



Lessons Learned & Success Stories – April to June 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. Proper verification of an Escorted Laboratorian Form (or ELF card) for escorted staff is the responsibility of the person doing the escorting. The presentation of a valid ELF card means that the person is medically cleared to enter the area and has met the training requirements needed to enter the space, even if only for a walkthrough/orientation. Maintaining compliance with tasks of all levels demonstrates a commitment to safety and biosecurity to your peers and visitors as well.
2. Handling of waste in biocontainment should be prioritized to ensure that it is autoclaved in an expedient manner. If it cannot be autoclaved the same day, it should be placed into a proper hard-sided container until an autoclave is available. As the waste generator, you are responsible to follow up and verify that the waste was autoclaved out of the suite in a timely manner.
3. This month, one of the Near Miss summaries described the risks associated with using equipment past its normal lifecycle. This incident is a good reminder for staff to check their equipment regularly for signs of wear and tear. Whether you work in the business operations side of things or in the laboratories, even the most well-constructed equipment will wear down over time. The sooner equipment problems are identified, the faster plans can be made to have a unit repaired or replaced before your work is affected. Staff should be sure to keep sensitive equipment clean and schedule regular preventative maintenance and calibrations, as necessary. While you might notice that your older equipment appears to be functioning fine, over time it may become less effective, which could eventually lead to mechanical issues or inaccurate readings. So, if you notice that equipment that is no longer functioning with the same efficiency as before, or that it is approaching the end of its lifecycle, have it evaluated by NBACC Information Technology (IT), Facilities Management Operations (FMO), or a manufacturer-approved technician. Ensuring that equipment is in appropriate operating condition not only maintains the integrity of your work, but also ensures that NBACC remains a safe place for all.
4. While most latex gloves have an expiration or manufacture date stamped on the side of the box, once the box is opened and the gloves are exposed to air, light and/or heat, the material will begin to degrade prematurely. If you have open boxes of gloves in your laboratory for extended periods, even if within the expiration date window, it is good practice to give them a quick visual check before use. If there are signs of discoloration, a loss of elasticity or visible signs of surface cracks, discard the gloves and open a new box to help avoid the risk of a glove tear while working.

SUCCESS STORIES

1. To better support NBFAC operations, it was necessary to convert a BSL-3 suite to BSL-2 space. Due to the reduction in containment level, the entire space needed to be decontaminated. Though we have performed multiple quad or suite-wide decons in the past, there has never been a need to convert a BSL-3 suite into a BSL-2 space at NBACC. This presented a unique challenge due to the drop in containment level and change in entry requirements, as well as decontaminating the amount of equipment in the space. To accomplish this, multiple groups had to effectively communicate and coordinate schedules, tasks, and responsibilities throughout the process. This required multiple meetings with each of the groups, numerous collaborative walk-throughs of the space, extensive space and equipment preparation for the decon, and the creation of task-specific instructions and working documents for pre-decon and post-decon activities. The decontamination required more biological indicators than any previous decontamination at NBACC and was successful on the first attempt. This would not have been possible without the effective pre-task planning, constant communication, and the hard work and dedication of each of the groups who played a role in the process. By achieving this, we now have a roadmap for future considerations and what steps are required to safely convert a BSL-3 into a BSL-2 space, while also continuing to adapt to our upcoming project needs.

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.
 - 03/01/2023; A staff member working in an interstitial area was removing a computer from a rack when they scraped their left index finger on the sheet-metal casing of the unit.
 - 03/03/2023; A staff member working in the buffer corridor was removing a piece of piping for repair when a fitting came loose and they hit their left hand on the side of an autoclave, resulting in a bruise and cut.
 - 03/13/2023; A staff member was breaking down boxes in a BSL-2 laboratory with scissors when they scraped their finger on a plastic piece of the handle.
 - 04/03/2023; A staff member operating as a fire watch in a buffer corridor discharged a fire extinguisher upon noticing a fire and sustained eye irritation from the smoke and extinguisher residue.
 - 04/12/2023; A staff member cut their finger while moving supplies in the BSL-4 buffer corridor.
 - 04/25/2023; A staff member working in an interstitial area cut their left index finger with a pocketknife while cutting a piece of plastic.
 - 05/01/2023; A staff member was bending over to dry off poly paper after showering out of a BSL-3 suite when they felt a sharp pain in their lower back.
 - 05/08/2023; A staff member working in a BSL-3 suite was placing items on a shelf when they scraped their right finger on a BSC certification device.
 - 05/16/2023; A staff member working in an interstitial area sustained a bruised left hand when a chair piston fell off a table and landed on it.

