After Action Review

Emergency Response to
January 9, 2014
Freedom Industries Chemical Leak

Submitted to Governor Earl Ray Tomblin

By

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I. General Description of the Incident

On January 9, 2014, an aboveground chemical storage tank owned and operated by Freedom Industries leaked an estimated 10,000 gallons of the chemicals crude 4-Methlycyclohexanemethanol ("MCHM") and Propylene glycol phenyl ether ("PPH") into the Elk River in Kanawha County, West Virginia. The leak occurred during an extreme weather event associated with the North Polar Vortex, which caused unprecedented low temperatures throughout West Virginia for a prolonged period. The location of the Freedom Industries leak was approximately 1.5 miles upstream of West Virginia American Water Company's ("WVAW") Elk River water intake, treatment, and distribution plant. MCHM and PPH infiltrated the plant, contaminating water that was distributed throughout the capital City of Charleston and to some communities in nine separate counties. This unprecedented incident – which has triggered federal investigations and indictments against Freedom Industries officers – affected 300,000 West Virginia residents and businesses. These residents and businesses lacked usable tap water for between 4 and 9 days.

II. The State's Challenges

Initially, the greatest challenge the State of West Virginia faced in responding to the incident was the lack of information regarding the chemicals MCHM and PPH and their potential health effects. This absence of knowledge about MCHM and PPH created public anxiety. Accordingly, the State's immediate emergency response primarily focused on the following: confirming MCHM and PPH were the chemicals at issue; understanding the health effects of these chemicals; developing appropriate water testing protocols and procedures; conducting testing of WVAW's water distribution system, both at the plant and at public facilities to ensure public safety; and effectively communicating these efforts to the public.

Another significant component of the State's emergency response was providing usable water to residents and facilities affected by the incident and monitoring its immediate impact on public health. Because it was essential to maintain continuous operations for health care providers and educators, State emergency responders made it a priority to get usable water to hospitals, nursing homes, and schools.

Following the "Do Not Use" stages of the incident, the State's focus shifted toward increasing public confidence. This was necessary because, among other things, the federal Centers for Disease Control and Prevention ("CDC") altered its

health effects guidelines. Accordingly, the State engaged independent consulting scientists and experts to better research MCHM and PPH, and to evaluate the water use health screening standards that had been relied upon in the emergency response.

III. General Overview of the State's Emergency Response

The West Virginia Department of Environmental Protection ("DEP") received odor complaints on the morning of January 9, 2014, from Kanawha County residents located in the vicinity of a Freedom Industries chemical tank farm adjacent to the Elk River. DEP investigators searched for the source of a distinct, objectionable licorice odor, located the chemical leak at Freedom Industries at approximately 11:00 a.m., and assessed the leak's impact. Investigators then initiated emergency response procedures to contain the leak and protect the environment. The West Virginia Department of Health and Human Resources ("DHHR") notified WVAW of the leak around noon. As in previous emergency responses, the State established a Joint Interagency Task Force ("JIATF") to ensure coordinated, effective, and timely management of all aspects of this emergency response.

At approximately 5:00 p.m., WVAW advised the Office of the Governor and DHHR's Bureau for Public Health ("BPH") its Elk River intake filters were overwhelmed and its public water distribution system may be contaminated. WVAW explained that shutting down its Elk River water intake was not a viable option, as fire protection services would be lost. Moreover, shutting down the plant and then restarting it would have been a prolonged, difficult process, keeping customers out of water for *any use* (including sanitation) for a substantial period of time. The extremely low temperatures had caused a significant number of line breaks that had impacted the systems' pressure zones, even though the system was running at full capacity.

WVAW noted it would issue a "Do Not Use" order to the public. The Office of the Governor began broadcasting this order immediately, working with State agencies and media outlets to direct WVAW customers in Boone, Jackson, Kanawha, Lincoln, and Putnam Counties to stop using tap water for drinking, cooking, washing, or bathing until further notice.

Governor Tomblin also proclaimed a "State of Emergency" in the above counties and activated the State's Emergency Operations Command Center ("EOCC") and the West Virginia National Guard ("National Guard"). Further,

Governor Tomblin requested a federal emergency disaster declaration from the President of the United States. Later that night, Governor Tomblin broadened the geographic scope of the State of Emergency to include selected communities in Cabell, Clay, Logan, and Roane Counties.

Also that night, Governor Tomblin and BPH contacted the CDC, requesting guidance on the health effects of MCHM. Notably, Freedom Industries had failed to disclose that PPH was also in the tank that leaked. CDC recommended a preliminary health screening standard of 1 part per million ("ppm") for drinking water. It advised an MCHM level at or below 1 ppm is not likely to be associated with any adverse health effects.

