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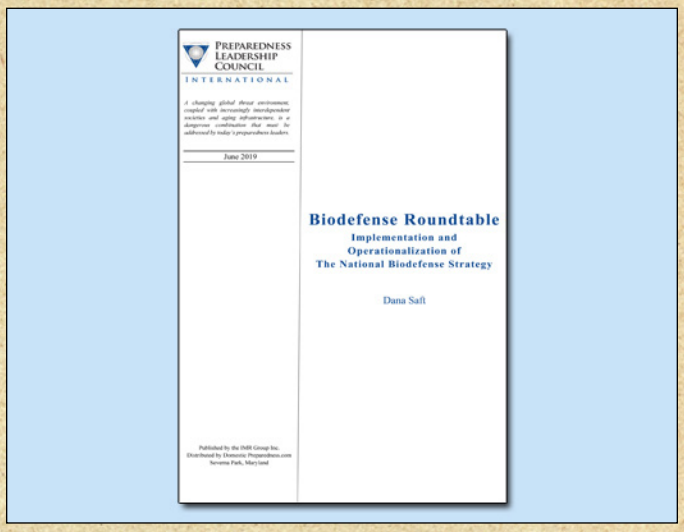
EMP Executive Order & Self-Funding Resilient Microgrids
By Charles (Chuck) Manto



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The Enterprise That Guards Against Attack

By Catherine L. Feinman

The Homeland Security Act of 2002 created the Department of Homeland Security (DHS) to safeguard the United States against terrorism. The department brought together 22 different federal agencies, each with a role to: prevent terrorism and enhance security, especially from a chemical, biological, radiological, nuclear, or high-yield explosive (CBRNE) attack; manage borders; administer immigration laws; secure cyberspace; and ensure disaster resilience. That is just the federal part of the equation. The first DHS Secretary, Governor Thomas Ridge, envisioned an enterprise where state, local, tribal, and territorial governments were also an integral part of that mission. What is not clearly stated is the role that nongovernmental organizations play. This would include industry, think tanks, and media.

The Preparedness Leadership Council (PLC) is one such organization that hosts roundtable discussions on topics of key interest to homeland security professionals from all disciplines. In October 2018, it held a roundtable with various homeland security experts, including Dr. Robert Kadlec, who is the current Assistant Secretary for Preparedness and Response (ASPR) at the U.S. Department of Health & Human Services (HHS). The discussion focused on implementing and operationalizing biodefense based on the new National Biodefense Strategy. With the intent to spur new ideas and promote collaboration between the public and private sectors, the PLC regularly brings together state, local, territorial, and tribal entities, practitioners, scientists, educators, and industry to address homeland security topics.

The European CBRNE Summit is one of many organized conferences around the world that focus on CBRNE threats. At the 2019 event, much discussion was devoted to two highly publicized CBRNE attacks: the 2018 Salisbury nerve agent attack and the 2017 Manchester concert arena bombing. Infragard's EMP SIG is an association that brings together public and private stakeholders with a special interest in promoting resilience with regard to natural and human-caused threats to the nation's critical infrastructure. A new electromagnetic pulse (EMP) executive order addresses community resilience and microgrids, which is of significant importance to members of groups like the EMP SIG.

Then, there are organizations that promote leadership during all emergencies and disasters. Organizations like the National Preparedness Leadership Initiative (NPLI) at Harvard University help to educate people on how to lead throughout the most difficult situations. This includes knowing how to lead the public as force multipliers.

This issue of the *DomPrep Journal* shares the wisdom of just a few leading experts on preparing for and responding to threats of national significance. Browse the website at DomesticPreparedness.com for more articles, reports, and podcasts from these and other experts on national security threats and how to address them.

New content from other experts is always welcome. Send ideas and submissions to cfeinman@domprep.com

EMP Executive Order & Self-Funding Resilient Microgrids

By Charles (Chuck) Manto

The U.S. government published two landmark emergency management policies in March 2019. The first was the update of the 2015/2016 Space Weather Strategy and Action Plan released from the Office of the President. DomPrep published an article on 15 June 2016 describing how the strategy and action plan affected disaster and emergency operations planning. Then, on 26 March 2019, the Federal Register published the Executive Order of the President 13865 (EO 13865), entitled "Coordinating National Resilience to Electromagnetic Pulses," which outlines the threats to the national (and global), economic, as well as health and safety security.

Section 1 of EO 13865 describes the critical nature of an electromagnetic pulse (EMP), its potential destructive properties, and the federal government's duty to act:

> *[An EMP] has the potential to disrupt, degrade, and damage technology and critical infrastructure systems. Human-made or naturally occurring EMPs can affect large geographic areas, disrupting elements critical to the Nation's security and economic prosperity, and could adversely affect global commerce and stability. The Federal Government must foster sustainable, efficient, and cost-effective approaches to improving the Nation's resilience to the effects of EMPs.*

A New U.S. Policy

The new policy of the U.S. government is to "coordinate whole-of-government activities and encourage private sector engagement" to "protect against" the "effects of EMPs" that include space weather effects. For example, Section 2b of EO 13865 states, "A geomagnetic disturbance (GMD) is a type of natural EMP driven by a temporary disturbance of Earth's magnetic field resulting from interactions with solar eruptions." The practical effect for the emergency planning community is that the community must consider mitigation and response for the all-of-infrastructure impacts of EMP and GMD, including months-long power outages and worst-case scenarios that cannot be overlooked:

> *Sec. 3. Policy. (a) It is the policy of the United States to prepare for the effects of EMPs through targeted approaches that coordinate whole-of-government activities and encourage private-sector engagement. The Federal Government must … protect against, respond to, and recover from the effects of an EMP through public and private engagement, planning, and investment….*
>
> *(b) … The Federal Government shall also provide incentives, as appropriate, to private-sector partners to encourage innovation that strengthens critical infrastructure against the effects of EMPs….*

(h) The heads of all SSAs, in coordination with the Secretary of Homeland Security, shall … enhance preparedness for the effects of EMPs, to identify and share vulnerabilities, and to work collaboratively to reduce vulnerabilities.

