooms in Lake Erie* (University of Toledo College of Law, White Paper at ii, Apr. 2010) http://www.utoledo.edu/law/academics/ligl/habs/Legal_Tools_White_Paper.pdf

26. *Id.*

27. *Quality of Water from Domestic Wells in Principal Aquifers of the United States, 1991-2004*, Scientific Investigation Report 2008-5227, United States Geological Survey (USGS) (2009) available at http://pubs.usgs.gov/sir/2008/5227/includes/sir2008-5227.pdf (Relying on the EPA's Maximum Contaminant Levels and the USGS Health Based Screening Levels as the health based standards).

28. B.G. Blackburn et al., *Surveillance for waterborne-disease outbreaks associated with drinking water—United States, 2001–2002*, Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, Vol. 53, No. SS-8, p. 23–45 (2004).

29. *Methods for Evaluating Temporal Groundwater Quality Data and Results of Decadal-Scale Changes in Chloride, Dissolved Solids and Nitrate Concentrations in Groundwater in the United States, 1998-2010*, Scientific Investigative Report 2012-5049, United States Geological Survey (USGS) (2012) available at http://pubs.usgs.gov/sir/2012/5049/support/sir2012-5049.pdf

30. *Groundwater Quality Data Report: Monterey County Focus Area*, State Water Board GAMA Program, Domestic Well Project (2011) http://www.waterboards.ca.gov/gama/docs/mntryrpt.pdf

31. *See*, R. Jackson, *Increased stray gas abundance in a subset of drinking water wells near Marcellus shale gas extraction*,110 Proceedings of the Nat'l Acad. of Sciences 28 (July 9, 2013); S. Osborn, *Methane contamination of drinking water accompanying gas well drilling and hydraulic fracturing*, 108 Proceedings of the Nat'l Acad. of Sciences 20 (May 17, 2011); R.D. Vidic, *Impact of Shale Gas Development on Regional Water Quality*, 340 Science 1235009-1 (May 17, 2013).

32. *Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources* (External Review Draft), EPA/600/R-15/047c, U.S. EPA (June 2015) at ES-23.

33. *Id.* at ES-6.

34. Heather Cooley & Kristina Donnelly, *Hydraulic Fracturing and Water Resources: Separating the Frack from the Fiction*, Pacific Institute (June 2012) at 15-16 http://pacinst.org/publication/hydraulic-fracturing-and-water-resources-separating-the-frack-from-the-fiction/

35. *Final Impact Assessment of Natural Gas Production in the New York City Water Supply Watershed*, New York City Department of Environmental Protection, (Dec. 2009) at ES-2 http://www.nyc.gov/html/dep/pdf/natural_gas_drilling/12_23_2009_final_assessment_report.pdf

36. Under 42 U.S.C. §300(h)(d)(1)(B)(ii), the definition of "underground injection" excludes "the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities."

37. 33 U.S.C. §1362(24).

38. The industrial code for the oil and gas industry, SIC Code 13, is not included under the Toxic Chemical Release reporting requirements. 42 U.S.C. §11023(b)(1)(A).

39. 40 C.F.R. Part 264.221(a).

40. 43 C.F.R. Part 3160. Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands. Bureau of Land Management.

41. *Groundwater Protection and Shale Gas Development: Recommendations for Pennsylvania Law*, The Center for Public Health Practice at the Graduate School of Public Health University of Pittsburgh (2014) at 9.

42. *See* http://earthjustice.org/features/campaigns/fracking-across-the-united-states (describing interactive map with fracking accidents).

43. Matthew McFeeley, *Falling Through the Cracks: Public Information and the Patchwork of Hydraulic Fracturing Disclosure Laws*, 38 Vermont L. Rev. 849, 857-858 (2014).

44. *Id.*, at 859.

45. *Id.*, at 897.

46. *Groundwater Protection and Shale Gas Development: Recommendations for Pennsylvania Law*, The Center for Public Health Practice at the Graduate School of Public Health University of Pittsburgh (2014) at 13.

47. Emergency Preparedness and Response. *2014 West Virginia Chemical Release*. Centers for Disease Control and Prevention (Aug. 11, 2014) http://emergency.cdc.gov/chemical/MCHM/westvirginia2014/

48. John Manuel, *Crisis and Emergency Risk Communication: Lessons from the Elk River Spill*, 122.8. Environ. Health Prospective A214, A215 (2014).

49. In its "Do Not Use Order," WVAW relied upon the CDC conclusions that "(a)t this time, scientists continue to recommend 1 ppm as a protective level to prevent adverse health effects. However, due to limited availability of data, and out of an abundance of caution, you may wish to consider an alternative drinking water source for pregnant women until the chemical is at non-detectable levels in the water distribution system." DHHR issued a similar advisory to pregnant women. Updated Press Release, Do Not Drink/Limited Contact Notice Lifted for Buffalo, Frazier's Bottom and Pliny Customers, West Virginia American Water (Jan. 18, 2014).

50. *Adapted from* Rahul Gupta, Andrew Whelton, David Latif, and James Hoyer. *Multi-disciplinary Approach to the Development of Sound Scientific Support: The West Virginia Experience*. NACCHO Annual 2014: The New Era of Public Health (July 8-10, 2014) http://www.kchdwv.org/KCHD/media/KCHD-Media/PDF%20Files/2014-NACCHO-ClosingPlenaryFF.pdf

51. U.S. Chemical Safety Board. Bayer CropScience Pesticide Waste Tank Explosion Investigation. Recommendation 2008-08-I-WV-6 (2008).

52. Dave Boucher, Capitol Bureau Chief, *Website to offer details for public, owners of tanks on law crafted after chemical spill*. Charleston Newspapers (May 21, 2014).

53. Community Assessment for Public Health Emergency Response (CASPER) Toolkit: Second edition. Atlanta (GA): CDC (2012).

54. West Virginia Department of Homeland Security and Emergency Management. West Virginia Testing Assessment Project. Governor's Website (2015).

55. After the release, Freedom Industries Inc. filed for bankruptcy to protect its assets, because a bankruptcy filing halts most litigation—forcing would-be plaintiffs to vie with other creditors for a share of a company's assets. Nevertheless, a federal judge consolidated roughly 60 civil suits against Freedom Industries Inc. and West Virginia-American Water Co. Good v. Am. Water Works Co., No. CIV.A. 2:14-01374 (S.D.W. Va. June 3, 2014). In addition, on Sept. 16, 2014 U.S. Bankruptcy Judge Ronald Pearson approved a class action settlement to cover economic losses with $3 million of insurance coverage. *In re: Freedom Industries Inc*., No. 2:14-bk-20017 (Bankr. S.D. W. Va.R. 2015).

56. Dave Boucher, Capitol Bureau Chief, *Website to offer details for public, owners of tanks on law crafted after chemical spill*. Charleston Newspapers (May 21, 2014).

57. Associated Press, "State IDs faulty tanks; now tank law is being scaled back." May 2, 2015. Available at http://accesswdun.com/print/2015/5/307608