

Beyond Reported Casualties: Environmental and Health Impacts in the Wake of Natural Disasters

Hurricanes, tornadoes, and floods, capable of causing significant damage and loss of life over large geographic areas, are not uncommon in the U.S. However, long after the publicity from a catastrophic natural disaster dies down, the affected communities and those assisting with the recovery efforts continue to encounter potentially dangerous environmental conditions and suffer health issues due to pollution. Liquid fuels and chemicals can leak from ruptured containers and contaminate lakes, rivers, and groundwater. Damaged and destroyed buildings may contain asbestos and heavy metals. And the cleanup of debris, which can last months and even years, can generate a significant amount of dust, some of it laced with hazardous substances, which is dispersed into the air.

Tornadoes and hurricanes that hit populated areas can destroy man-made structures, triggering unhealthy air quality conditions. For example, in the aftermath of a catastrophic April 2011 Tuscaloosa, Alabama tornado outbreak, health clinics and hospitals reported a significant increase in the number of patients suffering from allergies and respiratory problems, as well as an increase in asthma complications in children. Most of the people treated lived in or near, or had been working in, areas affected by the tornadoes and, for the most part, their health problems were attributed to mold growing in the damp debris and elevated levels of atmospheric particles from demolition activities and debris removal.

According to EPA, the biggest natural disaster it ever handled was Hurricane Katrina, which ravaged the New Orleans area in late August 2005, generating 22 million tons of debris — enough to fill the Superdome 43 times — and tens of millions of tons of hazardous waste that had to be disposed of. The



U.S. Coast Guard and EPA reported that Katrina caused at least 575 spills of petroleum or hazardous chemicals, 11 of which released approximately seven million gallons of oil. In addition, household hazardous wastes, medical wastes, and sewage in the floodwaters contaminated groundwater across hundreds of miles. And, when floodwaters receded and areas dried out, wind and mechanical disturbance of debris and demolition materials generated dust containing heavy metals and other hazardous substances.

Victims of Hurricanes Katrina and Sandy, as well as police and first responders, experienced similar health issues in the aftermath of the storms, with many complaining of rashes, asthma, and persistent coughing. The misuse of generators to provide power and stoves to provide heat created an additional air quality danger with emergency rooms and poison control centers reporting numerous cases of carbon monoxide exposure; in New Jersey alone, several deaths were attributed to carbon monoxide poisoning.

The destruction caused by tornadoes and hurricanes can also trigger health effects due to subsequent

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FROM THE TRENCHES

Hoping for the Best, Prepared for the Worst, and Unsurprised by Anything Between

According to the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration, Texas led the nation in the number of hazardous materials (hazmat) incidents in 2013. On top of that, Texas had the second highest number of hazmat-related hospitalizations and the third highest total of incident-related damage costs in 2013 at \$6,153,474!

Perhaps these statistics are not unexpected given the state's size, but the consequences of the incidents are, in large part, a function of the level of planning and preparedness of emergency responders. When starting out, a responder learns many things: always observe scene safety, stay confident under pressure, and follow your instincts. One incident in my early years as a responder not only proved the old adage that "Proper Planning Prevents Poor Performance," but also changed my life forever.

In the summer of 2009, I had the honor of continuing my service with a volunteer, student-run emergency medical service (EMS) organization at Texas A&M University as the immediate past president and was excited to be a part of a joint hazmat exercise for the campus and surrounding city responders. The exercise went well, and we all were worn out by the time the mid-day conclusion came, having worked hard since well before sun up to stay ahead of the heat and forecasted showers. Little did we know that our education for that day had only begun and many more hours would pass before anyone would be heading home.

As the post-exercise briefing began, many of the responders began receiving calls and pages and hurried out into the hallway — not a surprising turn of events as the real world seldom allows training to continue uninterrupted. Everything changed, however, when we heard the radios of more responders go off and city hazmat teams abruptly left the building. At that moment our hazmat exercise got traded in for the real thing — an ammonium nitrate fertilizer storage facility in Bryan, Texas had caught on fire and soon we would all need to use our training to its fullest extent, including training I almost didn't take.

