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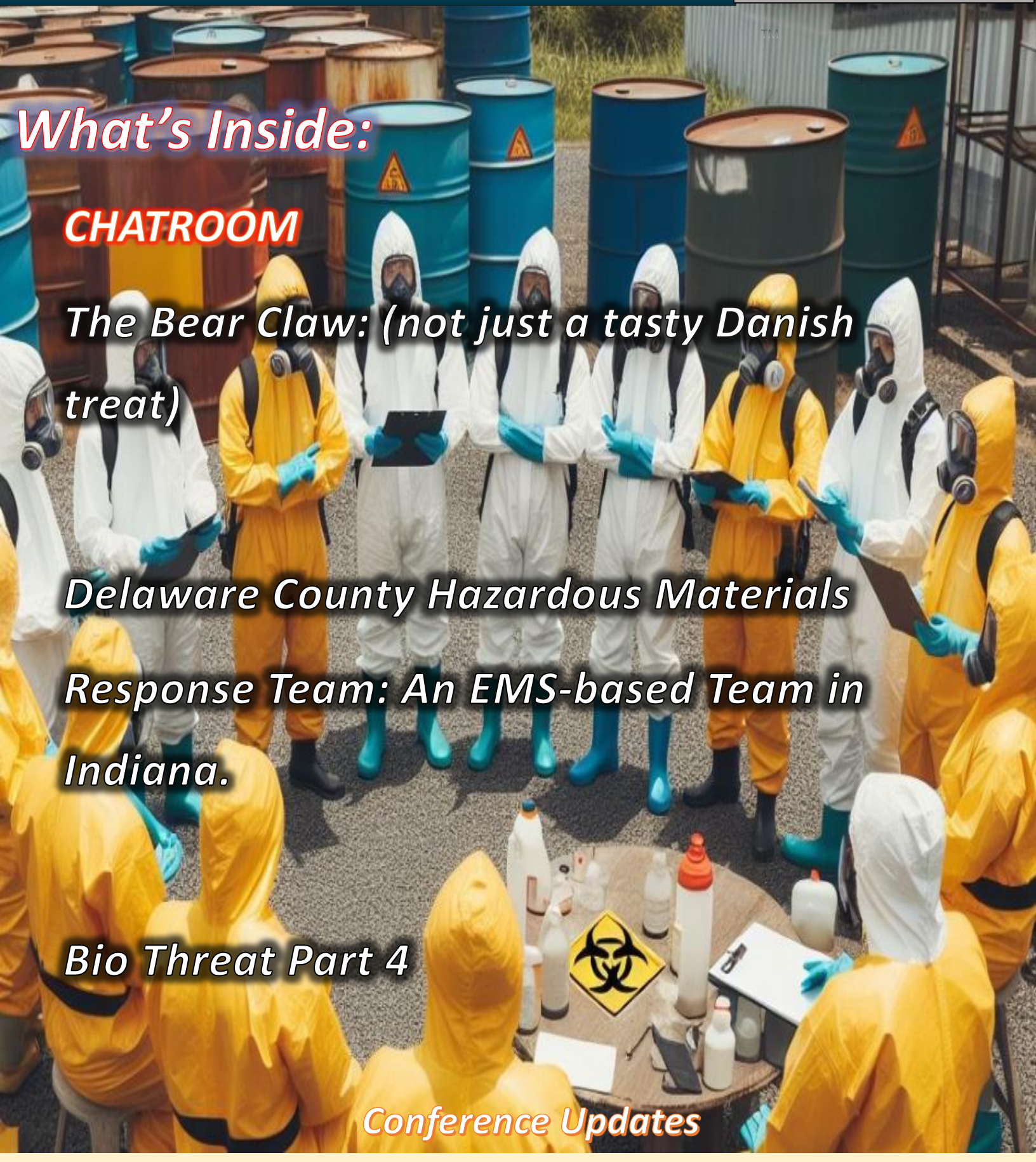

What's Inside:

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 If you would like to contribute an article want to advertise or have a question, please contact us at the following *submission@hazmathq.com*

CHATROOM – Around the U.S.

