Lessons Learned & Success Stories – June to August 2018 Report

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.

Note: *Effective May 8, 2018, all personnel working in the BSL-3 are required to wear a powered air purifying respirator (PAPR) system with a minimum assigned protection factor (APF) as defined by the American National Standards Institute (ANSI) of 25 upon entry into the suite. 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.*

SUCCESS STORIES:

1. An employee reported that the cord to the safety glasses attached to the 1st floor CD shredder was very short, forcing the user's face to be very close to the shredder itself, and possibly resulting in employee IDs or loose clothing/hair to become entrapped in the shredder. A member of Health and Safety removed the cord and affixed a hook to hold the glasses to the shredder, so now there is a place for the glasses to rest (and not be misplaced) without the employee being tethered to the machine.

2. An internal meeting was set to discuss ways to improve contaminated biomass sterilization practices. The team developed a path forward to improve the efficiency of this process. A validation study was developed and successfully implemented. The new validated process allows for increased throughput capacity and greatly reduces the number of cycles needed to run out the large amounts of biomass created in each protocol. This reduces wear and tear on the autoclaves and reduces the biological safety risk of having contaminated biomass waiting to be processed out of the laboratory.

3. An employee working in a BSL-3 laboratory noticed a small brown stain on the arm of their lab coat while in the BSC. The BSC was being set up, no work had started, and no agent was open. The employee soaked the stain with bleach and discarded the lab coat. The employee went around their workspace and ensured that no tubes were open and nothing had spilled. It was thought that the stain might have originated from grease on the chair where the lab coat had been resting earlier. The employee was observant and recognized a potential spill even though there were no other obvious signs. They correctly dealt with the potential hazard and reported the incident to Health and Safety.

4. A staff member reported that there was water dripping from the ceiling in an office. Eventually, the cause of the water was determined to be an excessive amount of condensation that had been a problem for an extended period of time. By being observant and reporting the problem, the staff member helped minimize the damage caused by the leak. Facilities staff did a wonderful job of solving a problem that was not obvious at the outset.

LESSONS LEARNED:

1. Spills are a part of life. They can occur at any time, whether spilling coffee in an administrative area, leaky pipes in the interstitial spaces or a biological spill in the laboratory. All these spills have their own unique hazards and it is important for staff to understand how to recognize a spill and how to respond to those spills. A key point to remember, not all spills involve liquids. A spill in the laboratory may involve, but is not limited to, tape falling out of the BSC, solid waste falling out of the trash, or any unknown source of liquid. Spill prevention is key to your safety and the safety of others around you. Please be mindful of the various types of spills that can occur in your work areas.

2. Remember that BNBI staff can reach a member of Safety, Facilities or DHS Security at any hour of the day by contacting the Command Center. Tell them who you are, whom you are trying to reach and your call back number. They are able to radio that person or contact the proper on-call personnel.

3. The mission of the NBACC Health and Safety Office is to support the scientific and administrative work that we perform in our building, both in and out of the labs. They are the main safety resource for functional as well as theoretical safety issues. If you have an issue with or a question about safety, or simply have an observation that they should be aware of, please reach out to them. It does not help anyone to discuss issues "amongst yourselves" and not talk to the folks who can work with you on a solution. Remember – they cannot help you if they do not know that there is a problem!

EVENT SUMMARIES:

1. **FIRST AID SUMMARY:** 05/08/2018; A staff member was bleaching down a room when their eyes became irritated and their vision became blurry. Upon investigation it was noted that the staff member was using a PAPR that lacked chemical cartridges. The certified medical authority (CMA) applied first aid and the staff member was able to work full duty. SOPs are currently being updated to require the use of dual HEPA/OV cartridges when cleaning rooms and using significant amounts of bleach.

2. **FIRST AID SUMMARY:** 05/15/2018; A staff member cut their finger on a desktop computer they were preparing for vapor hydrogen peroxide (VHP) decontamination while in the hallway of a BSL-3 laboratory. The CMA applied first aid and the staff member was restricted from BSL-2, -3 and -4 laboratories until the wound healed.