(i) The heads of all agencies that support National Essential Functions shall ensure that their all-hazards preparedness planning sufficiently addresses EMPs, including through mitigation, response, and recovery.

Community Response

These reports remind emergency planners of their need to revisit emergency plans to see how they would function despite outages that could last months if not years. The first question is whether the emergency management community can embrace that challenge and consider solutions or overreact in denial that is typical of what some are calling "pre-traumatic stress disorder."


Coyle Studios, 2015

The next question is, "What will business and state and local government do on their own over the next nine months as the first eight of sixteen (EO 13865) requirements are fulfilled by the Departments of Homeland Security (DHS), Defense (DoD), and Energy (DOE)?"

In the last several years, a series of other studies have shown that it is possible to mitigate these risks with microgrids, many of which could be funded out of energy and operational savings that they create. As a local system of distributed energy resources and electrical loads that can operate as a single entity either in parallel to the commercial grid or independently, the nature of microgrids makes it possible to enhance resilience through redundancy as well as flexibility through adaptability and modularity both initially and over time. Although no microgrids to date are known to be protected from EMP, discussions have been taking place over the last couple of years about creating EMP-resilient microgrids as SBIR Phase III commercialization implementation of solutions for the Defense Threat Reduction Agency (DTRA) call for EMP-protected microgrid systems. Some of these projects are hoped to launch in 2019.

Microgrids need to be protected from electromagnetic and cyber threats or they do not do much good and may do more harm to the extent that they are interconnected (see Dr. George Baker's report "Watershed Moment"). These new policies are especially timely in light of these studies, especially one from Noblis, "Power Begins at Home," that highlights both increased risks and opportunities for military bases.

Military Bases at Greater Risk

Military bases are at special risk not only because they make attractive targets for adversaries, they also are usually in more vulnerable remote areas. The Noblis report shows how day-to-day vulnerability of electric power for military bases in the United States is higher than normal for a variety of reasons, with typical outages lasting days or weeks. The Air Force disclosed planning for a combination of a hurricane such as Sandy and a cyberattack, which the Air Force anticipates would produce a three-month regional power outage with disruption of fuel supplies. Electromagnetic threats are expected to provide longer disruptions on their own and even greater disruptions when coupled with cyber or physical attacks. The Defense Threat Reduction Agency (DTRA) published concerns in 2015/2016 that threats could result in power losses that could be "permanent or last weeks or months."

> *The defense critical infrastructure (DCI) is the composite of DoD and non-DoD assets essential to project, support, and sustain military forces and operations worldwide. The DCI includes, but is not limited to, elements such as military bases, ballistic missile defense installations, radar sites, etc. An electromagnetic (EM) attack (nuclear electromagnetic pulse [EMP] or non-nuclear EMP [e.g., high-power microwave, HPM]) has the potential to degrade or shut down portions of the electric power grid important to the DoD. While a power grid may employ intentional islanding techniques to protect sections of the grid and prevent a cascading collapse of the power grid, the broad reach of potential EM attacks with the potential of simultaneous levels of disruption might prevent traditional islanding protection methods from being sufficient for continued operations of the DCI. Restoring the commercial grid from the still functioning regions may not be possible or could take weeks or months. Significant elements of the DCI require uninterrupted power for prolonged periods to perform time-critical missions (e.g., sites hardened to MIL-STD-188-125-1).*

On the positive side, the Noblis report mentions that the critical loads amount is about 40% of their total loads:

> *Military bases are subject to more and longer duration power outages than typical utility customers because many bases are located in outlying areas.... Military bases rely almost entirely on the commercial grid for their electric power.... A typical large military base has a peak electricity demand of about 50 megawatts (MW), of which about 20 MW (40%) represents "critical loads." Critical loads are those functions that must have emergency backup power under OSD's power requirements.... Outages that last just a few hours are not the major concern.... The real concern is power outages that last days or even weeks. (P. vii)*

The report also claims that microgrids serving those critical loads provide greater security and can often be fully funded by energy and operational savings (and occasionally revenue) if accounting systems would properly account for all related costs and revenues. These reports also propose alternative approaches to funding, comparing ownership to purchasing energy and security as a service.