Here are five notable hazmat incidents from last month, along with the lessons learned from each:

Here are five hazmat incidents from around the world in the past 30 days, with more detailed descriptions and key lessons learned:

1.Hydrogen Fluoride (HF) Leak - Louisiana, USA (October 2024)

At a petrochemical facility in Louisiana, a significant hydrogen fluoride leak occurred. HF is a highly toxic and corrosive gas, used mainly in the production of refrigerants. The leak prompted an immediate shelter-in-place order for local residents. It took several hours to contain the leak, and the facility has had a history of hazardous incidents.

Lessons Learned:

1. Infrastructure Maintenance: Aging pipelines and equipment should be regularly inspected and maintained to avoid recurring leaks.

2. Leak Detection Systems: Facilities should install advanced gas detection systems to quickly identify and respond to leaks.

3. Training for Workers: Comprehensive training programs are crucial for workers handling dangerous chemicals like HF, particularly in emergency response.

4. Safety Audits: Regular safety audits should be enforced to assess the risks associated with hazardous materials.

5. Public Communication:Facilities near residential areas must have efficient public alert systems for quick evacuations or shelter-in-place actions.

2. Chemical Fire - Port of Los Angeles, USA (October 2024)

A fire broke out in a chemical storage facility at the Port of Los Angeles. It involved flammable liquids, which intensified the blaze. Firefighters from the Los Angeles and Long Beach fire departments were called in, and it took several hours to control the fire. The incident led to a temporary closure of parts of the port.

Lessons Learned:

1. Proper Chemical Segregation: Flammable materials should be stored separately from other chemicals to minimize fire risks.

2. Specialized Fire Suppression Systems: Facilities handling flammable liquids must have fire suppression systems tailored to handle chemical fires.

3. Multi-Agency Coordination: Effective coordination between multiple agencies (fire, hazmat, and port authorities) is essential during such incidents.

4. Regular Emergency Drills: Drills should simulate multi-hazard incidents, ensuring all teams are prepared for complex scenarios.

5. Decontamination Readiness: Emergency response teams should have immediate access to decontamination equipment to protect against chemical exposure.

3. Ammonia Leak - Normandy, France (September 2024)

At a food processing plant in Normandy, France, a significant ammonia leak occurred. Ammonia is commonly used in refrigeration systems but can pose

severe health risks if inhaled. The leak caused local authorities to evacuate the surrounding area and close roads until the situation was under control. No fatalities were reported, but several individuals experienced respiratory issues.

Lessons Learned:

1. Routine Equipment Checks: Regular inspections of refrigeration systems are essential to prevent leaks of hazardous substances like ammonia.

2. Quick Containment Protocols: Facilities should have protocols for immediate containment of leaks to minimize exposure.

3. PPE for First Responders: First responders must be equipped with proper personal protective equipment (PPE) for ammonia exposure.

4. Public Safety Communication: Clear communication channels should be established to inform the public about evacuations and road closures.

5. Ammonia Sensors: Facilities using ammonia must ensure that their detection systems are regularly tested and fully operational.

4. Naphtha Spill and Fire - Gujarat, India (October 2024)

A storage tank containing naphtha, a highly flammable liquid, leaked and caught fire at a refinery in Gujarat, India. Naphtha is used in the production of gasoline, and this incident posed serious fire and environmental risks. Firefighters worked for over 12 hours to bring the blaze under control, and residents in nearby areas were evacuated as a precaution.

Lessons Learned:

1. Secondary Containment Systems: Naphtha storage tanks should be equipped with secondary containment systems to prevent spillovers.

2. Regular Tank Inspections: Frequent inspections are crucial to identify structural weaknesses in storage tanks.

3. Fire Suppression Systems: Refineries must ensure their fire suppression systems are adequately maintained to respond to large-scale fires.

4. Community Evacuation Plans: Neighboring communities should be well-versed in evacuation procedures in case of chemical spills.