The following day, January 10, 2014, President Obama approved Governor Tomblin's request for emergency assistance, issuing a federal emergency disaster declaration. This declaration authorized the Federal Emergency Management Agency ("FEMA") to provide on-the-ground assistance and support (*e.g.*, logistical support and supplies) to aid in the State's emergency response efforts.

The National Guard, working in conjunction with the Office of the Governor, DEP, DHHR, BPH, the West Virginia Department of Military Affairs and Public Safety ("DMAPS"), and the Department of Homeland Security and Emergency Management ("DHSEM"), began formulating water testing protocols and procedures. They formulated these protocols and procedures with the assistance of local consulting scientists, who regularly work with the West Virginia National Guard's Joint Interagency Training and Education Center. The National Guard then embarked on a comprehensive water testing mission, collecting more than 300,000 water samples from WVAW's Elk River plant and schools, hospitals, and fire hydrants throughout the nine affected counties.

The National Guard transported split samples to labs in West Virginia, Ohio, and Pennsylvania to ensure proper instrument calibration and accurate results. The National Guard, working with first responders, State agencies, multiple volunteer and charity organizations, and private businesses, also began distributing usable water to residents and businesses in need of this critical resource. Initial sampling results at WVAW's Elk River plant on January 10, 2014, reflected MCHM concentrations as high as 3.35 ppm at the raw water intake and 2.4 ppm post treatment.

On January 11, 2014, Governor Tomblin advised the public WVAW's "Do Not Use" order would be lifted "by zone." He explained that once the National

Guard's tests established that MCHM levels in a particular geographic area of WVAW's distribution system were below the 1 ppm health screening standard, residents in that area could use their tap water. However, residents first would have to "flush" the pipes in their home water systems. To assist this endeavor, WVAW released detailed flushing instructions that contained input from BPH.

On January 13, 2014, WVAW lifted the "Do Not Use" order in downtown Charleston and in priority zones containing four major hospitals. It lifted the order gradually in the remaining zones over the course of the next several days. All zones were "clear" based on the 1 ppm standard by January 18, 2014.

Despite the testing results, the public remained skeptical that water supplied by WVAW was "safe." The skepticism was fueled, at least in part, by the CDC backtracking on its prior guidance to the State. In a January 15, 2014, letter to DHHR, the CDC advised that "due to the 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." In addition, residents were worried because they could still smell the licorice odor even though testing indicated concentrations of MCHM less than 1 ppm in the water distribution system. Later testing confirmed MCHM does indeed have a low odor threshold.

Throughout the incident, Governor Tomblin requested additional scientific assistance from federal partners, reaching out to, among others, the White House, the Environmental Protection Agency ("EPA"), and the National Institutes of Health ("NIH"). However, because of the lack of scientific studies and information known about the chemicals at issue, the guidance provided by these federal partners did little to restore public confidence.

On or about January 17, 2014, the State adopted a more stringent testing standard of 10 parts per billion ("ppb") – a standard one hundred times more conservative than the CDC's initial standard of 1 ppm. The National Guard then began resampling each zone to ensure MCHM levels at less than 10 ppb. It continued resampling throughout January and February and ultimately confirmed MCHM levels in each zone at less than 2 ppb – 500 times more conservative than CDC's initial standard of 1 ppm.

The public, however, continued to demand safety assurances. Accordingly, Governor Tomblin formally requested the CDC, or its partners, to immediately conduct further epidemiological and toxicological studies related to the incident.

Moreover, on February 11, 2014, Governor Tomblin and the BPH established the West Virginia Testing Assessment Project ("WVTAP") through an emergency procurement facilitated by the West Virginia Department of Administration ("DOA"). With this procurement, BPH hired an independent team of scientists and experts to conduct an unprecedented scientific study related to the incident.

The WVTAP study focused on evaluating the 1 ppm water use health screening standard recommended by the CDC and relied upon by the State. The study also assessed the State's more stringent screening standard of 10 ppb. In addition, the WVTAP scientists investigated the aesthetic characteristics of MCHM and PPH through odor threshold concentration testing and other experiments. Finally, they developed a detailed sampling protocol for testing concentrations of MCHM and PPH in private residences.

WVTAP released its final report on June 26, 2014. The report helped to alleviate many of the concerns voiced by the public. Among other things, the WVTAP scientists and experts recommended a short-term water use health screening standard of 120 ppb for MCHM. Although this recommendation was an order of magnitude lower than the CDC's recommended 1 ppm screening level, it was well above the State's 10 ppb screening standard. The WVTAP scientists' experiments also confirmed citizen observations that the objectionable licorice odor caused by MCHM is present even where the concentration of MCHM in water is below the 10 ppb health screening standard.

Governor Tomblin lifted the State of Emergency designation in the affected counties on February 28, 2014. On March 14, 2014, Governor Tomblin signed Senate Bill 373. This bill contained the Governor's Aboveground Storage Tank Act. The Act will protect public health and the environment by regulating certain aboveground chemical storage tanks that were not otherwise subject to registration and inspection requirements.

