



Lessons Learned & Success Stories – July to September 2023

The NBACC Mishaps, Lessons Learned and Success Stories Summary serves to reinforce a strong culture of safety and accountability by promoting consistent reporting of mishaps, establishing strong lines of communication with the safety department, supporting a learning environment by allowing others to learn from reported events, and tangibly demonstrating NBACC Leadership’s commitment to safety, accident prevention, and continuous improvement.

LESSONS LEARNED:

1. Safety signs are critical to alerting individuals to potentially dangerous or hazardous areas and to prevent injuries and accidents. In fact, lack of safety signage is one of the leading causes of workplace injuries; however, it isn’t just safety signs that require our attention. Other signage throughout the building reminds us of our compliance and security responsibilities, such as those communicating regulatory reporting expectations or authorized access restrictions. Together these signs help staff and visitors navigate NBACC successfully. Since we rely on signage to educate, inform, and guide us through our workday, it is important that we ensure the signs throughout the building are present, up-to-date, accurate, and intelligible. If you notice that there are signs in the building that are insufficient or require review, please reach out to the process owner to have it addressed. Let’s make sure we are providing everyone with the information and awareness they need to continue to succeed.
2. An important line of defense in keeping our laboratory workers safe is the personal protective equipment (PPE) we don before we conduct our activities. These safety measures are in place to protect us from exposure to chemicals, infectious agents, laboratory accidents, hazards, and anything else that could cause us to be put in a position of not being able to perform safely. PAPRs, BSL-4 suits, hard hats, steel toed boots, gloves, shoe covers, lab coats, and protective eyewear only work when used appropriately. It also helps to be proactive and aware of those around us. If you see someone who could use a hand, a slight adjustment, or additional PPE, let safety be your guide. Know before you go!
3. This month’s events are a good reminder to report spills of any kind. Even if the spill is seemingly innocuous, such as a disinfectant or water, always follow proper spill procedures for the biosafety level you are working. The Health and Safety department will guide you through whatever clean-up procedure is appropriate. This reflects NBACC’s strong reporting culture and shows that no incident is too small to be reported.

EVENT SUMMARIES:

1. **FIRST AID SUMMARY (CUTS):** In all the following incidents, personnel reported to the Competent Medical Authority (CMA), first aid was applied as necessary, and laboratory restrictions were placed if needed.
 - 07/12/2023; A staff member was checking water lines in a server room when they scraped

their head on a zip tie that was holding some of the lines together. The staff member did not immediately notice the injury and reported to the Occupational Health Clinic the next day. It was noted that the connectors of the zip ties have a sharp edge, so the group plans on replacing all the zip ties with Velcro® straps.

NEAR MISS SUMMARIES:

2. **SPILL SUMMARY:** 06/07/2023; A staff member working in a BSL-2 laboratory was transporting a 2L glass filtration system when the Erlenmeyer flask on the bottom of the system fell and broke. The filtration system is held together by glass friction between the flask and filter housing. The staff member was holding the filtration system by the joint and did not have the bottom supported at the time of the incident. The filtration system contained trace amounts of water with 0.1% of trifluoroacetic acid. The glass was cleaned up and disposed of in a sharps container.
3. **SPILL SUMMARY:** 06/24/2023; A staff member working in a BSL-4 laboratory was placing sample collection tubes from a study involving a Risk Group 4 (RG) agent into a centrifuge bucket when they dropped it onto the counter and then it fell to the floor. The spill caused roughly 0.5 mL of sample to leak from the tube onto the counter and floor despite the cap remaining on the tube. The staff member remained hooked up to air and deconned the floor and counter with Micro-Chem Plus™. While reporting the incident to Health and Safety, the staff member explained that the seal of the tubes must be broken to allow gravity collection of the samples. Following discussions with Health and Safety, it was determined that the leak was either due to breaking the tube seal, the stopper not being completely pushed into place, or by residual sample being stuck near the stopper top. Moving forward, following sample collection, the top of the tubes will be wrapped in Parafilm™. The CMA ruled there was no potential exposure.
4. **PROCEDURAL FAILURE SUMMARY:** 06/26/2023; Two staff members entered a decontaminated BSL-4 laboratory without PPE, as the staff members did not know that the room had had a recent occupancy status change because there was no signage on the door. The incident was reported to Health and Safety and personnel were reminded of the importance of planning and organizing, appropriate room signage, PPE requirements, and transport so that they can be posted as soon as the movement is complete. Both staff members were medically cleared for entry into the laboratory at the time of the incident. The CMA ruled there was no potential exposure.
5. **PPE FAILURE SUMMARY:** 07/14/2023; A staff member working in a BSL-4 laboratory was exiting through the chemical shower when they noticed that the right knee of their scrubs was wet. Once in the suit room, the staff member noticed a small pinhole near the bottom of the zipper of their suit. The BSL-4 suit passed a pressure test prior to entry into the laboratory. The staff member had been conducting work on a downdraft table that involved an RG 4 agent. They confirmed that there were no spills or other incidents during their time in the suite. The suit was evaluated, repaired, and placed back into service. The CMA ruled there was no potential exposure.
6. **PPE FAILURE SUMMARY:** 07/20/2023; A staff member working in a BSL-4 laboratory was exiting through the chemical shower when they noticed that the upper left thigh of their scrubs was wet and that there was a slight “rippling” of the suit at that spot. This staff member had been working with an RG 4 agent in both the BSC and in a centrifuge. During their time in the suite the staff member noted that the samples were maintained in sealed cannisters during their time outside of the BSC and there were no spills or other incidents during their work. The BSL-4 suit passed a pressure test prior to entry into the laboratory. The suit was evaluated, repaired, and put back into service. The CMA ruled there was no potential exposure.

7. **PPE FAILURE SUMMARY:** 07/30/2023; A staff member was bringing supplies into the BSL-4 suite when, upon exiting the chemical shower and completing the suite's daily checklist, they saw part of their scrubs outside of the suit and realized that their zipper was not fully zipped. The staff member attempted to exit through the chemical shower and return to the suit room, but the chemical shower door had locked to begin the shower cycle. Unable to exit through the second chemical shower due to a malfunction, the staff member then zipped their suit while in the corridor and hooked up to air. Once they confirmed the scrubs were inside the suit and the suit was fully zipped, they proceeded with their work. During their time in the suite, the staff member did not have any other issues with their suit. Upon exiting the suite, the staff member reported the incident to the control room operator and Health and Safety. The CMA ruled there was no potential exposure. The staff member was reminded that the proper procedure for suit malfunctions is to immediately notify the control room operator and Health and Safety.
8. **PROCESS FAILURE SUMMARY:** 08/07/2023; A staff member forgot to wear a water-proof Band-Aid® prior to entering both a BSL-2 laboratory and a BSL-3 suite, as instructed by the CMAs. The staff member noticed they were not wearing a Band-Aid® while in the PAPR staging area of the BSL-3 suite. They immediately called a colleague and asked them to bring them a Band-Aid® and then called to report the incident to Health and Safety. When describing the event, the staff member confirmed that they had not worked with any agent during their time in the BSL-2, but they had donned two pairs of gloves to decon a BSC. They reported that both sets of gloves remained intact. The CMA ruled there was no potential exposure.
9. **PPE FAILURE SUMMARY:** 08/14/2023; A staff member reported wet scrubs while exiting the BSL-4 suite through the chemical shower. The staff member checked their suit upon exiting and discovered a small pinhole on the suit near the zipper. This staff member had been working with an RG 4 agent, but they reported that there were no spills or other incidents during their time in the suite. They also confirmed that the suit passed its initial pressure decay test prior to suite entry. The CMA ruled there was no potential exposure. An evaluation of the suit confirmed that the pinhole was not repairable, and the suit was retired.
10. **PPE FAILURE SUMMARY:** 08/21/2023; A staff member reported wet scrubs while exiting the BSL-4 suite through the chemical shower. The staff member checked their suit upon exiting and discovered a small pinhole on the suit near the shoulder seam. This staff member had been working with an RG 4 agent, but they reported that there were no spills or other incidents during their time in the suite. They also confirmed that the suit passed its initial pressure decay test prior to suite entry. The CMA ruled there was no potential exposure. An evaluation of the suit confirmed that the pinhole was not repairable, and the suit was retired.
11. **PPE FAILURE SUMMARY:** 08/22/2023; A staff member working in the BSL-4 suite reported that while retrieving pipette tips from underneath a shelf in a laboratory, their hand brushed up against the edge and they felt their left outer glove catch. They then noticed a small tear. The staff member soaked their hand in a detergent disinfectant before exiting to the suit room. Once in the suit room they performed a leak test on their inner gloves, confirming they were intact. This staff member had been working with unknown forensic samples prior to the glove tear but noted that there were no spills or other incidents during their time in the suite. The CMA ruled there was no potential exposure.