5. Backup Power Systems: Refineries must have robust backup power systems to maintain operations during emergencies.

5. Sulfur Dioxide (SO2) Release - São Paulo, Brazil (October 2024)

A sulfur dioxide release occurred at a chemical manufacturing plant in São Paulo, Brazil. SO2 is a toxic gas that can cause respiratory problems and environmental harm. The incident led to widespread health complaints from residents, with many reporting breathing difficulties. Local authorities issued a shelter-in-place advisory until the air cleared.

Lessons Learned:

1. Continuous Air Monitoring: Facilities handling hazardous gases like SO2 should have air quality monitoring systems in place to detect harmful releases in real-time.

2. Efficient Communication with Authorities: Quick coordination between the facility and local authorities can reduce the response time in hazardous incidents.

3. Public Safety Protocols: Clear guidelines on sheltering in place should be communicated to the public in advance.

4. Upgrading Equipment: Equipment designed to store or process corrosive gases like SO2 must be regularly updated to meet modern safety standards.

5. Community Awareness Programs: Educating nearby residents on the risks associated with hazardous chemicals can lead to more effective emergency responses.


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The Bear Claw

(not just a tasty Danish treat)

By: Lt. Gavin DeGrave

Racine Fire Department

Capt. Casey Simon

Milwaukee Fire Department

We are living in a time when technological advancements are constantly introducing new and improved tools for use at HazMat incidents. However, the tried-and-true colorimetric papers remain a relevant and important option in our arsenal. Somewhere along the line, instead of just walking around trying to hold on to 3, 4 or more colorimetric papers in our hand, a Hazmateer had the idea

to pre-assemble the papers together to make it easier to attach to entry personnel or their equipment. This was given the name of the "bear claw" due to its astounding resemblance. No Bruins have filed a complaint about this terminology being inappropriate as of the writing of this article. Within this article we will be discussing a few of the more common versions of the bear claw, their applications, and a review of the various papers most commonly used.

Home Made Bear Claw

The most basic version is made by simply taking pH, F, and K paper and folding a piece of duct tape over them (*Figure 1*). A zip lock

bag with 10 of these is generally enough for multiple entries into the hot zone. These homemade versions could additionally have M8 paper added to them. These are a cheap, easily made option that can then be used in multiple ways. One issue to consider with the homemade versions is the entry team personnel must either be sufficiently comfortable with the papers to read them on the fly or radio any changes back to Command for interpretation.

We normally use this version to attach to the recon or entry team. Taping one to the boot of the entry team addresses heavier than air vapors and adding a second to the forearm or near the face shield of a SCBA or Level A

addresses lighter than air vapors. Additionally, taping one to the end of a broom handle, or equivalent, allows members to observe changes prior to fully immersing themselves in a non-visible cloud. Just as with all air monitoring though, the entry team must proceed in a deliberate manner to give the papers a chance to react.

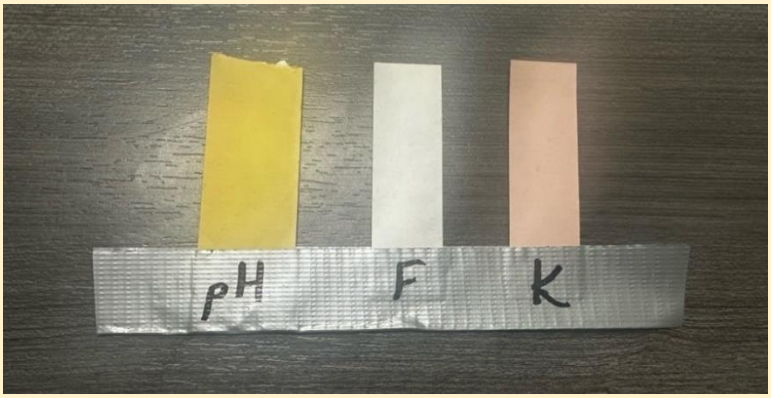

Figure 1: Homemade Bear Claw

Commercial Bear Claw

Another option currently on the market is commercially available Our Claw from a site called www.inourgear.net (note that there are several websites selling varying versions of the Bear Claw). This tool provides