NEAR MISS SUMMARIES

2. **PROCEDURAL FAILURE SUMMARY**: 03/02/2023; A staff member was escorted into a laboratory space to complete a suite orientation without an approved ELF card. Upon further investigation, it was discovered that another staff member from the same group had been escorted into the same spaces without an ELF card previously as well. The Laboratory Space Manager (LSMs) and the staff

members' supervisor believed the ELF card was unnecessary because it had not been required for the other BSL-2 suite orientations that the staff members had completed. Those orientations were conducted at the threshold of laboratories and did not involve staff entering the spaces. The supervisor was reminded that, as the point of contact (POC), they are responsible for ensuring that all access approval paperwork is in order and the LSMs were reminded that they are responsible for checking an individual's ELF card before escorting them into a space.

3. **PROCEDURAL FAILURE SUMMARY:** 03/16/2023; During a laboratory inspection, a staff member noticed a bag full of waste propped up on a chair. The waste had been generated 2 days prior and the bag was taped and labeled to be autoclaved. The staff member placed the bag in the empty, hard-sided waste bin inside the room and placed a note on top of the bin requesting that the trash be autoclaved as soon as possible. As a follow-up, the staff member then reached out to the individual who had prepared the bag to discuss their findings and was assured the waste would be autoclaved the following day. A month later, another staff member was conducting an inspection and noticed that the waste had not been autoclaved as requested by the first inspector. The staff member who initially discovered the waste once again reached out to the waste generator and arrangements were made for another staff member that was planning on entering the suite the next day to take care of the trash. When that staff member did not enter the suite, the trash sat for another week before being autoclaved out almost two months after being generated. After speaking with a member of Health and Safety, the waste generator admitted that they had cleared out the room after completing a study and simply forgot about the bag of waste since they no longer needed to re-enter the space. They further stated that the waste was not autoclaved at the time it was prepped because the autoclaves for the suite were being utilized. Though our process is that all waste is decontaminated before being placed in a waste bag, Health and Safety reminded the staff member that, moving forward, bags of waste should stay inside a hard-sided waste container until they are ready to be placed in an autoclave. Further, if a staff member cannot enter the suite to address their waste, they should ask another staff member with suite access to autoclave the waste for them so that it does not sit for long periods of time.
4. **PROCEDURAL FAILURE SUMMARY:** 03/23/2023; Staff members working in a BSL-2 laboratory reported a pungent odor when they opened the flammable chemical storage cabinet beneath a chemical fume hood (CFH). Earlier in their work, the staff members had poured chemicals from their source bottles into conical tubes to use in a nearby piece of equipment. Those bottles were placed back into the storage cabinet. Upon noticing the smell, the staff members exited the room and called the Chemical Hygiene Officer (CHO). Upon entering the lab, the CHO opened the storage cabinet, immediately noted the smell, and left the room. The CHO reentered the room to start checking for leaks or cracked lids in bottles but had to leave the room to acquire respiratory protection equipment. After returning to the room with a chemical PAPR, the CHO and another member of Health & Safety (H&S) attempted to determine the source of the smell by checking the bottles in the storage cabinet for leaks or cracked lids. All bottles remained intact, and no spills were observed. After evaluating the four different chemicals being used in the project, the H&S members were able to narrow down the likely culprit to two chemicals the staff members had used. Upon further examination, it is believed that the reason for the odor was that residual chemical remained in the threads of the bottle due to staff members pouring the chemicals out. Staff members noted that plastic pipettes were not compatible with the chemicals being used. The chemicals were allowed to off-gas in the CFH and then placed back into the flammable chemical storage cabinet. H&S, along with the staff members, are working together to improve chemical hazard communication and safety for their project and future projects.
5. **PROCEDURAL FAILURE SUMMARY:** 04/03/2023; Subcontractors were performing grinding work on