Prior to this incident, I had volunteered to develop a continuing education course on hazardous materials for our organization's members, but our advisor shot down the idea, reminding me that if there were a true hazmat incident the city's teams would respond. I followed my instincts and prepared myself anyway, taking free training to learn more about hazardous materials and their effects and how to be better prepared as an emergency medical technician should a hazmat incident ever happen. Little did I know that on the afternoon of July 30, 2009 my instincts would prove correct. When the decision was made by city officials to evacuate almost



Photo credit: Eagle file/Stuart Villanueva

the entire City of Bryan (approximately 70,000 people), nearly 800 of the evacuees would be under the care of my organization as we staffed a shelter at Texas A&M's Reed Arena.

My first step was to assume temporary command of our staff, given that our current president was not immediately available. I then worked to mobilize our volunteers and recall the organization's leadership for staffing. I pulled an Emergency Response Guide from our office shelves and immediately began flipping through the pages to determine the hazards and relevant information. Then I called the current president and briefed him on what was happening. He immediately approved my continued service in command and advised me that he would be delayed coming in to assist, as he was part of the evacuating population. Using my training and information about the event, I was able to more accurately relay information and coordinate with our safety officer to ensure that any volunteers reporting for duty would not be in harm's way when traveling.

Within a few minutes of opening the shelter, people from the hardest hit areas began to arrive, many experiencing difficulty breathing, emotional distress, and other concerns. Because we were adequately trained, we were able to provide them with appropriate care, including respiratory support, medical treatment, and decontamination for treatment of skin irritation.

Without my hazardous materials training and the assistance of the staff I worked with, things could have gone much differently. I will never forget the lesson we learned that day — to quote Maya Angelou, we were "hoping for the best, prepared for the worst, and unsurprised by anything in between." ✨

Linda Salzar

Staff Scientist / HazMat Academy Instructor

AN ATTORNEY'S PERSPECTIVE

The General Duty Clause — A Significant and Troubling Requirement

Complying with air quality laws usually entails number crunching or examination of readily identifiable work practice standards or equipment specifications. There is, however, a significant additional requirement for which determining applicability and what must be done for compliance is neither objective nor clear.

The federal Clean Air Act General Duty Clause (the Clause) is contained in a portion of the Act that addresses prevention of accidental releases, including the Risk Management Program (RMP). The Clause imposes on owners and operators of *all* stationary sources (not just those subject to the RMP) producing, processing, handling, or storing extremely hazardous substances a general duty to: (1) identify hazards that may result from releases, (2) design and maintain a safe facility taking necessary steps to prevent releases, and (3) minimize the consequences of accidental releases that do occur. EPA asserts that a violation of the Clause can occur even if there has not been an actual release and suggests that it may freely investigate facilities for those types of violations.

Identifying whether a source is subject to the Clause is not easy. The Act does not list what are “extremely hazardous substances,” and EPA’s guidance explains that the term is not limited to substances listed under the RMP program, but also includes *any* substance that “. . . may as the result of short-term exposures associated with releases to the air cause death, injury, or property damage due to its toxicity, reactivity, flammability, volatility or corrosivity.”

The Clause’s focus is prevention of accidental releases — the “unanticipated” emission of an extremely hazardous substance. In its guidance, EPA notes that the legislative history indicates that an accidental release is one which “causes or may cause immediate (or near term) death, serious injury or property damage” due to exposure over “limited periods of time” and not chronic exposures over a long period of time. EPA guidance explains that releases authorized by permit or subject to a limitation or standard under federal law are not “accidental releases,” nor are releases that are planned control measures to prevent catastrophic events during a process upset.