3. **FIRST AID SUMMARY:** 06/13/2018; A staff member working in the BSL-3 laboratory reported that after sneezing they reflexively went to wipe their nose with the sleeve of their disposable lab gown, accidently pushed their PAPR up, and had their sleeve brush against their mouth. They immediately called Health and Safety to report the incident. The staff member had been wearing the lab gown while working in the BSC, making serial dilutions of a risk group (RG) 3 organism for PCR. There were no reported spills or splashes in the BSC during their work nor was there any noticeable liquid or droplets on the sleeve of their lab gown. The staff member did not report any skin imperfections. The CMA placed the staff member on a six-day fever watch. There was no fever reported. This was reported to the CDC as a Form 3.

4. **FIRST AID SUMMARY:** 06/26/2018; A staff member reported that while showering out of the BSL-4, they noticed a scrape on their left elbow. The staff member did not recall scraping their elbow prior to entering containment, nor did they sustain any injuries while working in the BSL-4. There were no reported issues with their BSL-4 suit or gloves. The CMA applied first aid and the staff member was restricted from work in the BSL-3 and BSL-4 until the next day.

5. **FIRST AID SUMMARY**: 07/12/2018; A staff member reported that they scraped their arm on a cabinet latch while grabbing a bottle of disinfectant out of the chemical storage cabinet. The cabinet latch is intended to be used with a padlock, but the cabinet is not required to be locked. A member of

environmental operations (EO) removed the latch from the cabinet. The CMA applied first aid and the staff member was restricted from work in the BSL-3 and BSL-4 until the next day.

6. **FIRST AID SUMMARY**: 07/23/2018; A staff member reported that while gathering dry ice, they cut their hand on the edge of the ice scooper. The staff member was not wearing the required safety glasses or thermal gloves at the time of the injury. The CMA applied first aid and the staff member was placed on modified duty. The staff member was retrained and a sign was placed near the container of dry ice reminding staff to wear the appropriate PPE.

NEAR MISS SUMMARIES:

7. **PROCEDURAL FAILURE SUMMARY:** 05/01/2018; A staff member wore an expired suit into the BSL-4 to conduct work. The expiration date is based on the average life expectancy of the suit as determined by Safety. This expiration date is more conservative than the manufacturer's expiration date. The suit was pressure tested prior to entering the suite and the employee did not report any leaks or tears. The staff member had been provided with a new suit but the old suit remained in the suit room unmarked. Health and Safety met with the laboratory space manager (LSM) and moving forward suits will be marked upon expiration and removed from the suit room. The CMA ruled no potential exposure.

8. **EQUIPMENT FAILURE SUMMARY:** 05/01/2018; A staff member working in a BSL-3 laboratory reported that the dunk tank of a Class III BSC had leaked roughly 500mL of liquid into a plastic bin located under the dunk tank. The Class III was contaminated at the time but never lost its containment barrier since the liquid level in the dunk tank remained above the bevel. The dunk tank was installed one year ago and appeared in good condition. Staff are investigating whether the leak is the result of bleach or a product defect. The CMA ruled no potential exposure.

9. **PROCEDURAL FAILURE SUMMARY:** 05/02/2018; A staff member in a BSL-3 laboratory was retrieving a bagged conical tube of Trizol waste from a satellite accumulation point when they noticed that the tube was leaking inside the bag. The tube of Trizol waste had been in the sealed bag for three years and the staff member was unsure of its exact contents, whether it had come in contact with viable virus and whether it had been treated. The bag was placed inside another bag and sealed. Safety is working with the chemical hygiene officer to get the waste out of the suite.

10. **SPILL SUMMARY:** 05/03/2018; A staff member reported a spill from a biohazard bag in a BSL-3 laboratory. The bag ripped as the employees were removing it from the biohazard bin. Staff did not follow proper spill procedure and attempted to clean-up the contents of the spill until they observed liquid leaking from the bag. They then left the room and called Safety. The CMA ruled no potential exposure. The LSM has decided to line the waste bins with two biohazard bags.