> *This approach to measuring the value of energy security reflects an economic framework – with its emphasis on cost avoidance – makes intuitive sense: Based on the analysis we presented in Section IV, Figure 21 shows the 20-year cost to protect a kW of load using backup generators is modest, between $80 and $85 per kW (per year) for a standalone generator.*
>
> *Granted, standalone generators are not the optimal approach to ensuring energy security for the reasons we spelled out in Section III. Thus, one might argue that DoD is justified in paying a premium to get a higher quality approach to energy security, in the form of a robust microgrid. However, the analysis we presented in Section IV demonstrates that in most parts of the country, microgrids provide more energy security for less money than the Services are currently paying for standalone generators. (P. 36)*

Average military base critical load size of about 40% compared to their peak loads is very similar to hospitals, which provide backup power to their critical loads subdivided into "emergency, critical and life safety loads" that typically range in size from 30-50% of their normal loads. These ranges were seen in various engineering reviews of hospitals of different sizes and types across the country held by IAN LLC including work done under contract to the National Institute for Hometown Security funded through DHS.

This is helpful because it shows that on-site microgrid solutions may only need to cover half their loads. Additional funds can also be acquired such as those by the 2019 National Defense Authorization Act for community infrastructure. For example, reported in Beyond the Fence Line, "The FY 2019 National Defense Authorization Act created the Defense Community Infrastructure Pilot Program88 which enables DoD to contribute up to 70 percent of project costs for investments in community infrastructure supportive of a military installation." These microgrid islands in turn can be connected to each other. When crossing over property lines, these connections need to be facilitated by regulated power utilities that will not only ensure that those connections are made safely, but can also provide the means for the microgrids to make money by selling their excess power to other users. Utilities would naturally earn money from those transactions and see those microgrids play a role in reducing peak-load demands and help in black-start operations when centralized grids inevitably fail.

Given that the private sector is already working quietly with military bases including the National Guard to establish EMP- and cyber-resilient microgrids, it will be interesting to see what may emerge in the next months in time to meet the requirements of EO 13865 and the new space weather strategy.

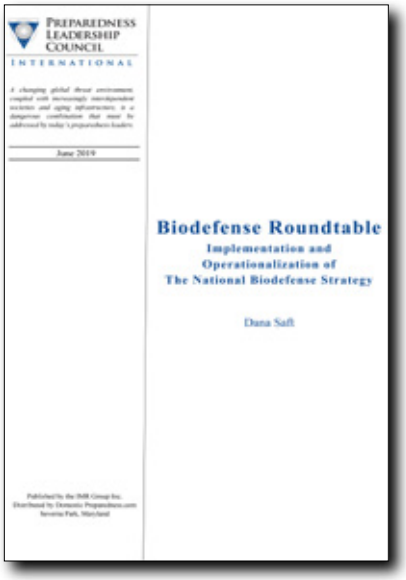
Charles (Chuck) Manto is chief executive officer of Instant Access Networks LLC (IAN), a consulting and research and development firm that produces independently tested solutions for EMP-protected microgrids and equipment shelters for telecommunications networks and data centers. His company holds the data rights package for its SBIR program for EMP-protected microgrid systems. He received seven patents in telecommunications, computer mass storage, EMP protection and a smart microgrid controller, the core of IAN's "Resilient Adaptive Modular-Microgrid System" (RAMS(TM)). He is a senior member of the IEEE and is chairman-emeritus of InfraGard National's National Disaster Resilience Council. He can be reached at cmanto@stop-EMP.com

Biodefense Roundtable – Implementation and Operationalization of the National Biodefense Strategy

By Martin D. Masiuk

The Preparedness Leadership Council was truly honored to host a roundtable in October 2018 at the Booz Allen Hamilton Innovation Center, in Washington, DC. During that event, Dr. Robert Kadlec, the Assistant Secretary for Preparedness and Response (ASPR) at the U.S. Department of Health & Human Services (HHS), presented his overview on the President's National Biodefense Strategy. I am pleased to present the meeting readout as a report that will be distributed to preparedness and resilience professionals.

This report would not be possible without the support of many participants, most significantly the ASPR office, including Dr. Kadlec, Theresa Lawrence, Ph.D., CAPT, USPHS, Director, Division of Biosafety, Biosecurity, and Countering Biological Threats, Office of Policy and Planning, and Jack Herrmann, M.S.Ed., N.C.C., L.M.H.C., the Deputy Director of the Office of Policy and Planning. Also, my thanks to Marco Bourne, Joseph Nemmich, Dana Saft, and David Sulek at Booz Allen Hamilton for their sponsorship, support, and guidance assembling this roundtable and report. Additional appreciation goes to the 20 roundtable participants and more than 600 respondents to a nationwide survey from which key data points were extracted.



This is not the PLC nor DomPrep's first report in the biodefense space. In addition to many articles on biodefense, I published the following reports: Advancing Technology in Biological Surveillance and Detection in September 2012; BIODEFENSE. The Threat, the Cost & the Priority in June 2013; and Optimal Biothreat Preparedness: Impeded by Deficits in Funding, Training & Risk Communication in March 2015.

What is different today can be summed up in one word: leadership. This new biodefense strategy is a multi-departmental effort that brings seasoned practitioners together to develop and execute a multilayered plan. As Executive Director of the Preparedness Leadership Council and Publisher of DomesticPreparedness.com, I believe and hope that this is not another half- hearted attempt to address a critical problem, but one that truly comes to grip with this existential threat to our nation's security.

How to Lead the Public

By Eric J. McNulty & Leonard J. Marcus

In almost any adverse incident, whether natural or manmade, the general public is involved. At times, they are the victims and survivors. Active bystanders may be the true first responders simply because of proximity. Volunteers often surge forward hoping to help. Eager though untrained, members of the public can be a help or hindrance – and the difference may be how effectively they are led.