To determine compliance, EPA examines whether the owner or operator has identified hazards that may result from “accidental releases,” designed and maintained a “safe” facility, and provided for the minimization of the consequences of a release, ***taking into consideration existing industry standards and practices and state and federal regulations.***



EPA has frequently enforced the Clause against oil and gas (O&G) production operations, using infrared cameras to identify “leaks” from production wells such as broken seals and stuck hatches. EPA then asserts that the leaking emissions include methane, “a highly flammable and/or explosive substance,” and issues an Administrative Compliance Order alleging violation of the Clause. The order directs that the leaking components be fixed, repaired, or replaced and EPA advises the company that additional enforcement action may be taken. Additional examples of O&G sector enforcement are the issuance of orders and penalties because lighting strikes caused fiberglass storage tanks to be thrown into the air to distances that could reach off-property structures.

What should those operating stationary sources do to address the Clause? First, they should determine whether they have extremely hazardous substances (being mindful that the term is broad and nonspecific) and, if so, they should consider evaluating the potential for accidental releases and whether those releases could result in off-property damages given the surrounding land use. They should then consider steps to minimize the potential for accidental releases, paying particular attention to fire, construction and building codes, trade association and other non-governmental and governmental guidance, and industry practices regarding the safe construction and operation of those sources. EPA enforcement personnel look to those types of codes and guidance as factors in determining violations of the Clause. Finally, to maintain compliance, operators should consider monitoring for changes in the surrounding land use and changes in standards and guidance for safe design and operating practices.

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News Briefs

national news

EPA Releases Proposed Greenhouse Gas Emissions Rules for Existing Power Plants

On June 2, the Environmental Protection Agency (EPA) issued proposed rules to control carbon emissions from power plants. These rules would establish state-wide limits on carbon intensity to reduce greenhouse gas (GHG) emissions from the nation's power sector by 30 percent in 2030, compared to 2005 levels. Limits for individual states would vary depending on the state's potential for renewable energy deployment, projected demand-side management savings, and the capacity factors at existing natural gas combined cycle units. For more information, contact Bob Breeze at 512.879.3671 or bbreeze@zephyrenv.com.

Supreme Court Strikes Down GHG Tailoring, Upholds GHG BACT

On June 23, the Supreme Court ruled that EPA has no authority to require Prevention of Significant Deterioration (PSD) and Title V air quality permits because of GHG emissions. However, the Court held that EPA can require best available control technology (BACT) for GHG emissions in PSD permits for criteria pollutant emissions. The immediate impact of the decision is minimal because the vast majority of PSD permits and associated GHG BACT are required because of criteria pollutant emissions. Inclusion of GHG BACT requirements in PSD permits for criteria pollutant emissions will continue without change. The Court's decision does not presently impact any other major GHG emission rules, such as EPA's plan to regulate GHG emissions from existing power plants. For more information, contact David Mahler at 410.312.7909 or dmahler@zephyrenv.com.

Court Sides with EPA in SO₂/NO₂ Secondary Air Quality Standard Case

On June 9, the D.C. Circuit Court of Appeals upheld EPA's decision to retain the secondary national ambient air quality standards (NAAQS) for nitrogen dioxide and sulfur dioxide, denying environmentalists' claims that EPA should establish a novel joint NO_x-SO_x air standard to prevent degradation of wildlife due to acid deposition. In making the ruling, the Court agreed that EPA did not have adequate scientific or technical basis for developing a multi-pollutant standard, once again

demonstrating its deference to EPA on scientific judgments. For more information, contact Lucy Fraiser at 512.879.6652 or lfraiser@zephyrenv.com.

OSHA Standard Revised to Improve Worker Safety in Electric Power Sector

On July 10, revised OSHA standards for the operation and maintenance of electric power generation and transmission equipment, and power distribution lines went into effect. Included in the changes, which have compliance deadlines of April 1, 2015, are new or revised requirements for fall protection, minimum approach distances, arc-flash protection, and exchange of safety information between host employers and contract employers. The changes also address electric protective equipment and remove the requirement for employees to wear protective footwear as protection against electric shock. For more information, contact Molly McKenna at 512.579.3837 or mmckenna@zephyrenv.com.