an exterior BSL-4 window when a spark or piece of hot debris was sucked into the dust collector and caught the HEPA filter and bottom of the machine on fire. The fire watch immediately unplugged the unit, but this forced the flames to the top of the machine, resulting in additional filter fires. The fire watch used the fire extinguisher to reduce the flames and control the fire until it was extinguished. Though the fire was extinguished by the time the Emergency Manager arrived, they called the Fort Detrick Fire Department (DFD) to report the incident and DFD advised that the building should be evacuated. FMO activated the fire alarm, and the building was evacuated per established emergency procedures. Once the fire department arrived, they doused the smoldering machine with copious amounts of water to completely extinguish it and cleared the building for re-entry.

6. **PROCEDURAL FAILURE SUMMARY:** 04/03/2023; A staff member crashed out of a BSL-3 containment suite during a fire alarm before waiting for instruction from the marquee. After crashing out of the airlock and exiting the building, the staff member did not report to the designated 'crash out' area and was not immediately noticed by nearby H&S members. Once spotted, the H&S members had them stand in the appropriate area until the building was cleared for re-entry. The H&S members escorted the staff member back to the airlock so that they could re-enter the suite. Next, the H&S members cordoned off the corridor, bleached the floors, and wiped down handles. Prior to crashing out, the staff member had been doing chores in the suite and no agent work had taken place. The staff member was retrained on emergency containment procedures by a member of H&S.
7. **SPILL SUMMARY:** 04/04/2023; A staff member working in the BSC of a BSL-4 laboratory was transferring frozen samples from a plastic box to a cardboard box when they noticed that a sample treated with an organic extraction reagent had a small amount of residue frozen on the outside of the 2mL screw cap tube. The sample was derived from animal origins and had been stored in a -80°C freezer prior to transfer. The tube appeared to be intact with no visible cracks, but the staff member noted that the cap felt slightly loose, which would have caused some of the sample to leak from the tube prior to reaching freezing point the last time it was manipulated. After disinfecting the tube, the cap was tightened, and the tube was transferred to the new freezer box. After transferring all samples to the new cryo-freezer box, the box was placed in a plastic zip-top, disinfected with a detergent disinfectant, and transported back to the -80°C freezer.
8. **PROCESS FAILURE SUMMARY:** 04/11/2023; A staff member working in an administrative area reported the coffeemaker in the office had a large amount of mold in the water reservoir. The staff member said that the unit had been cleaned a few weeks prior and that only water from the filter water machine in the kitchenette area was used. The coffeemaker was in direct sunlight, so the sun and heat along with the water being stored in the reservoir at all times likely led to mold growth. The coffeemaker was replaced, and it was recommended that the new unit be kept in a cool, dark location and that water not be stored in the reservoir for more than one day.
9. **EQUIPMENT FAILURE SUMMARY:** 04/13/2023; A member of IT reported that a computer tower in a BSL-2 laboratory showed signs of an internal electrical arc. The group began an investigation and determined that the plastic likely broke down due to the long-term effects of higher-than-normal temperatures. The system was put in service 8-9 years ago and was outside of its normal life cycle. After looking at the condition of other models of this generation, two other computer towers showed melted plastic and evidence of arcing. The IT group immediately moved to replace any systems with signs of breakdown or wear and is prioritizing replacing the remaining systems that are approaching the end of their life cycle.