Pursuant to Governor Tomblin's directives, DEP continues to supervise the work of contractors who are remediating Freedom Industries' Elk River aboveground storage tank site. These contractors are, among other things, razing the chemical storage tanks located at the site.

IV. Governor Tomblin Orders a Review of the Emergency Response

At the onset of the incident, Governor Tomblin directed Peter Markham, General Counsel, Office of the Governor; Jimmy Gianato, Director, West Virginia

Division of Homeland Security and Emergency Management; and Adjutant General James Hoyer, West Virginia National Guard (collectively, the "Review Team") with coordinating this comprehensive After Action Review of the State's emergency response.

During the months of April and May 2014, the Review Team encouraged all emergency responders to engage in collaborative, roundtable discussions to assess the strengths and weaknesses of their actions. Using written questionnaires, the Review Team solicited information and feedback from individuals, agencies, and organizations to better understand the particular roles they played, the responsibilities they managed, and the successes they achieved.

The questionnaires also asked the participants to identify and analyze the problems they encountered, and requested that they pinpoint concrete solutions they can implement to improve their emergency response efforts going forward. The Review Team requested feedback by the end of May, 2014, but extended this deadline to accommodate emergency responders needing more time to review their actions.

In addition to the questionnaires, the Review Team also requested public feedback by establishing a website allowing citizens to complete an online comment form. The comment forms also could be accessed in paper form through the Office of the Governor. The public comment website was open throughout the month of May, 2014. The public comments the Review Team received are included in Appendix 19.

The Review Team's inquiry was threefold. It sought to understand: What actually occurred in the emergency response? What went well and why? What can be improved and how?

V. Participants in the Review

The following agencies responded to the Review Team's questionnaire:

American Red Cross	Appendix 1
Centers for Disease Control and Prevention	Appendix 2
Office of the Governor	Appendix 3
West Virginia American Water	Appendix 4
West Virginia Bureau of Senior Services	Appendix 5
West Virginia Department of Administration	Appendix 6

West Virginia Department of Agriculture	Appendix 7
West Virginia Department of Education and the Arts	Appendix 8
West Virginia Department of Environmental Protection	Appendix 9
West Virginia Department of Health and Human Resources	Appendix 10
West Virginia Department of Military Affairs and Public Safety	Appendix 11
West Virginia Department of Revenue	Appendix 12
West Virginia Department of Transportation	Appendix 13
West Virginia Rural Water Association	Appendix 14
West Virginia Secretary of State	Appendix 15
West Virginia Voluntary Organizations Active in Disaster	Appendix 16
WorkForce West Virginia	Appendix 17
34 Miscellaneous Reports & Letters	Appendix 18
Boone County Community Organization	
Cabell County Emergency Services	
Cabell County Schools	
Cabell-Huntington Health Department	
City of Charleston Emergency Management	
Clay County Health Department	
County Commissioners' Association of West Virginia	
Jackson County Board of Education	
Jackson County Commission	
Jackson County Health Department	
Kanawha County Emergency Management	
Kanawha County Public Schools	
Kanawha Valley Senior Services, Inc.	
Lincoln County Health Department	
Lincoln County OES/911	
Lincoln County Opportunity Company, Inc.	
Lincoln County Schools	
Lincoln Public Service District	
Logan County Health Department	
Mid-Ohio Valley Health Department	
Putnam County Office of Emergency Management	
Putnam County Schools	
Roane County Commission	
Roane County 911/Office of Emergency Management	
United States Environmental Protection Agency	
Utility Workers Union of America	

West Virginia Association of Counties	
West Virginia Broadcasters Association	
West Virginia Department of Veterans Assistance	
West Virginia Higher Education Policy Commission West Virginia Council for Community and Technical College Education	
West Virginia Hospital Association	
West Virginia Public Service Commission	
West Virginia Senior Care	
West Virginia State Auditor's Office	
Public Comments	Appendix 19

The Review Team received public comments from individuals in 25 West Virginia counties, 4 of which were directly affected by the leak — Boone, Cabell, Kanawha, and Putnam. One hundred ninety three comments were submitted to the Review Team. Individuals located in Kanawha County were the most vocal, offering 128 comments.

The Review Team encourages readers to review the Appendices of this Review in addition to the following summaries. The questionnaire responses provide a degree of detail summaries cannot capture.

VI. The State's Key Successes in Responding to the Emergency

1. DEP immediately took action investigating odor complaints, locating the chemical leak at Freedom Industries, and initiating containment and remediation efforts. Likewise, the Office of the Governor was swift and decisive in broadcasting the "Do Not Use" order to the public, proclaiming a State of Emergency, and promptly marshaling State agency and federal resources to combat the emergency.