Court Vacates EPA Aggregation Guidance

For years, EPA interpreted "adjacent" to include a consideration of the functional interrelatedness of multiple emission units, in addition to their physical separation, in determining whether they should be aggregated in making source determinations in federal air quality permitting. However, on August 7, 2012, the 6th U.S. Circuit Court of Appeals overturned this approach, ruling that "adjacent" meant physically adjacent. In response, EPA issued formal guidance stating that the court decision would be applied only in areas under the jurisdiction of the 6th Circuit (i.e., Michigan, Ohio, Tennessee, and Kentucky). On May 30, the D.C. Circuit Court of Appeals vacated EPA's formal guidance limiting the application of the prior court decision, holding that it was "plainly contrary to EPA's own regulations, which require EPA to maintain national uniformity in measures implementing" the Clean Air Act. For more information, contact Thomas Sullivan at 512.879.6632 or tsullivan@zephyrenv.com.

EPA Revises Refinery Air Emissions Standards

On June 30, EPA revised its refinery maximum achievable control technology (MACT) standards Subparts CC and UUU and new source performance standards

(NSPS) Subparts J and Ja to include 1) requirements for fence-line monitoring for benzene, 2) requirements for additional controls of storage tank emissions (revised definition of a Group I tank), 3) revised requirements for flare pilots and flare emissions visibility testing, 4) new requirements for delayed coking units based on work practice standards instead of emission limits, and 5) technical corrections and clarifications raised by industry. For more information, contact Ed Fiesinger at 281.668.7353 or efiesinger@zephyrenv.com.

Conservation Plan for American Burying Beetle Approved

On May 21, the U.S. Fish and Wildlife Service approved an industry plan that streamlines the Endangered Species permitting process for oil and gas activities in potential Oklahoma habitat of the American burying beetle. The plan allows for take that is incidental to oil and gas exploration and the construction, operation, maintenance, repair, and decommissioning of pipelines and related well field activities and will cover construction activities for two years and operations and maintenance activities for 20 years in 45 Oklahoma counties. For more information, contact Clay V. Fischer at 512.879.6629 or cfischer@zephyrenv.com.

EPA Considers Fracturing Chemicals Disclosure Rules

On May 21, EPA announced proposed rulemaking and sought public comment on information that should be reported about hydraulic fracturing chemical substances and mixtures as well as the mechanism for obtaining this information. EPA is specifically requesting input on regulatory and voluntary mechanisms for obtaining information, including alternatives, rationales, benefits, and technological and economic feasibility for disclosure. Comments are due August 18, 2014. For more information, contact Betty Moore at 512.879.6622 or bmoore@zephyrenv.com.

Supreme Court Upholds EPA's Cross State Air Rule

In 2011, EPA issued the Cross State Air Pollution Rule (CSAPR), which required 27 upwind states to reduce emissions such that they would not contribute significantly to downwind non-attainment of the NAAQS. In conjunction with the rule promulgation, EPA issued federal plans for implementing this rule (FIPs) for each upwind state, stating that their state implementation plans (SIPs) were not adequate. Shortly after rule promulgation and FIP issuance, the D.C. Circuit Court of Appeals found that the issuance of FIPs was inappropriate because states did not have a defined standard upon which to comply prior to the issuance of CSAPR. On April 29, 2014, the Supreme Court overturned the previous lower court opinion that the EPA had exceeded its authority in promulgating CSAPR and issuing FIPs, effectively reinstating the rule and declaring EPA's issuance of the FIPs to be valid. Moving forward, states may still challenge CSAPR emissions budgets if they determine the budgets would result in more reductions than are necessary to bring downwind

states into attainment. For more information, contact Eric Quiat at 512.579.3823 or equiat@zephyrenv.com.