an easy-to-use option that is reusable; you just need to add the papers to the clips. They have both a 4-claw version with legs for pH, F, K, and M8 paper or a 5-claw *(Figure 2)* which adds a claw for water finding paper. There is the option for the Our Claw to be handheld or attached to entry personnel with a wristlet. These are an affordable option that will run about $15 (keep in mind the papers cost extra). One advantage these have over the homemade version is that it lists information for interpreting any reactions you may have; directly on the "Our Claw."

Figure 2 – The 4 or 5-Leg "Our Claw" photos obtained from www.inourgear.net

CST Version of the Bear Claw

Our state Civil Support Team came up with their own version of the Bear Claw which bears mentioning (see what I did there?). They print address labels which identify which papers are present as well as a spot to write in the Location. These labels are used to affix the papers to index cards *(Figure 3).* They use these specifically when dealing with multiple unknowns, such as might be found at a clandestine lab. They lay them out next to the various containers and then using a pipette place a drop on each of the papers. For evidentiary purposes, they can then take pictures of the container and the card to make it easier to keep track of their findings. The picture is an approximation of what they

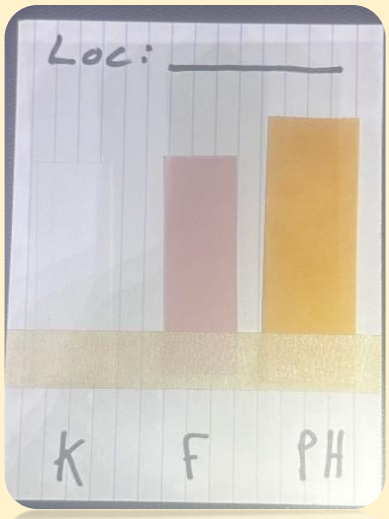

Figure 3: CST Bear Claw

use. They look much better. So now that we've reviewed a few variations of Bear Claw as a whole; let's dive into the individual papers a little further… What are you wearing for PPE when it comes to unknown chemicals? How do you make that decision? SOP/SOG? We were taught in class or during training to always have 3 reference sources. Don't make decisions based solely on SOP/SOG; base it upon the facts you have before you. Utilizing the components of the Bear Claw aids in that fact finding process.

KI Paper

Potassium Iodide Starch Paper (KI Paper for short) is utilized to detect the presence of Chlorine, Iodine, and Peroxides in solutions (oxidizers). Lower levels react with the strip between 5 – 10 ppm. Initial reactions show a slight blue color, while higher concentrations turn the strip from dark blue to purple. (*Figure 4*)

Why do we care? Oxidizers speed up the development of a fire and can make the fire more intense. Oxidizing agents cause substances that do not normally burn readily in air to burn more rapidly. Combustible materials can burn spontaneously without

the presence of obvious ignition sources such as from a spark or flame.

Figure 4: Photo courtesy of Amazon.com showing positive hit

Tip: Wetting KI paper can help detect oxidizing vapors around you

F Paper

For any unknown substance, the utilization of F Paper is a must. F Paper is used to detect the presence of Fluorine. Fluorine is extremely corrosive, toxic, and highly reactive. Fluorine is found naturally and utilized in many different everyday applications such as

dental cleaning and mouthwash. However, fluorine is also in Hydrofluoric Acid (HF); HF is hazardous to humans through inhalation, ingestion, and direct contact. Without the correct medical attention, even low concentrations can be hazardous to human health with delayed effects. Any HF exposure requires immediate specialized medical treatment.