2. The National Guard engaged local consulting scientists, developed water testing protocols and procedures, and began procuring necessary testing equipment within 24 hours of the leak. The National Guard then worked 24 hours a day sampling water at 109 schools, 8 hospitals, and countless fire hydrants throughout the affected counties. In addition, the National Guard, first responders, FEMA, State agencies (including the Department of Transportation and the Department of Agriculture) distributed 2,513,562 gallons, 9,514,866 liters, and 19,029,732 bottles of water to the public. The National Guard and those entities that assisted it were well organized and efficient in accomplishing the mission.

3. The National Guard was also swift and transparent in providing water testing results to the public, making them available on-line as soon as their accuracy could be confirmed. The Office of the Governor, DEP, DMAPS, BPH and the other agencies responding to the incident were likewise quick and transparent in addressing Freedom of Information Act ("FOIA") requests posed by the media.

4. It was wise and necessary to establish WVTAP. The WVTAP scientists and experts conducted thoughtful, independent research that helped restore public confidence in the safety of the drinking water in the nine affected counties. Given the lack of scientific support provided by the State's federal partners (*e.g.*, CDC, EPA, NIH), the State would have benefitted from having had comprehensive, outside scientific assistance earlier in the incident.

5. The Attorney General took appropriate action advising citizens and businesses of the State's consumer protection laws aimed at curbing price gouging during a declared State of Emergency. His office was likewise of help to the public in investigating complaints and taking necessary legal actions. The Secretary of State's decision to provide increased flexibility to businesses affected by the incident in conjunction with their registration obligations is also noteworthy.

6. WorkForce West Virginia helped citizens obtain financial assistance and file unemployment or low earnings claims during and after the incident. It processed approximately 83 regular unemployment claims and 727 low earnings claims related to the incident and responded to countless telephone calls requesting information.

7. The West Virginia Legislature passed Governor Tomblin's Aboveground Storage Tank Act during the 2014 Regular Session of the Legislature. The Act contains reasonable regulations to protect the environment and public health. Among other things, the Act requires DEP to inventory and register aboveground storage tanks and develop a regulatory program to ensure they function properly. It also mandates tank inspections and site-specific spill containment and spill response plans.

8. First responders throughout the nine county area impacted by the incident were consummate professionals. They provided the key link for the coordination and delivery of necessary supplies to affected citizens. These

emergency responders are to be commended for their accomplishments during extremely cold temperatures to make sure citizens' needs were met.

9. The State was prompt in requesting federal assistance in the emergency response and demanding that WVAW change the filters at the Elk River water intake. Likewise, the Public Service Commission was swift in launching its investigation into the incident.

10. It should be highlighted that the citizens of West Virginia — individuals, charitable organizations, volunteers, businesses, *etc.* — shined throughout the emergency response, donating water, checking on neighbors, and exhibiting *patience* under difficult circumstances.

VII. The State's Most Prominent Shortcomings

1. As of January 9, 2014, certain types of aboveground storage tanks in West Virginia were inadequately regulated. Although the Legislature had established a comprehensive statutory framework in 1984 to prevent spills from *under*ground storage tanks, it did not address *above*ground tanks in that legislation. Consequently, aboveground tanks that were not otherwise regulated under an applicable federal or state permit escaped government oversight. Aboveground tanks containing MCHM, for instance, were not of heightened concern because MCHM was not classified as a particularly hazardous chemical. The lack of readily accessible health and environmental effects information State and federal agencies had on the chemicals MCHM and PPH, even though these chemicals were stored only 1.5 miles from WVAW's Elk River water intake, was another shortcoming. The Aboveground Storage Tank Act and other new laws passed in the wake of the incident will help address these shortcomings, will increase public safety significantly, and will help protect the environment.

2. Few staffers in the Office of the Governor have participated in the National Incident Management System ("NIMS") Training Program relating to the components of preparedness, communications and information management, resource management, and command and management. NIMS training for these staffers — as well as for Cabinet Secretaries and certain agency crisis managers — undoubtedly will help ensure better emergency preparedness and management efforts going forward. The Review Team recommends NIMS training and coordination.

3. Because of the many unknowns associated with this particular incident, and the delays associated with obtaining information from federal partners, the State struggled at times communicating information effectively at press conferences. These press conferences often occurred with little advance notice, and the message intended to be conveyed sometimes was lost amid confusing or ambiguous statements. The Review Team recommends that the State host regularly scheduled press conferences throughout the duration of an emergency situation – even if there are no new updates to report and even if the only purpose is to answer questions. Press conferences should also feature a limited number of speakers who are appropriately informed. Scientific information ought to be conveyed in an easily understandable manner. Charts and graphics should be utilized, where helpful.