11. **PROCEDURAL FAILURE SUMMARY:** 05/10/2018; A staff member reported a spill inside the BSC while working in a BSL-3 laboratory. The employee was using a robot that, during an automated run, malfunctioned and picked up an entire box of pipette tips. While attempting to retrieve the tip box from the robot, the staff member bumped the container of Micro-Chem in the BSC and caused a spill. The CMA ruled no potential exposure.

12. **SPILL SUMMARY:** 05/11/2018; A staff member reported a spill from a biohazard bag in a BSL-3 laboratory. Upon removing the double-bagged trash from the biohazard bin, the staff members noticed a glove protruding from both bags. The staff members in the room did not follow proper spill procedure by leaving the room immediately. They placed the breached bags in a new outer bag, taped that bag and placed it the waste container in the BSL-3 hallway. Upon inspecting the biohazard bin, the staff member noticed that trash and liquid remained at the bottom of the container. They then

left the room and called Safety. The CMA ruled no potential exposure. On 05/22/18, Safety released a 'Safety Flash' informing staff of recent changes to the stocked biohazard bags. The changes to the bags have increased the potential for staff to accidently tear the bags prior to use. Staff have been encouraged to use more care when tearing bags from the roll. Safety will continue to closely monitor near-misses associated with bag tears and investigate alternative vendors, if necessary.

13. **SPILL SUMMARY:** 05/11/2018; Staff members working in a BSL-3 laboratory were running an assay on an automated plate washer outside of a BSC when some liquid overflowed off of their plate. Both staff members left the room immediately and called Safety. The CMA ruled no potential exposure.

14. **SPILL SUMMARY:** 06/07/2018; Two staff members working in a BSL-3 laboratory reported a spill inside the BSC. The staff members were using the automated plate washer to wash microplates that they were immunostaining. The plate was infected with a RG2 organism. After removing the plate from the plate washer, a staff member tilted the plate to aspirate remaining wash buffer from the wells when liquid rolled off the side and onto a diaper pad inside the BSC. Upon further investigation, staff members determined that the plate was not lined up properly in the plate washer. The CMA ruled no potential exposure.

15. **PPE FAILURE SUMMARY:** 06/11/2018; A staff member in a BSL-3 laboratory noticed a glove tear while looking at microplates on a microscope. The staff member was wearing a single pair of gloves while handling the plates that were fixed, but not inactivated per a validated CDC inactivation method. The plates had been infected with a RG2 organism. The staff member was reminded that a minimum of two pairs of gloves are required when handling potentially infectious material at BSL-3. The CMA ruled no potential exposure.

16. **SPILL SUMMARY:** 06/11/2018; A staff member reported a spill in the BSC in a BSL-3 laboratory. During their work, the waste tubing for a particle size analyzer became dislodged from its flask and leaked approximately 4-5 mL of dilute RG2 organism on the tray of the cabinet. Neither staff member left the room until instructed by Safety. A 30-minute wait period was observed and then staff re-entered the room and cleaned the spill with bleach. The waste container now has a cap with a small hole to hold the waste line in place. The staff members were reminded by Health and Safety to follow proper spill procedures and leave the room even when a spill is inside the BSC. The CMA ruled no potential exposure.

17. **SPILL SUMMARY:** 06/12/2018; A staff member working in a BSL-3 laboratory reported a spill outside the BSC. The staff member was preparing to start their work in the BSC and during their pre-work decontamination, they wiped off a roll of tape and it rolled out of the BSC and onto the floor. The staff member did not follow proper spill procedure and leave the room, but instead put the tape back in the BSC and cleaned the area where it landed. When another staff member entered the room, they were informed of the incident and called Health and Safety to report. The CMA ruled no potential exposure.

18. **SPILL SUMMARY:** 06/13/2018; A staff member and visitor were preparing to decontaminate their PAPRs in the PAPR staging area of the BSL-3 when the trigger of the spray bottle disconnected and caused the bottle to fall and pour bleach on the PAPR motors, batteries and charging units on the shelves below. The bottle of bleach was immediately picked up and all battery chargers were unplugged from the outlet. The staff member then called Safety and was instructed to clean up the spill and place the charger units out of service. The PAPR units, batteries and charger units were inspected by the Respiratory Protection Program Administrator and placed back in service.