EPA Issues Power-Plant Cooling Water Rule Involving Endangered Species Act Reviews

On May 20, EPA issued a rule under the Clean Water Act (CWA) to minimize adverse environmental impacts due to impingement and entrainment of aquatic life at cooling water intake structures (CIWS). Applying to power plants and other large facilities withdrawing more than two million gallons per day and using at least 25 percent of this water for cooling, the rule requires that location, design, construction, and capacity of CWIS and "best technology available" controls be addressed in National Pollution Discharge Elimination System (NPDES) permits for facilities. Responding to concerns by the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS) about the rule's adequacy to protect threatened and endangered species under the Endangered Species Act, the final rule requires that a state drafting an NPDES permit for a facility's cooling-water intake structure send a copy of the draft permit to FWS and/or NMFS for recommendations before finalizing the permit, and that the facility implement any recommendations in order to be in compliance with the CWA. For more information, contact Mike Horvath at 512.579.3803 or mhorvath@zephyrenv.com.

Court Upholds Fine Particle Air Standard

In May, the D.C. Circuit Court of Appeals rejected industry's challenge to EPA's lowering of the annual NAAQS for fine particulate matter (PM_{2.5}) from 15.0 to 12.0 µg/m³. In finding for EPA, the Court stated that industry petitioners "simply have not identified any way in which EPA jumped the rails of reasonableness in examining the science" that led to the revision. In addition, industry had challenged EPA's new requirement that states locate ambient PM_{2.5} monitors near heavy trafficked roads in large metropolitan areas. However, the Court agreed with EPA that such monitoring protects populations exposed to PM_{2.5} in those areas. The Court also rejected an industry challenge to EPA's elimination of spatial averaging provisions for ambient PM_{2.5} monitoring measurements that, according to EPA, would allow some portions of a compliance area, where sensitive individuals may reside, to exceed the PM_{2.5} NAAQS for some periods of time. For more information, contact Lou Corio at 410.312.7912 or lcorio@zephyrenv.com.

EPA Revises Guidance for Modeling Secondarily Formed Fine Particles in Air Quality Impact Assessments

On May 21, EPA revised its guidance for modeling in NAAQS and PSD air quality assessments the effects of primarily-formed PM_{2.5} as well as PM_{2.5} formed secondarily from precursors (NO_x

and SO₂). The assessment approach varies depending on levels of direct PM_{2.5} and NO_x/SO₂ emissions and includes qualitative, hybrid qualitative/quantitative, and full quantitative photochemical grid modeling (see April 2003 issue of *Currents* for discussion of draft guidance proposal). The guidance also revises one of EPA's options for demonstrating PM_{2.5} NAAQS compliance by providing a new methodology for calculating representative background concentrations. For more information, contact Sid Bhardwaj at 512.879.6648 or kbhardwaj@zephyrenv.com.

state news

TCEQ to Draft Expedited Air Permitting Rule

On May 14, the Texas Commission on Environmental Quality (TCEQ) proposed rulemaking that would implement the expedited air quality permitting process enacted into law in 2013. Previously, permitting was only expedited through internal review practices. The proposed rule, however, would allow the TCEQ to use overtime or contract labor to expedite reviews and add a surcharge to cover expenses incurred by the expediting process. Applicants requesting the expedited process would be required to demonstrate that issuance of the permit would benefit the state or local economy. The anticipated adoption date of the proposed rule is October 22. For more information, contact Carrie Bochenek at 512.879.6631 or cbochenek@zephyrenv.com.

EPA and TCEQ Reach Agreement Regarding Wastewater Permitting of Thermal Discharges

On May 12, EPA and the TCEQ reached an agreement regarding interim and long-term strategies for the issuance of TPDES permits that included thermal discharge limitations. Accordingly, EPA will no longer object to the issuance of permits with temperature issues. For more information, contact Dave Sorrells at 512.879.6626 or dsorrells@zephyrenv.com.