12. **SPILL SUMMARY:** 8/30/2023; A staff member working in the BSC of a BSL-4 laboratory was submerging pipette tips that had been used with an RG 4 agent in a container of detergent disinfectant when one of the tips exited the container, rolled out of the BSC and onto the staff member's boot, and then onto the floor. The staff member was not entirely sure that the tip had been in contact with the disinfectant for a full contact time of five minutes prior to the spill. Upon noticing the tip, the individual remained connected to air and proceeded to appropriately clean up the spill and decontaminate the path the tip traveled with a detergent disinfectant. The CMA ruled there was no potential exposure.

OTHER OCCURENCES:

1. **REPORTED EVENTS:** In all of the following, personnel reported the events to Health and Safety, and they were tracked for trending purposes.
- A staff member working in a BSL-4 laboratory reported a spill of roughly 100 mL of DNA-ExitusPlus™ on the floor. They had been spraying their gloves with the chemical when the bottle detached from the spray nozzle. The staff member noted that the nozzle felt slightly loose before it detached from the bottle. The staff member cleaned up the spill appropriately with absorbent material and then mopped the floor.
 - A staff member working in a BSL-3 laboratory was holding the laboratory door open with their back as they removed biohazard waste from the room when their PAPR battery detached from their PAPR unit. The staff member picked up the battery and reattached it to the unit. Staff are reminded that adjustments and troubleshooting of PAPRs should take place in the PAPR staging area.
 - A staff member working in a BSL-3 suite reported hearing a humming sound upon entering a laboratory. They found the source of the sound to be a motorized pipet controller, which was charging on the benchtop. The pipet controller had been "running" overnight and was hot to the touch. The staff member unplugged the unit and noticed that it still sounded as though the aspirate or dispense buttons were depressed, although neither were. The controller cooled off shortly after being unplugged. The unit does not have a power button so the only way to turn it off was by removing the battery. Upon further investigation, it is likely that a mechanical issue inside one of the buttons caused the control to remain on. The unit was discarded.
 - While emptying a recently completed autoclave cycle, a staff member noticed that one of the medium-sized sharps containers had a partially popped lid, a cracked outer rim, and the melted remains of a bag stuck to its side. There was another medium-sized sharps container in the autoclave that showed no signs of damage. Upon further investigation it was determined that a sealed bag had been placed inside of the damaged sharps container prior to being autoclaved by one of the laboratory groups. Despite being run on the correct cycle, the pressure ruptured the bag and damaged the container. The group's normal process is to bag waste in the Class III Biosafety Cabinet (BSC) and seal it before removing it from the cabinet. Once outside of the cabinet, the bag is placed into a hard-sided, biohazard sharps container and moved into the BSL-3 to be autoclaved. Due to the sealed nature of the bags, pressure builds during autoclaving and has the potential to expel the contents outside of the sharps container.
 - A staff member preparing to enter the BSL-4 containment suite was testing their suit in the suit room when they noticed a pinhole near the filter on the headpiece. The suit was marked out of service and the staff member entered the suite wearing a different suit. The staff member's original suit was evaluated, patched, and placed back in service.