For several years, "whole of community" has been a theme in preparedness and response circles. The goal is to engage as many individuals and entities as can productively participate in making a community safer and more resilient. Few measures, however, can reveal whether the general public is more engaged or better prepared as a result. Professional responders know that the public will be affected and involved. The question is how to lead them most productively.

Members of official organizations tend to self-identify as the "real" responders. The "in" group is comprised of those who are with an agency, are credentialed, or are certified in Incident Command System/National Incident Management System (ICS/NIMS). Then there is everyone else. There can be a tendency to look at these "others" as of marginal value in both preparedness and response. At times, untrained volunteers may offer more risk than reward, as colleagues at the National Preparedness Leadership Initiative (NPLI) saw in the 2010 Deepwater Horizon oil spill (see Figures 1-2). Unskilled and ill-equipped, members of the public put themselves at risk to chemical exposure and did inadvertent damage to the environment. In other situations, such as the 2013 Boston Marathon bombing and 2012 super storm Sandy responses, there was great value from self-deployed, ad hoc responders. Whether assisting the injured in the former or building mesh networks in for communications connectivity in the latter, they filled critical gaps in the overall response.

Fig. 1. Leonard Marcus and Eric McNulty getting ready to fly over the spill during their research on the Deepwater Horizon response (*Source:* NPLI, 2010).

The Roles Nonprofessionals Can Play

The four directions of the connectivity dimension of meta-leadership provide an instructive framework for considering the options. With professional responders in the center of the network, think of them leading: up to those to whom one is accountable; down to those

Fig. 2. A group meets during the Deepwater Horizon response, including Leonard Marcus on the left and RADM Mary Landry (an NPLI alum) on the far right. Landry was the Unified Area Commander during most of the response (*Source:* NPLI, 2010).

who are accountable to them; across to others under a common governance structure; and beyond to peers outside of the common governance structure.

Leading across is the facet least potentially applicable as the public is not one more "silo" in one's organization. From there, however, things get interesting. The "up" quadrant, which typically includes "the boss," is one where influence outweighs authority in giving guidance and prompting decisions. Responders are ultimately accountable to the citizens and taxpayers who sanction and fund their efforts. They are, after all, servants of the public. Seasoned subordinates know that giving those above them a job to do can be the best route to keeping them from finding something counterproductive with which to occupy their time.

Leading down may be where many responders situate the public, either explicitly or implicitly. They give direction to community members and expect obedience. After all, it is the professionals who are "in charge" and who have specialized knowledge and skill to cope with the dangers of a hazardous environment. Subordinate status, however, requires the consent of the suborned. The same members of the public who may willingly follow direction in the chaos of an active shooter event may resist it when trying to assist neighbors after a wildfire. Even with their authorized status, officials are likely to limit the authority they exercise to the most extreme or dangerous circumstances.

For example, in a 2013 interview with Massachusetts' Governor Deval Patrick in the aftermath of the Boston Marathon bombings, NPLI inquired about the decision to "lock down" much of greater Boston (see Figure 3). The governor quickly and emphatically corrected the interviewers. It was a "voluntary shelter-in-place request," not an order to stay off the street. The request was so effective, however, that the mayor of one local community not originally included in the affected area asked his citizens to comply as well. And they did.

Leading beyond may seem an odd designation for the public as it puts them in the category of "peer." However, self-deployed individuals have increasingly played productive roles. Participants in Occupy Sandy distributed food and other supplies to affected populations after that destructive hurricane in 2012. In the aftermath of Hurricane Harvey in 2017, the "Cajun Navy" rescued stranded individuals. Disaster response has become an avocation for some, and they expect respect for the capacity and capability they bring to bear.

Finding the Best Way to Lead

Which way is the best to lead depends on many factors. However, a multi-faceted approach to leading public involvement is both prudent and productive.

For much of the public, leading "up" may be the most effective attitude. Members of the public do not like being told what to do. Witness the frequent resistance to evacuation orders in the face of impending hurricanes and other sever weather. Despite many inquiries, there is not yet a definitive answer as to what percentage of the public has the 72-hour supply of food and other essentials on hand suggested by the government. Nor does anyone know how many people understand why 72 hours is a significant number.

The 72-hour warnings are essentially transactional: Do this (prepare) and the government will do that (show up within three days). The message is "comply and be safer or ignore them at your own peril." A better approach is transformational. One of the tenets of meta-leadership around leading up is instructive in this regard: understand what matters to those above and how those people best receive information. Thinking of the public as a population over which one has, at best, limited positional authority reveals that there is primarily influence to deploy. One's ability to influence can be enhanced by listening and understanding the concerns of those one hopes will prepare for a major calamity. Economic, physical, and emotional forces shape the behavior of people. Grasping and appreciating those considerations is hard work; certainly harder than crafting yet one more clever, prescriptive public service campaign. Yet, deriving those insights is essential to leading behavior change.

Two useful sources of information in this regard are the Edelman Trust Barometer and the Yale Program on Climate Change Communication. The former, updated annually, uncovers how the public feels about institutions, current issues, spokespeople, and communication channels. The Barometer is useful in determining how to frame the message and choose a messenger. The latter, while focused on one specific issue, has much to offer about what it takes to have people comprehend an abstract threat and act to mitigate it.

Fig. 3. Dr. Eric Goralnick, Dr. Barry Dorn, Gov. Deval Patrick, Leonard Marcus, and Eric McNulty at an interview regarding the Boston Marathon bombings (*Source:* NPLI, 2013).