4. One of the ongoing and frustrating issues – both for the general public and State officials – was the question of when the water was considered "safe." The public wanted assurances, not personal views or opinions, although the questions continued to be asked of officials not in a position to make the safety determination. Adding to frustration and confusion was the fact that CDC officials – those with the best information and scientific background – refused to publicly speak in terms of "safety" even after the "Do Not Use" order was lifted. As this incident was unprecedented in West Virginia, better communication from those at the national level (CDC, EPA, NIH) would have been extremely helpful. In retrospect, State officials facing those questions should have made clear that while they understood the concerns of citizens, answers regarding water safety should come from scientists, not lay persons.

5. Government officials should have visited individuals and businesses in the affected areas to help restore calm and exhibit empathy.

6. Certain State agency websites were embarrassingly out of date at the time of the incident. *Every* agency should review its website regularly to ensure that emergency information and contacts are up to date. Furthermore, in this age of increased reliance on social media for emergency information, agencies must embrace services like Facebook and Twitter to distribute information timely and accurately. It should be noted that the Office of the Governor did utilize Twitter and social media throughout this incident; this was helpful to the public.

7. Public schools had to be closed because their kitchens could not be utilized to prepare meals. The National Guard was positioned to distribute "Meals Ready to Eat," which would have solved the problem, but for rigid Code of State

Regulations requirements regarding caloric intake for public school students. These requirements – or perhaps the West Virginia Code – should be amended to provide increased flexibility in feeding public school students during a declared State of Emergency. This will help ensure continuity of educational opportunities where they can be safely managed during times of crisis.

8. The flushing procedures addressed single-family residences only and did not take into account other types of facilities with more complicated plumbing. They were not well vetted. In providing information to the public in the future, utilities and officials must direct guidance to businesses, multiple family residences, schools, hospitals, *etc.*, in addition to individual customers or residents.

9. Although well-intentioned, local health departments overregulated restaurants in the affected areas by shutting down many facilities that probably could have operated using alternative (*e.g.*, bottled) water sources to serve demand. These health departments should review their emergency processes and procedures and offer legislative fixes and policy adjustments.

10. In preparing the initial draft of the Aboveground Storage Tank Act, State officials should have solicited feedback from all affected parties, including environmentalists, instead of only vetting proposals with business and industry representatives. But in making this observation, the Review Team notes DEP played a pivotal role in crafting the Act and did address environmental concerns.

11. With the abundance of chemical and manufacturing facilities in the Kanawha Valley (many of them near critical waterways), a more efficient way of managing Tier II reports should be implemented. The Review Team is advised the State Emergency Response Commission is in the process of releasing a Request for Procurement for an electronic Tier II management system. This is important for a variety of reasons. Among other things, it will provide a central electronic filing system that can be accessed remotely to make information – including MSDS sheets – immediately available to first responders, county and local emergency planning committees, and State agencies. The electronic management system will also have GIS mapping capabilities to identify nearby hospitals, zones of critical concern, water intakes, highways, railroads, and other potential concerns. Facilities will be able to update their inventories and emergency response plans and make them available online instantaneously. This will be of great benefit to the public and to emergency responders, both in terms of planning for emergency events and responding in times of crisis.

VIII. Additional Feedback from Agencies and Review Participants

This section summarizes certain of the questionnaire responses submitted by State agencies and other Review participants (see Appendix). The Review Team does not necessarily believe all of the following findings and recommendations are well founded and should be adopted; however, State agencies should give them serious consideration, discuss them internally and with the Review Team, and implement those recommendations that are most appropriate.

1. Agency Emergency Communications — It was difficult to offer detailed emergency communications due to the lack of information State officials originally had regarding the scope of the leak, the nature of the contaminants, and their potential reach through WVAW's water distribution system. Communication was also limited initially based on the expedited timeframe and the need to alert public to the potential threats.

   Many local government agencies and first responders were frustrated they first learned of the leak on the news and were not made aware before the public announcement. Some counties were also frustrated the original map that was broadcasted by the media included an entire county in the "Do Not Use" order, even though only a very small geographical area and number of customers in that county were WVAW customers affected by the leak.

   In reviewing their specific emergency response procedures and communications, the agencies offered the following recommendations:

   - Have one central call in number for State, county, and local authorities and emergency responders where they can obtain emergency contact information for all State agencies.
     - The contact information should also be published online in a printable version and updated monthly.
   - Create a text or email system that will alert identified government leaders, hospitals, nursing homes, and the like to join a predetermined conference call number at a given time.

- Set regular briefings via conference call.

- This can be an "opt-in" alert system.

- Create a "Unified Central Command" that would handle all logistics and operations. To ensure proper management of public messaging, Central Command should include communications representatives from each State agency involved in responding to an emergency.

    - Ensure all information is synchronized through one source and then distributed.

    - Establish an after-hours communication point person or number.

    - Utilize the NIMS framework for incident management.

    - Utilize the Everbridge or similar communications system during emergencies. Such a system sends emergency management messages via telephone, text, and email to affected citizens.