When F Paper comes out of the box it is Pink in color (*Figure 5*); with a positive reaction changing to a yellow-white color when exposed to an acidic chemical containing fluorine, such as Hydrofluoric Acid (HFA) or Hydrogen Fluoride (HF). (*Figure 6*)

Figure 5: Photo courtesy of safeware.com

Figure 6: Photo courtesy of Noble.com

pH Paper

The Hazmateer's most basic, yet trusted tool in the toolbox, pH paper (*Figure 7*). pH stands for potential hydrogen, which measures the number of H+ (hydrogen) ions there are in a substance, which determines its acidity. If the substance has a high concentration of H+ ions, it is classified as an acid, and if it has a low concentration of H+ ions, it is classified as a base. It is used to determine the presence of Acids or Bases, more specifically Corrosive

materials. We know that Corrosives can hurt us if inhaled or if they get on our skin.

The most common wide range pH scale paper will turn green into a darker blueish/purple indicating the presence of a Base or Alkaline (8 <). pH paper that turns orange to reddish is an Acid (> 6). If it stays that light green color, it is indicative that the chemical is neutral, which is what we like to see.

There are many manufacturers and different types of pH Paper on the market, from small testing strips to large adhesive strips to varying wide or narrow pH ranges. Know

what your pH paper looks like, how it is used, and what it exactly reads.

Utilizing pH Paper allows us to make better decisions; especially when it comes to our PPE. I asked before what you are wearing for unknown chemicals. We still don't know what the chemical is when utilizing pH paper; however, we have narrowed it down to at least one of the associated dangers. This helps us make decisions on PPE.

Trick: Wetting pH Paper with sterile water prior to entry can help indicate the presence

of corrosive vapors before you even get near the spill or leak.

Figure 7: Photo courtesy of MicroEssentialLab.com

Tip: Don't let the color blind Hazmateer be the person down range reading the pH Paper!

M8 Paper

Teams should be familiar with how to use M8 Paper because it is a quick way to detect and identify Blister (H-) Chemical and Liquid Nerve (G and VX) agents. Additionally, M8 paper aids in detecting and classifying fourth generation agents (FGA), also known as A-series or Novichok nerve agents. M8 Paper is

typically used by taking a small sheet and dabbing it onto a suspicious liquid to see if it changes color.

Figure 8: Photo obtained from: https://www.psmagazine.army.mil/News/Article/3380958/

A-series color change from dark green to yellow green

M8 Paper is a three-color detector paper used to detect and identify liquid nerve agents and liquid blister agents. It changes color depending on the type of agent detected:

- The paper will turn yellow or gold if it detects a G-series nerve agent.
- The paper will turn green if it detects a V-series nerve agent.
- The paper will turn red or pink if it detects a blister agent like mustard gas.
- Upon exposure to a liquid, a yellow/green or green/blue color is indicative of an FGA and may shift to a more yellow color over time (up to 10 minutes). This color change is further indicative of an FGA versus VX.

As you read, there are many versions and variations of the Bear Claw in the HazMat World. We utilize these papers to assist in making decisions on our next steps. We hope

that these few examples are of use to you and your team. Perhaps it even sparked an idea for a new or different application of the Bear Claw, if so, please share it with all of us!

Keep on being a NERD!

Gavin DeGrave

With over 15 years of experience as a HazMat Technician, Gavin has dedicated his career to ensuring safety and effective management in hazardous materials incidents. Throughout his extensive tenure, he has embraced a variety of roles, ranging from downrange operations to serving in a command capacity as Science Officer and Incident Commander. Currently a Lieutenant with the Racine Fire Department, Gavin is also a key member of the Regional Hazardous Materials Type II team and contributes to WI Task Force 1, showcasing his commitment to community safety and emergency response.

Since 2018, Gavin has embraced the role of instructor, sharing his knowledge and expertise in both public and private settings. His training focuses on fire dynamics and hazardous materials response, covering all levels from Awareness to Technician.