There are other segments of the population to which one can lead "down." Those at immediate perceived risk are often receptive to direction. They sense danger and want to be told what to do. In preparation, there are

those who join Community Emergency Response Teams (CERTs) and similar entities as a way of integrating themselves into the emergency management hierarchy. They may not have full-time disaster responsibilities, though they are willing to invest their time to be trained and, when needed, deployed. They willingly enter the chain of command and are eager to be put to work.

Yet another segment can be engaged by leading "beyond." These are the ad hoc groups such as Occupy Sandy and the Cajun Navy. Official responders can choose to ignore them, although that will not stop them from undertaking their self-appointed mission. They can try to actively discourage them, breeding resentment and potential conflict. Or they can find ways to work with them.

One's ability to influence can be enhanced by listening and understanding the concerns of those one hopes will prepare for a major calamity.

In meta-leadership terms, leading beyond requires motivating unity of mission and often calls for generosity of spirit and action. Each entity needs to invest in understanding and appreciating the capabilities and limitations of others. This is facilitated through "translators" with credibility in both formal and informal response networks. These individuals are able to translate "government speak" into "street talk" and back again. They can explain the rules and norms – even loosely coupled movements such as Occupy have them – to illustrate why entities are behaving in certain ways. The challenge to leaders is to foster peer relationships based on trust and respect.

In their interaction with the Cajun Navy, officials defined the rules of engagement simply: Do not leave anyone in a place where they are stranded. In other words, do not simply move someone from their flooded home to higher ground; get them to an area where official responders can help them. This arrangement leveraged needed capacity from the volunteers and shaped a positive narrative of people working together for the greater good.

A Multifaceted Approach in Practice

The experience of Joplin, Missouri, is illustrative. Joplin is best known for the heroic efforts by the community in the aftermath of a devastating tornado in 2011. Less known, however, is that some of the foundational elements of that response sprung from an initiative to stanch the local high school dropout rate.

A core group of community leaders saw that the economy was shifting. The factory jobs at which a high school dropout could earn enough to buy a home and raise a family were disappearing. The future vitality of Joplin depended on a better educated workforce. They invited people from public, private, and nonprofit sectors to join them and were surprised by the number who responded. This is an important leadership lesson: It is easier to motivate people when *they* perceive the urgency of a problem and are invited to help shape the solution.

Although the doors were open to everyone, there was also a hurdle to participate beyond the initial meeting. Each person had to agree to join a multi-week education program to understand the root causes of the decision to drop out of school. If they were to help solve the problem, they had to commit to truly understanding the problem. They embarked on a shared journey to explore nutrition, poverty, domestic violence, substance abuse, and many other factors that motivated young people to abandon education.

At the end of that process, the group committed to meeting the needs of any potential dropout within 24 hours of learning about it. If someone needed shoes, they would find shoes. If they required a safe place to live, they would provide one. The response network was a coordinated combination of nonprofit agencies providing their normal services, volunteers to fill some of the needs that traditional service providers could not, and funders who would provide the financial resources to meet yet other needs.

In making the commitment to potential dropouts, the group led up. They did not lecture or harangue these young people. Instead, they led by putting themselves in the service of removing obstacles to the success of those students. Within individual components of the system, leading down maintained order and ensured compliance with the relevant laws and regulations. Each entity led across its various internal silos to gain cooperation and contribution to the effort. Beginning with that first meeting, the core group led beyond. They recruited others to give what they could on mutually acceptable terms. They started with the assumption that none of them had all of the answers and that, more likely, all of them had part of the answer.

Then, on that fateful May day in 2011 when the tornado struck, it was this network that sprang into action. The trust-based relationships and problem-solving acuity cultivated for one cause were put to use in another. Some of the same mechanisms, such as for in-kind donations, were flipped from serving potential dropouts to helping tornado survivors. The work they did together is a case study in resilience. For more on their efforts, *Joplin Pays It Forward* NPLI alumnus Jane Cage compiled a book of lessons learned.

Working with the public is a true meta-leadership challenge that presents many defining "you're it" moments. Leading successfully requires the self-confidence and humility to meet people where they are, the wisdom to discern both the potential and pitfalls they represent, and the curiosity to uncover their motivations and concerns. When practiced adeptly, this approach links disparate resources and finds leverage points to unlock vast capacity for preparedness, response, and resilience.

Eric J. McNulty is associate director of the National Preparedness Leadership Initiative (NPLI). Leonard J. Marcus is the NPLI's founding co-director. They are two of the co-authors of a new book on leadership: You're It: Crisis, Change, and How to Lead When it Matters Most (PublicAffairs, June 2019). The NPLI is a joint program of the Harvard T.H. Chan School of Public Health and the Center for Public Leadership at the Harvard John F. Kennedy School of Government.

European CBRNE Summit 2019 – Salisbury & Manchester

By Bobby Baker

Birmingham, United Kingdom – Over the past few years, the term "asymmetry" has been applied many times to the emerging threat landscape to first responders and military personnel around the world. Asymmetrical means that two sides do not match or are uneven. Intelligence SEC's 2019 European CBRNE Summit recently held in Birmingham, United Kingdom, highlighted two of the largest and most prominent chemical, biological, radiological, nuclear, high-yield explosive (CBRNE) incidents in the world: The 2018 Salisbury nerve agent attack and the 2017 Manchester concert arena bombing. Intelligence-SEC will be presenting the 2019 Asian CBRNE Summit to be held 3-5 December 2019 in Bangkok, Thailand.