    - A core group of communications representatives from emergency management agencies (*e.g.*, DMAPS, DHHR, State Police, National Guard, *etc.*) should meet every six months to discuss crisis communications, update communications plans, and rehearse contingencies.

    - Personnel with graphic design skills should be available for creation of accurate maps, charts, and informational graphics to release on social media and to media outlets.

    - A room should be established for temporary media use that has internet connectivity. This will allow media to file stories in a timely manner. Having media established on premises near Central Command will promote transparency and timely, accurate release of information.

- Publicize and utilize Charleston's Chemical Alert Siren if the capital city is impacted.

- Designate a physical location for the West Virginia Volunteer Organizations Active in Disaster to have a headquarters.

- Create a mechanism to notify non-governmental organizations of disasters timely and based on priorities and expertise.

- Communicate results of any testing on chemical agents to health care facilities via email.

2. Media — There was frustration from both the public and State and local agencies that the information being supplied by the media was inaccurate and too general. Frustration also existed because State agencies and the public believed the media was not updating information timely. Notably, some of the media information was conflicting even within the same network. As this was the primary mechanism to notify those affected by the leak, it is critical the information transmitted by the media be clear and accurate. Review participants offered the following suggestions regarding the media:

    - Provide the media accurate and updated information and correct any misinformation being broadcast.

    - Get media access to incident sites, where possible, to better convey information to the public and promote public confidence in government.

    - Create a written plan for the Public Broadcasting Service's role in live emergency press conferences.

    - Enter into an ongoing satellite contract with a service provider in order to ensure that public emergency broadcasting is available even during cable and internet outages.

    - Consider installing fiber and cameras in the House Chamber and determine a better method of sending video from the Capitol to the Public Broadcasting Service.

- Establish a direct link from DHSEM to media outlets in other regions of the State for a satellite uplink. In the event there is no telephone, internet, or cable in Charleston, this would allow information to be transmitted directly.

- Establish procedures for responding to media and general public FOIA requests during an active, ongoing emergency.

3. Public Awareness — Public awareness and information distribution was critical in this incident and, at least initially, there were reports of panic based on the general nature of the information communicated through the media. In conjunction with the media discussion above, suggestions related to public awareness are as follows:

    - The initial announcement made by the Governor lacked interpreters for the hearing impaired. Once this was remedied, the television stations did not include the interpreter in the broadcast picture, even though she was present at press conferences.

        - Work with the media to ensure interpreters are included in emergency television broadcasts.

        - Ensure closed captioning is available for the hearing impaired.

    - Consider multiple different methods of transmitting information to the public, including in writing and orally.

        - Keep in mind those with disabilities, including the hearing and vision impaired.

        - Everyone does not have access to the internet or television — ensure information is transmitted via radio, telephone, newspaper, *etc.*

    - Conduct regularly scheduled press conferences.

- Ensure that press conferences are clear and concise and that the *most pertinent information is communicated first.*

4. Websites and Social Media — Although websites and social media were widely used to transmit information during the incident, this was not accomplished consistently or effectively. Many agencies and individuals expressed the need for more information online. Further, there were reports key information on state websites was outdated and unusable. Review participants expressed the following recommendations regarding websites and social media:

    - The Governor's Twitter feed was very helpful to the public.

        - Create an event specific Facebook account to be used during emergency situations.

    - Include a link to the Governor's website on all State agency websites.

    - Use social media as soon as possible to keep accurate information available *and to correct misinformation.* This is a big, but vital, task.

        - Have the Office of the Governor release statements to State agencies so they may use them to update their social media pages and websites. It should be highlighted here that the Review Team disagrees and believes there should be one, and only one, disaster website – one source that the public can trust for the most up to date information. This website's address should be communicated to the public at every press conference.

    - Better utilize State websites and keep them up to date.

        - Many State agency websites provide contact information that is out of date and names of individuals who no longer work for that agency.

- Consider only putting general contact information on the website that would always be monitored and assigned to an active employee.

5. Disaster Hotlines — In general the disaster hotlines were functional and operated to provide the public with necessary information. There were some glitches, but these were remedied quickly. However, the following suggestions remain:

   - Expand the capabilities of the hotlines and divert unanswered calls to a message service instead of giving a busy signal.

   - Work with vendors to ensure technical glitches are remedied and functioning systems are in place.

6. Schools — Communication with schools is critical in a State of Emergency. Representatives of various schools and county boards of education believed they did not receive information soon enough about the chemical leak and its impacts. However, as soon as the Governor declared a State of Emergency and emergency management operations began, these participants expressed that they were involved in decision making as it related to student and staff safety. The following suggestions relate to school operations and communications during a State of Emergency:

   - When sending emergency supplies to schools, supplies should be sent *only to affected schools*.