Gavin's passion for educating the next generation of responders highlights his dedication to enhancing safety standards and fostering a culture of preparedness. With a wealth of experience and a mission to protect people and the environment, Gavin is at the forefront of hazardous materials safety and response. He can be reached at gavin@hazard3.com

KC Simon

Casey Simon has more than 15 years of Hazardous Materials experience and training that spans the private and public sectors. He serves as a Fire Captain within the Milwaukee Fire Department and is a member of Wisconsin's largest Hazardous Materials Tier I Team; which serves as a State asset. Casey also currently teaches HazMat Awareness, Operations, and Technician level training at the local technical college. He has taught at just about every sort of facility that has reportable hazmat on premise or may deal with hazardous materials; such as hospitals, chemical facilities, food production/storage facilities, and to first responders/hazmat teams. He is what most people consider a NERD; mainly because of his passion for HazMat. He can be reached at Casey@Hazard3.com

Delaware County Hazardous Materials Response Team: An EMS-based Team in Indiana.

By EMA Director and Hazmat Team Deputy Commander John Coutinho

Introduction

The Delaware County Hazardous Materials Response Team is a specialized emergency response unit based in Muncie, Indiana. Operating as an EMS-based Level A service, the team provides critical support for hazardous material incidents across Delaware County and the surrounding 13 counties within the Indiana Department of Homeland Security (IDHS) District 6.

Background

The inception of the team arose from the pressing need for decontamination services in response to a rise in clandestine methamphetamine labs in the mid-2010s, as well as the threat of H1N1 viral threat, and increased threats of WMDs after 9/11. Local police, EMS, and fire agencies identified a gap in resources, prompting the establishment of the team to enhance community safety and operational effectiveness.

Expansion and Equipment Acquisition

Initially formed to address decontamination needs, the team

quickly evolved into a comprehensive hazardous materials response agency. Key developments included the acquisition of a used Spartan full walk-through Heavy Rescue vehicle, equipped with a variety of specialized tools and supplies.

Over time, the team's capabilities have further expanded. The addition of a large box trailer allows for the transportation and housing of extensive remediation supplies and equipment. Moreover, a dedicated trailer has been established to facilitate decontamination operations, enhancing the team's response readiness.

To bolster its technical capabilities, the team has successfully pursued multiple grants, enabling the acquisition of advanced diagnostic equipment. Notable additions include a handheld Raman mass spectrometer, alongside various radiological and biological testing supplies, which enhance the team's ability to assess and manage hazardous materials effectively. Recently, the team acquired specialized containers and suppression devices to handle small to medium-sized lithium-ion battery fire incidents.

Team Structure and Management

The Delaware County Hazardous Materials Response Team is primarily managed through Delaware County Emergency Medical Services (EMS), under the leadership of Director Mike Ashley. The Hazmat Commander position is held by Greg Micheal, the EMS Deputy Director. The team consists of 12 certified hazmat technicians and over 20 individuals trained in hazardous materials operations and awareness. The team plans multiple events every year to educate and familiarize local fire response agencies with the team and its capabilities. This year, the team also hosted high school students from the

Muncie Area Career Center public safety class.

The Delaware County Emergency Management Agency (EMA) plays a pivotal role in the team's operations, particularly concerning the tracking and billing aspects of response activities. The EMA Director, John Coutinho, serves as the Hazmat Team Deputy Commander, while the EMA Deputy Director, Cory Kissick, and Logistics Chief, Kyle Johnson, also contribute their expertise to the team.

Conclusion

The Delaware County Hazardous Materials Response Team represents a vital resource for managing hazardous material incidents in Indiana. Through ongoing training, equipment acquisition, and inter-agency collaboration, it continues to enhance its capabilities, ensuring the safety and well-being of the communities it serves.

Photos & caption

Left: EMS Deputy Director & Hazmat

Team Commander Greg Micheal. Center: EMS Director Mike Ashley. Right: EMA Director and Hazmat Team Deputy Commander John Coutinho

Hazmat team members testing an unknown substance incident using the lab equipment on the Hazmat 1 truck.

Muncie Area Career Center students participating in hazmat decontamination training with the team.

The Hazmat Team and LEPC hosted a Propane Water Injection Class for local fire departments.