Many articles and chat groups discuss the 2018 Salisbury nerve agent attack that left the emergency response world asking many questions and covering all response elements – from local Salisbury responders to British Military Special Operations Units. New response matrixes have been documented since this brutal attack involving the first publicly documented execution of a Generation 4 toxic warfare agent. CBRNE experts – from those at the DSTL in nearby Porton Down to major international counterterrorism experts – were called upon to determine what they were dealing with and who might have the capability and capacity to carry out such a surgically engineered attack. This recent incident in Salisbury was the major highlight of the European CBRNE Summit. More than 150 top international leaders and academic scientists gathered to discuss the events with actual incident commanders who worked to mitigate this CBRNE incident in the UK countryside.

The Asymmetric Threat Environment

Today's geopolitical landscape is dynamic and volatile. The ease of deployment of asymmetric threats coupled with the technological advancement of science have created a heightened sense of awareness from local governments to top legislative bodies throughout most of the world. Security experts still warn that simple, practical, and easy-to-deploy metrics are the most probable hazards. However, despite much scientific validity to that point, there is growing concern that asymmetric threats are undergoing an emerging paradigm shift, with major incidents already affecting and likely to continue affecting governments and critical infrastructure – whether deployed as surgical strategic strikes on individuals or with the intent of inflicting a mass casualty effect. Both homegrown violent extremists and potential state-sponsored deployment of these modalities exponentially exacerbate the need for unified counterterrorism training and exercises pertaining to CBRNE prevention and mitigation matrixes. The complexity of the Salisbury incident enhances the need for continuous training and collaboration among all emergency response agencies and the private sector.

Wiltshire Chief of Police John Campbell led the Summit with a detailed presentation of the actual Salisbury response, and highlighted lessons learned and resilience projects that have been berthed from the incident, which affected the entire European Union. In 2011, the United Kingdom released a document, entitled "Contest: The United Kingdom's Strategy for Countering Terrorism," which included the National CBRNE Policing Center and overall strategy as well as roles that different agencies would play in response, consequence management, and forensic investigations – including the prosecutorial evidence gathering to bring those responsible to justice. Due to the ongoing investigation in Salisbury, evidentiary details that might affect that investigation are not listed here. However, response details and training opportunities will continue to emerge.

Salisbury Lessons Learned

The Salisbury incident presented three major takeaways that can be applied to emergency response personnel mitigating similar incidents in the United States.

- The lack of advanced technological detection and advanced countermeasure protocols at the local level hinder the U.S. response plan, mitigation, and treatment of fourth generation nerve agents. Post-9/11, many agencies discarded major supplies of pralidoxime (2-PAM) chloride and did not replace the cache for future attacks. In addition to these gaps, Dr. Laura Cochrane from Emergent BioSolutions highlighted the treatment methods of certain Oxime inhibitors to nerve agents currently being researched. The Homeland Defense and Security Information Analysis Center (HDIAC), which is sponsored by the U.S. Department of Defense, published (Vol. 6, Issue 1, Spring 2019) an article entitled "Next-Generation Nerve Agent Antidotes," which provides a glimpse of advanced research currently being executed among the highest levels of government to combat these emerging threats.
- The need for more unified command exercises and the demand for National Incident Management System (NIMS) nomenclature to be used and exercised within major Urban Area Security Initiative (UASI) cities are well documented. However, many organizations still do not utilize incident action plans or information sharing as formal command tools to enhance community resilience and public safety. The complexity of Salisbury taxed the most robust and formal response protocols that the United Kingdom engaged in. In the first 72 hours, it was thought to be another opioid episode, perhaps involving one of the fentanyl analogs increasingly seen around the world. It was not until experts at the Defense Science and Technology Laboratory (DSTL) at Porton Down forensically identified the known classified agent that was deployed as an assassination attempt.
- During the summit, it became evident that asymmetric threats involving the senses that first responders are taught to enhance and inject in every incident they engage are the most serious. Such threats would tax the most robust and resilient emergency response plans and entities due to the multiple complexities involved. The National Response Framework and the U.S. mitigation method of

> starting with the locals and ending with the locals are different than response plans deployed elsewhere. Although the National Response Framework provides a robust and thorough response to many incidents, the increased reflex time in the deployment of Title 32 and Title 10 assets could have a major effect on incident stabilization and full-site characterization for asymmetric threats that pose an exponential mass casualty effect. The present threat level around the free world continues to increase in complexity due to the multiple modalities deployed quite often over a larger than usual geographic footprint. For example, almost two weeks after the first exposure to the agent, two bystanders casually walking through a park some 30 miles away from Salisbury were exposed to what is now known to be the original dissemination tool. The potential to respond to these events coupled with unknown limits of potential exposures support the need to train and equip highly advanced local CBRNE teams that can rapidly detect and characterize the scene, stabilize the incident, and deliver advanced agent-specific countermeasures in the hot zone.

Dr. Paul Russell, the primary medical microbiology and virology consultant for the Salisbury incident, presented on the nuances and complexities faced during the initial response and first few months following the incident. The fact this took place in vicinity of the DSTL Porton Down Salisbury and not another mass populated city such as London, New York, Dallas, and Los Angeles is a complexity that was discussed at length. Stakeholders noted that emergency responders do not have the luxury of picking the theater in which the event will unfold.