   - Rely on county superintendents to determine appropriate school closings—*e.g.*, Jackson County schools closed for a day even though they were not serviced by WVAW.

     - If only one or two schools need to be closed for an extended period, consider transporting students to other schools within close proximity to ensure educational opportunities.

     - Close only those schools that need to be closed because of actual health and safety concerns.

7. Disaster Classification — Some issues arose with the type of disaster classifications that were in place during the State of Emergency. Review participants noted the following suggestions:

   - The spill was not classified as a "disaster" by FEMA and therefore Disaster Unemployment Assistance was not available.

     - Be aware of the appropriate disaster classifications and make sure to request all classifications to best aid affected individuals, businesses, and organizations.

8. Business Issues — Although the first priority in a State of Emergency is the safety of the public, protocols need to be in place to address business issues stemming from an emergency. Here are some recommendations:

   - Enact legislation that would allow the Secretary of State to extend deadlines or set specific extensions for required filings during a declared State of Emergency.

   - Bring businesses into the fold sooner in an emergency situation to determine how to reopen the businesses to serve the public throughout the emergency.

9. Hospitals — Although hospitals were able to maintain critical services and operations, there was concern regarding communication with health care providers. We received the following comments and suggestions:

   - Healthcare providers need to be considered independently from businesses and the public during an emergency situation.

     - For example, flushing instructions provided were not applicable to or feasible for hospitals.

   - Improve coordination between the State and the Incident Command Center at the hospital, and ensure local officials receive timely information. There should be a specific, 24-7

local contact person identified by each facility who is on-call any time the Governor declares a State of Emergency.

- Determine a better method for communicating health data to the DHHR or the CDC.

    - Data related to emergency room visits and patient charts potentially linked to the incident had to be reported to the CDC every two hours during the incident. Although this was disruptive to hospital activities, State officials believe it was a vital aspect of the information-gathering process. The Review Team agrees.

10. Processing/Delivering/Tracking Resources — There is general consensus that individuals affected by the incident were able to obtain plenty of potable water from either tanker trucks or bottled water supplies; yet, there was concern over coordination and delivery of these supplies throughout the affected counties. The comments and recommendations received are as follows:

    - Add GPS to all Department of Transportation vehicles to assist with resource tracking and communication.

    - Maintain a better system for tracking and distributing supplies — establish a "central command" which can coordinate resource delivery.

        - Ensure distribution centers know when and what resources they will receive prior to transport and delivery.

    - Have a plan in place for a volunteer staffed call center that can operate to take monetary donations during and after a disaster.

        - FEMA requires the State to have a Donations Management Plan which includes a FEMA approved viable inventory management plan, an effective distribution strategy, articulation of sustainment costs for such an effort, and adequate logistics expertise to avoid

situations where funds are wasted because supplies are rendered ineffective due to lack of planning. Perhaps groups like Volunteer Organizations Active in Disasters and the American Red Cross could assist in this endeavor.

- Some citizens in counties other than Kanawha County believed water distribution should have been better coordinated.

- Distribution of water to the elderly and shut-ins ought to have been closely monitored.

    - Work with local senior agencies.

- Water distribution sites shut down too soon after the "Do Not Use" order was lifted.

- Have water distribution in evening hours as well as during the day to serve those who work day shifts.

- Be aware that individuals may need transportation to water distribution locations.

    - Place distribution centers on public transit routes.

11. The State Emergency Operations Command Center — Although the EOCC operated effectively during the incident, there were recommendations on how to have the EOCC function more efficiently and effectively in the future. These recommendations are as follows:

- Clearly define the roles of the EOCC and Health Command to prevent duplication of efforts.

- Improve communication between the EOCC and federal authorities.

- Only have one command center and ensure the chain of command is known at the local level.

- Improve communication with local officials.

    - Predetermine a State office or official who local officials should pose questions or concerns to during a State of Emergency.

- Consider expansion of the Civil Support Team's ("CST's) mobile laboratories to better test and evaluate particulate matter. For example, the CST's Analytical Laboratory Suite ("ALS") Gas Chromatograph Mass Spectrometer ("GCMS") is capable of qualifying hazardous substances, but not quantifying them. Accordingly, it can identify numerous hazardous substances, mainly focusing on toxic industrial materials, weapons of mass destruction agents, and precursors, but cannot measure their amounts. By adding a polar column to the GCMS and providing additional training to CST lab operators, quantitative analysis could be feasible.

12. Utilities Costs — Many citizens were unhappy they were required to pay for water and other utilities used as a result of the leak. The Public Service Commission is investigating these issues. The following comments and recommendations were offered:

    - Investigate whether the 1000 gallon credit on water bills was sufficient to cover the costs associated with "flushing."

    - Participants believe there should have been no "base" charge on water bills for households that were not using water during or after the leak.

    - Should there have been a credit on sewer bills, which are directly linked to water bills?