Newly acquired Lithium-ion fire suppression containers

The Biological Weapon Threat- (Part 4) Recognizing the problem

By Kevin Ryan

New challenges are given to first responders on a regular basis now. Time and again these responders rise to the occasion and provide the answers. Hazmat responders in particular had to adapt and overcome the biological threat in response to the events of September 2001. More than 20 years later the words virus, bacteria and toxin are a part of every Hazmat Tech's vocabulary and training material. Equipment and procedures developed allowed for a reasonably rapid determination of the threat level involving suspicious substances. The investigation

techniques utilized are really no different than any other hazmat. The training and equipment just needed to catch up to the new threat. Members of the Baltimore City Fire Department Hazmat discovered our suspicious substance procedure could be used as a guide for investigations that were not just sent in letters. One such case took place in April of 2017. A single engine company was sent to investigate a package that was reported to have exploded or ruptured. The location was a shipping store in the base of a high rise hotel in downtown Baltimore. Once on scene, the OIC (officer in charge) quickly requested for a hazmat tactical (tactical consists of Battalion Chief, (2) hazmat trained companies and hazmat unit) to respond. Initial recon with members of the BCPD Bomb Squad showed an

exploded shipping box that contained a thermos bottle used to keep a biological sample chilled for shipment to a university lab in Florida. The threat of a secondary explosion was quickly ruled out once initial recon was completed. The package sender also kept a lab at a university in downtown Baltimore. The sender regularly shipped samples in this manner between his labs. The focus of the investigation turned to assess the biological as there were 2 workers in the store possibly exposed. The sender was also identified and contacted to return to the scene. The IC and Hazmat OIC's on scene formulated a plan to take samples at specific places in the shipping store. The suspicious substance procedure was used as a guide yet modified to meet the needs of a different environment. The procedure

provided assessment, PPE and detection options to assist the IC with his decision making. The occupants were interviewed using the Risk Assessment Sheet. A better understanding of the scene, package and scenario was given to the IC and entry members based on the Risk Assessment. The determination of the WMD compliant suit along with a CBRN cartridge was suitable for PPE. The bio detection equipment listed on the Entry Procedure was used to assess possible samples of the thermos bottle or surrounding surfaces. A protein check, lateral flow HHA and other options were utilized. Samples were taken at several points most notably from the thermos and places where the sample could have been dispersed to. The entry team found it difficult to properly assess the scene given

the rupture that took place, scattering the package in all different directions. The sender finally returned to the scene to give more information on his package. The sample was bacteria called bdellovibrio that he was studying in his labs. He would use liquid nitrogen to cool the inside of the thermos bottle then pack the sample in ice and close up the thermos bottle. A biologist from USAMRIID was consulted about bdellovibrio. She described it as a threat to other bacteria but not human beings. The sender was studying the bacteria in specific environments and ecosystems. The most logical explanation to explain the rupture would be that liquid nitrogen was not completely removed from the bottle before the ice was added. The ice would be at a higher temperature causing the liquid

nitrogen to warm up. The warming process would create pressure inside the closed vessel. The pressure then eventually would cause the rupture of the container. The sender had only packaged the sample within the last hour so it did not take long for the pressure to build inside the container. The incident really got us to see how versatile the suspicious substance procedure could be. We were able to assess the scene, use the entry procedure to manage the risks and use our findings to determine if the scene was a criminal threat in any way. As it turned out, the cause was unintentional. Local law enforcement was on scene throughout with federal agencies updated on the incident progress. The procedure continues to be more diverse than we ever thought. The investigation of fentanyl fits right in with our

procedure. We simply added narcotic and fentanyl specific test kits backed by IR capabilities already in our arsenal. PPE was adjusted as needed to possibly include SCBA instead of CBRN cartridges depending on the scenario. Part 4 concludes the this series on the Biological Weapons threat. Readers with any questions or comments can email me at kevin.ryan@baltimorecity.gov.

Kevin Ryan leads the Baltimore City FD Hazmat Operations Office. A 31-year veteran of the fire service with 26 years of experience in the world of hazmat response. He is a Level III instructor and adjunct at the BCFD Fire Academy.

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