Recently, incidents occurring in unlikely places erase the modern threat matrix formula that utilizes population density as a major indicator of chance contact for such threats. The execution of this event in a town such as Salisbury confirms what many CBRNE experts have known all along: response, training, equipment, and consequence management must be deployed with the understanding that no place and no entity is immune in the modern global transport era. Attacks using never-before-seen agents have changed the emergency response landscape, thus increasing the complexity and adding to the importance of whole of community response and training.

Initial speculation was that the Salisbury incident was like the 2011 attack on Alexander Litvinenko in London using alpha radiation. Due to the 2011 incident, it is understandable why responders would naturally gravitate toward initial experience in previous deployments of CBRNE material. This natural phenomenon of cataloguing from past experiences is a classic example of why full-site characterization is mandatory in response to the dissemination of a substance with an unknown etiology among hazardous materials teams. These teams must rule out what is there, but also what is not there to give the incident commander a full spectrum of analysis to make the best public safety decisions.

Salisbury was exacerbated by many variables that affected the short-term acute response to the incident and long-term consequence management execution that would present 90,000 man-hours of scene remediation – expanding exponentially over a three-week span due to

the peripheral exposure to the two other victims 30 miles away. The unknown dissemination device and unknown location of the agent's inception synergistically complicated matters. Not having a clear picture of ground zero nor where the exposure area stopped delayed a major mode of operation in incident stabilization for two weeks after initial contact with the agent. Only when two later victims fell ill to the exposure did incident isolation take effect. This led to the long forensic investigation and quantification of exactly how much of the agent officials were dealing with.

Similar to the Kim Jong-nam assignation in Kuala Lumpur in 2017, the perpetrators responsible for delivering the weapons of mass destruction (WMD) entered the United Kingdom without any suspicion or detection en route to deliver the weapon. Asymmetric threats present a complexity to prevention and detection protocols. Criminals who execute asymmetric attacks are not bound by lists and entities that mankind produced. Kuala Lumpur was shut down for two weeks, with an economic loss and psychological impact that only dissolves as time goes on. Led by the lack of a triggering event, the emergency medical services (EMS) team that responded to the two victims in Salisbury initially assessed the case as an opioid overdose due to the similarities of presentation and lack of SLUDGE (salivation, lacrimation, urination, defecation, gastrointestinal distress and emesis), which is common with nerve agent exposure. This delay in the adrenergic response presented a complexity that continued for a few days until DSTL in Porton Down confirmed the presence of generation four nerve agent through forensic blood tests.

Almost two years post-incident, the emergency response community at the local level is having difficulty getting the information and training needed to classify and give some type of qualitative data for public safety consequence management. Detection capabilities continue to be a controversial topic as to which technology works best to detect these agents due to classification. To save lives, a tremendous amount of work is needed on the detection capabilities to be placed on the approved equipment list in the United States coupled with advanced countermeasures to combat these threats. Only the adversaries have the luxury of knowing when an attack will be deployed, so first responders deserve the latest and best technology to correctly classify threats present, minimize exposure to these agents, and avoid becoming victims themselves.

Manchester Lessons Learned

On the eve of the Ariana Grande concert on Sunday, 22 May 2017, the adversarial tactic for defeating security measures was to place improvised explosive devices and other potential WMD at the exit points of mass gatherings. This tactic caught security and emergency responders by surprise. The Manchester incident introduced the common theme that tactics, techniques, and procedures engaged in by the adversary are a dynamic and nonlinear delivery model that is constantly being enhanced and changed to produce a mass effect.

Allen Cordwell, head of the Northern Care Alliance NHS Trust, is a former British military operative who presented a humbling and grim scene of the tragic carnage left behind from the not-named adversary in the Manchester arena bombing. The Northern Care Alliance is comprised of four acute care hospitals in the northern region of the United Kingdom and one

urgent care facility – including a staff of 17,500 workers supporting the mission of protecting and providing emergent care in all modalities related to asymmetric threats and CBRNE materials. The Manchester incident left 22 dead, 140 injured, with 23 of these patients triaged as critical care.

Deliberate attacks in the United Kingdom implement the "NCA Index of Suspicion Model – Level High," with the first patients arriving at North Manchester undergoing radiological scans combined with detection of possible chemical contamination. Negative scans were initially reported as being absent and ruled out, leading one participant at the summit to ask how many emergency response protocols call for scanning initial victims for radiation and chemical agent contamination. Continuous reporting utilizing the Index of Suspicion canary model limited controlled movements of staff for the first 30 minutes with another assessment at 60 minutes. After all patients were cleared, surveillance was maintained throughout the clinical treatment phase of each patient. Observation of close proximity staff, responders, and volunteers continued throughout the event looking for early warning signs of CBRNE contamination and exposure to persistent chemical agents.

Following are lessons applicable to future mass casualty care in potential asymmetric attacks that include an explosive weapon delivering kinetic energy to inflict acute life-threatening traumatic injuries:

- Supply chain needs to ensure sufficient surgical instruments and implants available for maxillo-facial reconstruction, as well as sufficient wound care dressings.
- Continued training and implementation of tourniquets must be included for the whole community to save lives, much like the introduction of automated external defibrillators (AEDs) for treating ventricular fibrillation.
- Damage limitation surgery *must* be limited to a 1-hour maximum.