- A staff member working in a BSL-3 laboratory was conducting a pre-work decon of a BSC when their PAPR shut off. The staff member returned to the PAPR staging area, evaluated the PAPR motor and battery, and grabbed a new battery before going back to their work. The first battery was marked 'out of service' and will be evaluated by Health and Safety.
- Following a successfully completed autoclave cycle, a staff member reported that one of the bags containing a hat box had a large tear near a seam of the hat box and an excessive amount of fluid in the bottom of the secondary containment pan. Since both boxes/bags were taped and prepared similarly, the cause of the tear was not believed to be that they were taped too tightly. After discussions between EO and Health and Safety, it is believed that the issue may be due to the thickness of the bag. A recommendation was made for the group to try 4 mil thick bags rather than 2 mil thick bags for ABSL-3 waste to see if there is an improvement.
- A staff member was emptying an autoclave after a successful cycle when they noticed that one of the bags of waste appeared to have opened during the cycle and partially melted on itself. Upon further investigation, it was unclear if the bag had ruptured due to being taped too tightly. The incident occurred a day after another incident involving waste from the ABSL-3, so it is believed that utilizing thicker bags will reduce the occurrence of these incidents.
- A staff member working in a BSL-3 suite was walking past a laboratory when they noticed that the ducted BSC in the room was in alarm. There was no one in the room at the time. After reporting the alarm to Health and Safety, the staff member was permitted to enter the laboratory and reset the alarm.
- A staff member working in a BSL-3 suite over the weekend was cleaning their PAPR hood in the write-up area when their face shield cracked. Since it was outside of normal business hours and there were no extra PAPR hoods in the suite, the staff member donned another staff member's PAPR hood and entered the lab. After reporting the incident to Health and Safety, both staff members were able to acquire new PAPR hoods. Additionally, a box of extra hoods was placed in the suite's PAPR staging area in case staff need to replace their hoods after hours or on the weekend.
- A staff member reported observing a staff member getting supplies in the buffer corridor while wearing a lab coat and booties. Though they had not entered any animal rooms in their PPE, the staff member had donned the PPE in the ABSL-2 and then walked back into the buffer corridor to gather supplies. The staff member was reminded that while entry requirements instruct PPE to be donned upon entering a space from the buffer corridor, PPE must be doffed prior to exiting into the buffer corridor for any reason.
- A staff member working in a BSL-2 laboratory reported a spill of roughly 50 mL of buffer in the BSC. The lid to the conical tube containing the liquid was loose, so the buffer spilled onto the surface of the BSC when it was accidentally knocked over. The spilled buffer remained confined to the working surface of the BSC. The spill was cleaned up and the waste discarded appropriately by the staff member. No agent was present at the time of the spill.
- A staff member working in a BSL-3 suite was walking past a laboratory when they noticed that the ducted BSC in the room was in alarm. There was no one in the room at the time. After reporting the alarm to Health and Safety, the staff member was permitted to enter the laboratory and reset the alarm.

Note: It should be assumed that staff are wearing a PAPR (minimum APF 25) in events taking place in the BSL-3 laboratories unless otherwise stated.

Document Definitions:

Event Summaries – Any OSHA recordable mishap or first aid injury or illness.

Near Miss Summaries – Any mishap that requires a potential exposure ruling from the Competent Medical Authority (CMA), represented a CDC Form 3 submission, or a potentially serious accident or incident that could have resulted in personal injury, illness, death, and damage to property or the environment, but did not occur due to one or more factors.

Other Occurrences – Mishaps that do not fit into the other two categories.

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All research was conducted in compliance with the Animal Welfare Act and other federal statutes and regulations relating to animals and experiments involving animals and adheres to principles stated in the Guide for the Care and Use of Laboratory Animals, and approved by both the NBACC Institutional Animal Care and Use Committee and, when applicable, the DHS Compliance and Assurance Program Office. The facility where this research was conducted is fully accredited by AAALAC International and maintains a Public Health Service (PHS) Humane Care and Use of Laboratory Animals (Policy) assurance.