13. Education and Training — As with any emergency situation, this After Action Review revealed areas where additional training and education of State officials and first responders may help facilitate a smoother process in future emergency situations. Important recommendations are as follows:

- Conduct NIMS and Incident Command System (ICS) training.
    - Training should be for those involved in the emergency response, including members of the Governor's Office.
    - Mixed training with individuals from several agencies is best (*i.e.*, hospitals, law enforcement, government).
- Educate the appropriate persons on the availability of the Statewide Interoperability Radio Network ("SIRN") handheld radios and how to use these radios.
- Educate relevant persons about the multi-agency warehouse operated by the Homeland Security State Administrative Agency and its capabilities.
- Provide training to local and county officials on E-Team procedures.

14. Law — Many legal issues were raised during the incident. The Governor and State Legislators sprang into action quickly to resolve certain of these issues. The public was pleased with the quick response of lawmakers and the signing of Senate Bill 373. However, there are recommendations for additional legislation.
    - Revise W. Va. Code § 22-19-1, *et seq.* to allow the DEP to assume greater responsibility to direct clean-ups of chemical spills.
    - Evaluate the Governor's emergency powers to determine if additional legislation is needed.

15. State and Local Government — These recommendations relate to the function of State and local governments during this particular State of Emergency. The Review Team received the following recommendations:
    - State and local governments need to remain functional in a State of Emergency, if possible.

- Enact a policy articulating which individuals need to report to work during an emergency.

- Set up predetermined "operations outposts" within agencies.

- In instances where food and water supplies are at issue, designate an area at work where essential employees can obtain food and water.

- Develop a leave time policy "essential" state employees may utilize during a declared State of Emergency to handle personal business.

- Set up a remote access system so employees can accomplish work from home if need be during a declared State of Emergency.

- Stock bottled water in government buildings.

- Better utilize the Secretary of State's Office to determine how businesses are affected by an emergency.

- Have safety committees in place for various State agencies and encourage private employers to form such a committee.

- Have the DHHR provide information about the type of public health emergency to Constituent Services in the Office of the Governor.

- Emergency plans should be made for all State facilities with confined populations and health experts should be involved in creating these plans to determine necessary daily allotments.

- County and local officials as well as the Governor's Office need to have maps of public utilities and their suppliers. Officials should also have information on alternate utility sources.

- Ensure the General Services Division of the State's DOA has emergency access to all State facilities.

- Consider purchasing temporary hand-wash and eye-wash stations for State agencies and facilities.

- Conduct drills for emergency scenarios and ensure there are plans in place for a variety of potential emergency situations.

- Assign different agencies within State and local government specific tasks in an emergency to eliminate duplication of efforts and waste of resources.

- Improve the notification process for mobilization day, M-Day, personnel.

IX. Conclusion

During the last four years, State agencies and Governor Tomblin's administration shined while combatting floods, a derecho that knocked out electrical power throughout the State during a record setting heatwave, and the effects of Hurricane Sandy, which included a snowstorm across the State that also terminated power. The State, moreover, prepared effectively for thousands of visitors to converge on rural West Virginia for the National Boy Scout Jamboree. The Freedom Industries chemical leak incident, however, was unique and unprecedented. There was no roadmap for handing the intricacies of this particular crisis.

Governor Tomblin's Aboveground Storage Tank Act – passed by the Legislature in the wake of this incident – is a significant step in protecting public health and the environment. As a result of the Act, DEP is now preparing an inventory of the State's aboveground storage tanks. With this inventory, regulators will be able to easily access information on tank ownership, location, date of installation, capacity, age, type, volume of contents, and distance from the nearest public water supply. And significantly, there is now a comprehensive regulatory program in place to prevent the kind of leak that occurred at Freedom Industries' Elk River tank farm.

The Review Team believes the findings and recommendations of this After Action Review will also be beneficial to all West Virginians as we work to

improve the effectiveness of future emergency responses. Some of the findings and recommendations included in this Review are common sense conclusions that can be implemented with relative ease. Often it is the "easy fixes" that can make the most difference. We must not only improve overall efforts to strengthen communication, education, and preparation for future emergencies, but also we must emphasize the unique and important role of each agency, entity, utility, and individual in creating the necessary teamwork to confront future challenges.

This incident was difficult to manage. It was also an important learning experience – not only for West Virginians, but for individuals and governments around the world. Israeli military members and Israeli water company representatives, for instance, traveled to West Virginia and spent a substantial amount of time with the National Guard and State emergency responders learning from their experiences in case Israel's water supply is ever contaminated through terrorism or otherwise.

The Review Team is pleased to have been given the opportunity to evaluate the State's emergency response and offer the above findings and recommendations. The lessons learned will help contribute to successful emergency response efforts going forward.

Respectfully submitted by:

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January 9, 2015