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.
 - While unloading an autoclave, a staff member reported a small hole in an autoclave bag. They noted that the bag was tied tightly, and the hole was likely the result of pressure building in the bag. A member of Health and Safety spoke to the staff member who prepared the bag and reminded them to leave room for steam exchange when closing their biohazard waste.
 - A staff member reported a small quantity of blood in the women's shower. The shower was bleached by a member of EO.
 - A staff member working in a BSL-3 suite removed their PAPR to use the restroom and upon exiting the bathroom grabbed lab supplies and walked to a shelf in the suite hallway before realizing that they forgot to re-don their PAPR. Before the staff member reached the shelf, they recognized their mistake and returned to the PAPR staging area. The staff member reported the incident to Health and Safety and then donned their PAPR.
 - A staff member working in a BSL-3 laboratory reported that a ducted BSC was in alarm. After speaking to a member of Health and Safety, the staff member was permitted to clear the alarm and continue their work which did not involve that BSC.
 - A staff member reported an inner glove tear while training in the BSC of a BSL-3 laboratory. The staff member had previously been working with a Risk Group (RG) 1 agent and was removing their outer gloves to exit the BSC when they noticed the tear. The staff member reported that they had dripped a few drops of sterile media prior to opening any agent samples but that was the only spill in the BSC. They also confirmed the water-proof bandage they were wearing under their gloves remained intact and sealed following the glove tear. The staff member performed a leak test of their doffed outer gloves and confirmed with Health and Safety that they were intact.
 - A staff member that had been working in the BSL-4 suite noted that upon exiting through the chemical shower, the left knee of their scrubs became wet. The staff member had been working with a RG 4 agent in the BSC and noted that there were no spills of agent during their work. The suit was repaired but during the requisite suit testing, a new hole was discovered, and the suit was retired.
 - A staff member working in the BSC of a BSL-4 laboratory reported that a sterile cap fell out of the BSC and onto the floor. The staff member was connected to air at the time of the spill. They picked up the cap and disinfected the floor before continuing their work.
 - A staff member working in the BSC of a BSL-4 laboratory reported that a plastic filter canister fell out of the BSC and onto the floor. They were working with noninfectious samples at the time of the spill. The staff member remained connected to air, picked up the canister, disinfected the floor, and continued their work.
 - 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 laboratory reported that members of FMO that had been prepping a BSC for its second VHP decontamination were wearing their Tyvek throughout the suite instead of doffing them inside the laboratory. The BSC had already successfully undergone one VHP decontamination, and while the HEPA is not expected to be overtly

contaminated, FMO wears additional PPE for HEPA replacement procedures as a conservative safety stance. In this instance, the members donned their PPE but then needed to access a closet in the suite to retrieve additional equipment. After the incident was reported, the BSO met with the members of FMO and discussed the perception and importance of donning and doffing locations. They were asked to treat the rooms similar to other laboratories in the suite where spunbound polyethylene fiber suits are removed before exiting the laboratory. Out of an abundance of caution, the BSL-3 suite was mopped with bleach and staff conducted a round of environmental sampling. All sampling came back negative for growth.

- A staff member reported that there was a powerful odor of bleach in the write-up area of a BSL-3 suite. The worker was instructed to get to an area with fresh air to reduce the potential for irritation. Upon further investigation, it was determined that the suite hallways had been mopped with bleach minutes earlier.
- A staff member working in a BSL-3 laboratory was processing samples in the BSC when they noticed a tear in one of their outer gloves. The staff member discarded their outer gloves, performed a leak test of their inner gloves, and confirmed that they remained intact. After reporting the incident to Health and Safety they returned to their work.
- During a voluntary audit, a BSL-4 Laboratory Space Manager (LSM) noted a staff member was escorted into the suite several times after their escorted access had expired. The LSM suspended the escorted individual's access until a new Escorted Laboratorian Form (ELF) was completed. In addition to removing access, the Biological Safety Officer (BSO) checked with the CMAs and the Responsible Official (RO) to ensure that there was no lapse in medical or regulatory coverage.
- A staff member working in a BSL-3 laboratory reported that their PAPR battery detached from their motor unit when they adjusted themselves in a chair. The staff member confirmed with Health and Safety that there were no spills of material outside of primary containment while their PAPR was shut off. The staff member reattached the battery and continued their work.
- A staff member working in the BSC of a BSL-3 laboratory reported noticing an outer glove tear on the back of the hand. They were unsure of the origin of the tear, but it is thought that the gloves (latex) may have dried out after being in use for a prolonged period. They confirmed with Health and Safety that their inner gloves remained intact.
- A staff member working in a BSL-3 suite was preparing to enter a laboratory when they heard the ducted BSC in alarm. They called Health and Safety from the hallway to report the alarm and to inform the Safety member that agent was present in the BSC since the group had run an assay overnight containing a Risk Group 2 (RG) agent. The staff member was permitted to enter the room wearing an air protection factor (APF) 1000 PAPR to clear the alarm since the ducted BSC serves as the dedicated exhaust for the room HVAC system and as such consistently maintains primary containment, even during the power cycling required to clear 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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