New Chesapeake Bay Pollution Agreement Signed

On June 16, governors and officials from six states, the District of Columbia, and EPA signed the latest voluntary agreement on reducing pollution in the Chesapeake Bay, the nation's largest estuary. Among other factors the agreement sets goals to address nutrient and sediment pollution loads, sustainable fisheries, reduction of toxic contaminants, and climate change. The agreement is more extensive than previous agreements through the inclusion of measurable goals, more transparency, and a mechanism for changing the agreement if evidence warrants change. All practices would need to be in place to meet the federal pollution standards by 2025. Environmental groups, although generally satisfied with the agreement, claim that it lacks accountability, with no real enforceable terms. For more information, contact Lou Corio at 410.312.7912 or lcorio@zephyrenv.com.

West Virginia Launches Comprehensive Storage Tank and Drinking Water Protection Law

In response to a chemical spill from a storage tank that contaminated drinking water in nine West Virginia counties in January, the state legislature passed into law a bill requiring that storage tanks with greater than 1,320 gallons capacity be registered by October 1 and inspected annually by a qualified inspector. In addition, operators must submit storage tank spill response plans for approval by the West Virginia Department of Environmental Protection by December 3. For more information, contact David Mahler at 410.312.7909 or dmahler@zephyrenv.com.

EPA Investigates Facilities for EPCRA Violations

Passed in the 1980's following the chemical disaster in Bhopal, India, Sections 311 and 312 of the Emergency Planning and Community Right-to-Know Act (EPCRA) require facilities to report inventories of listed chemicals above a certain amount to local officials. In light of the recent explosion at a West, Texas fertilizer plant and a chemical spill into the Elk River in Charleston, West Virginia, EPA Region 2 recently investigated numerous facilities in New York and New Jersey for compliance with the EPCRA reporting requirements. Some industry observers believe that this particular effort could spread to other EPA regions as EPA increases its focus on facility safety. For more information, contact Ed Fiesinger at 281.668.7353 or efiesinger@zephyrenv.com. ✨

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It is important to remember that although a release is not necessary for the Clause to be violated, it is also true that a release, even one that results in off-property damage, does not, by itself, constitute a violation. If the company has designed and maintained a safe facility, including measures to minimize the potential for and the consequences of a release, it has satisfied the Clause. ✨

James Braddock
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long-term exposures to toxic materials used in construction. For example, nearly 80 million homes in the U.S. were built and painted before lead was banned in paint in 1978, and EPA estimates that tens of millions of buildings constructed before the 1980s still contain asbestos. These substances can be deposited on the soil and entrained in the air in the aftermath of severe storms.

Floods can also generate environmental and health hazards. During the devastating Missouri River flooding in 2011, the

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FROM THE PRESIDENT

The U.S. Energy System — A Snapshot

I find that I keep returning to perspectives on issues associated with energy in America. That's the case for a couple of reasons. First, energy is a key factor in all facets of American life and business, and that's certainly true for Zephyr's clientele. Virtually all of our clients are either producing energy (e.g. the oil and gas sector), generating energy (e.g. electric utilities), or are using large amounts of energy to make their products. What's important to our clients is important to Zephyr. A second factor is that the U.S. energy system is in a state of enormous flux — stalwart energy sources such as coal must radically change or retire from the scene, oil and gas extraction has been completely reinvented and it's changing the economics of all sources, and renewables are ready to take their place on center stage sooner than later.

One of my favorite new daily sources of information is Vox.com, Ezra Klein's new start-up that aims to present important news in a succinct and fresh way. I recommend it. Vox had a really interesting piece posted in June called "11 Maps that Explain the U.S. Energy System" — it's worth looking up. Several things I learned from the article are worth sharing.