- All wounds from ballistic injuries that have removed shrapnel are part of forensic evidence – label and store.
- Daily trauma conference of all surgical specialties is needed.

Asymmetrical Threats to First Responders

The asymmetric threat landscape is more dynamic than ever and will continue to expand in complexity due to the ease of transport and increasing ease of delivery modalities for complex unseen asymmetric threats. For these reasons, more diligence and calculation in a unified and synergetic delivery method are needed to cover training as well as research and development in all metrics of response – including but not limited to personal protective equipment (PPE), detection equipment, and the ability to rapidly disseminate countermeasures in all asymmetric threat modalities that can be scientifically delivered.

As more data about emerging threats to critical infrastructure become available, the need for quick and decisive preventive countermeasures in public venues becomes more important. Protecting the public from population and critical infrastructure perspectives are vital components to incident stabilization. Since the European CBRNE Summit, there has been a rapid increase in the Ebola crisis in the Congo, an estimated 200 million pigs will be destroyed in China due to a rapid outbreak of the Africa swine influenza although scientists say that it is strictly relegated to animals only and has shown no signs of spreading to humans. Multiple U.S. law enforcement personnel continue to be exposed to fentanyl, typhoid fever, and other asymmetric threats while serving in the community. An increasing likelihood of exponential exposure and chance contact with an asymmetric threat outside of normally seen tactics, techniques, and procedures to first responders continue to dominate the current prevention and response landscape and will only increase with time.

This dynamic will continue to challenge stakeholders, as recently seen with the Los Angeles Police Department exposure to typhoid fever in downtown Los Angeles. The board of directors for the Los Angeles Police Protective League, the police labor union, said in a statement that officer safety must be considered. "At this point we don't care who is at fault, we just want these toxic work sites cleaned and sanitized," the statement reads. "Officers worry enough about being shot or injured policing the streets of Los Angeles, they shouldn't also have to worry about being infected with diseases they can take home to their families simply by showing up to work. Our demand is simple; clean it up and provide preventive measures before there is a massive outbreak." The common operating picture has changed dramatically, leading to two new operation level responder mission-specific competencies for diving in contaminated water environment and evidence collection were added to NFPA 472 2018.

The Salisbury incident demonstrates how a Salisbury police officer on patrol on a quiet Sunday afternoon was the first external exposure to the agent of record. The standard operating picture must be addressed for field patrol officers as to the correct PPE to be donned in the field to maximize protection for responders. The actual etiology of the symptoms to

the victims transported had yet to be identified. However, this leads to the need that all first due responding personnel must be provided with basic all hazards training and personal protective equipment.

The asymmetric biological threat continues to dominate the current emergency planning docket around the world as biological pandemics affecting major countries rapidly rise. Adding a biological detection capability with in-field polymerase chain reaction (PCR) could help classify and prevent the presence of biological incidents such as Ebola and Anthrax. This would support the hazmat teams' consequence management goals of life safety, incident stabilization, and critical infrastructure preservation, and increase the resilience and ability to return to normal daily operating routines. Biological asymmetric threats potentially could shut down and interrupt major critical operating modalities in a synergistic and cascading effect, thus increasing the potential life safety and economic disruption to the nation. Public safety sampling and the ability to rapidly deploy accepted scientific technology such as in-field PCR, with the goal of providing the incident commander and hazmat group supervisor a quick and accepted decision matrix for public safety should become the gold standard among first responders and hazmat teams nationwide. This technology enhances early notification of the Department of Justice WMD Directorate nationwide, combined with the totality of the circumstances to help implement Title 18 statutory command in the event it is classified as a terrorist event.

Continuous reporting of daily asymmetric threat execution is no longer mandated and separated by earlier geographic regions. Chance contact among various emergency response personnel – both in the homeland security arena and the military arena abroad – should encourage stakeholders as a group to continuously improve and enhance capabilities to mitigate current and future emerging asymmetric threats in all parts of the world.

Captain Bobby R. Baker Jr., (RET.) Dallas Fire Rescue, is a senior training specialist with the Counter Terrorism Division with Mission Support Test Services LLC, the primary contractor to the Nevada National Security Site and the Department of Energy based in Las Vegas, Nevada. He recently joined CTOS after serving 20 plus years, retiring as a captain with Dallas Fire Rescue in 2018 as the WMD/hazmat coordinator for the Type 1 Dallas Fire Rescue Hazmat Team. He was responsible for the daily regulatory compliance, training and response competencies for the Type 1 DFR Hazmat Team servicing the City of Dallas and the 16 county North Central Texas Council of Governments. He holds numerous critical infrastructure protection certifications from the Department of Homeland Security specializing in adopting countermeasures to prevent and deter large-scale CBRNE mass casualty events. He is a frequent speaker and guest lecturer on all matters concerning CBRNE consequence management for local response agencies, emphasizing the need for multiple agency unified command and training among all first responders. He recently presented "Asymmetric Threats to First Responders" at the European CBRNE Summit in Birmingham, United Kingdom, in April 2019. He is a 2003 graduate of Dallas Baptist University with a Bachelor of Science in History and World Religion.

None of the statements presented today are representative or reflective of the Counter Terrorism operations support (CTOS), MSTS, and or the Department of Energy or the United States Government. All information in the presentation is representative of Capt. Baker (Ret) and his affiliation as an editorial board member of the Domestic Preparedness.

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