Coal: Although coal-fired power plants still provide 37 percent of America's electricity (down from over 50 percent in the past 10 years), many older plants are being retired; in fact, 145 coal plants, with an average age of 55 years, were retired between 2010 and 2012. Other coal plants are making big investments in pollution control equipment to meet new environmental regulations.

Natural Gas: Natural gas is surging as an energy source, and now 1,714 gas-fired plants provide 30 percent of America's electricity. Due to advances in extraction technology and the resultant "fracking boom," gas represents an economical and clean (relative to coal) energy source.

Renewables: Hydropower is still our largest source of renewable energy, providing about seven percent of our electric power. Wind energy is surging, from about one percent of our total in 2008 to about 4.1 percent of our total in 2013. Solar energy is still relatively tiny at less than one percent; but, due to the reduced cost



of solar panels, this source is at an economic "tipping point" and will be broadly and quickly deployed in the next few years. David Crane, CEO of NRG Energy, has called these trends "a mortal threat to the existing utility system."

Energy Transmission: At Zephyr, we already understand that transmission infrastructure (transmission lines and pipelines) is being upgraded at a furious pace since those are some of the types of projects we're working on. This trend will continue as transmission lines must be extended to new sources of energy (wind and solar facilities for example) and pipelines must be built to move oil from new shale plays, such as the Bakken in North Dakota and the Eagle Ford in South Texas, to refineries that can process it into fuel.

New technologies and new environmental concerns will continue to cause us to reinvent and renew how we make and use energy. As I said in a previous edition of *Currents*, our energy mix is very different from what it was five years ago and it will be very different again five years from now. ✨

Joe Zupan
President

Zephyr is a full-service environmental, health, and safety firm offering consulting, training, and data systems services to clients worldwide. We specialize in air and water quality, waste management and cleanup issues, incident management, natural resources, and workplace and community safety.

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Omaha sewage treatment plant released millions of gallons of raw sewage daily into the Missouri River. In addition, runoff from animal feedlots and leakage/spillage of farmers' pesticide and fertilizer stocks polluted waters that inundated downstream communities.

Regulatory agencies may, of necessity, relax the enforcement of environmental rules to facilitate cleanups following a natural disaster. For example, in the aftermath of the May 2011 Joplin, Missouri tornado — the nation's deadliest in more than six decades, destroying some 8,000 structures — the Missouri Department of Natural Resources temporarily waived enforcement of some of its solid waste and air pollution regulations for affected counties. In particular, it allowed landfills to accept materials normally not allowed, permitted the burning of tree and brush waste, and waived the requirement that state-certified supervisors be involved in removal of materials containing asbestos. Similarly, to facilitate removal of the extraordinary amounts of debris from government-ordered demolitions in Louisiana and Mississippi after Hurricane Katrina, EPA did not enforce certain Clean Air Act emission standards for asbestos.

Relaxing environmental rules during an emergency is understandable, but improper handling or disposal of waste material can make a bad situation worse. For example, if plastics, asbestos, or treated wood find their

way into debris fires, they could produce emissions particularly harmful to people with respiratory diseases.

An important lesson learned from Hurricane Katrina was the need to improve environmental health risk communications to the public following disasters. Post-Katrina communications made by EPA regarding environmental contamination and potential health issues were untimely, incomplete, and confusing, according to the U.S. Government Accountability Office.

Proper training can help reduce the impacts of post-disaster environmental hazards. After the Tuscaloosa tornado outbreak, more than 13,000 volunteers converged on the Tuscaloosa area alone to work on cleanup efforts. These volunteers received some level of safety training prior to going in the field, and were provided masks, eye protection, and gloves, all of which helped to reduce exposure to contaminants.

The U.S. will continue to experience natural disasters, and these events will continue to wreak havoc on communities and ecosystems. However, in the aftermath of these events, properly-trained professional responders and volunteers and a well-informed public can help to reduce the impacts on human health. ✨

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