19. **PPE FAILURE SUMMARY:** 06/14/2018; A staff member working in a BSL-2 laboratory reported a glove tear while working with Vero cells in the BSC. The CMA ruled no potential exposure.

20. **SPILL SUMMARY:** 06/18/2018; A staff member working in the BSL-4 reported a spill inside the BSC.

Staff members were inverting a 15 mL conical tube, containing a RG4 organism cell pellet and MicroChem, when a small amount of liquid spilled onto an absorbent lab diaper pad inside the BSC. The diaper pad was saturated with MicroChem, allowed to sit for the appropriate decontamination time and then disposed. There was no report of a spill outside of containment and no problems with the BSC, their gloves or their suits. The CMA ruled no potential exposure.

21. **SPILL SUMMARY:** 06/19/18; A staff member working in the BSL-4 reported a spill outside of the BSC. Staff were doing plaque assays with RG4 organisms when the aspirator fell out of the BSC and onto the floor. The aspirator was not in use when it fell and had only been used to aspirate media from negative plates prior to it falling out of the BSC. There was no tip attached to the aspirator, nor was there any liquids or fluids inside the tubing when it fell out. Staff remained hooked up to air during the spill and did not report any issues with their suits or gloves. The area where the aspirator landed was cleaned with MicroChem. The CMA ruled no potential exposure.

22. **SPILL SUMMARY**: 07/10/2018; A staff member in a BSL-3 laboratory opened an autoclave and had condensate leak onto their scrubs. The autoclave had completed its sterilization run and the material was no longer considered infectious. The CMA ruled no potential exposure.

23. **PPE FAILURE SUMMARY**: 07/13/2018; A staff member discovered a pinhole in their BSL-4 suit (Sperian #229) while in the chemical shower. The suit was repaired. The CMA ruled no potential exposure.

24. **SPILL SUMMARY**: 07/13/2018; A staff member working in a BSL-2 laboratory was removing a bottle of media from the BSC when they tipped the bottle and its contents started to leak. The employee immediately sat the bottle down in the BSC, held their breath, left the room and contacted Health and Safety. The employee then reentered the room and cleaned up the spill with appropriate disinfectant after instruction from Health & Safety. There was no agent work taking place at the time of the spill.

25. **SPILL SUMMARY**: 07/18/2018; A staff member working in a BSL-3 laboratory reported that a pipette tip from a robot was expelled from the BSC and onto the floor when the waste container was jostled. The staff member was performing work with a RG3 agent and the tip had already been rinsed with MicroChem and expelled into the waste container. The staff member did not follow proper spill procedure and leave the room, but instead put the tip back in the BSC before exiting the room to contact Health and Safety. The staff member was retrained on proper spill procedures. The CMA ruled no potential exposure.

26. **SPILL SUMMARY**: 07/25/2018; A staff member working in a BSL-4 laboratory reported that liquid material spilled out of a sharps container that was being loaded into the autoclave. The liquid in the waste container had undergone the proper decon time. The staff member contacted Health and Safety and was instructed on how to clean up the spill. Upon further investigation, it was determined that the bars inside the BSL-4 autoclave made loading the autoclave difficult. The LSM is working with EO to determine if the autoclave racks can be removed. The CMA ruled no potential exposure.

27. **SPILL SUMMARY**: 07/25/2018; A staff member working in a BSL-4 laboratory was pipetting a dilution of a RG4 agent out of a 15ml conical tube when they inserted their serological pipette too deeply into the conical tube and approximately 1ml of the dilution spilled inside the BSC. The staff member contacted Health and Safety and was instructed on how to clean up the spill. The CMA ruled no potential exposure.

28. **EQUIPMENT FAILURE SUMMARY**: 07/25/2018; A staff member working in a BSL-2 laboratory was conducting an inventory in the BSC when they noticed a severely cracked frozen vial containing a RG2 agent. The vial and its contents were decontaminated with bleach and placed into a waste container. The CMA ruled no potential exposure.

29. **PPE FAILURE SUMMARY**: 07/26/2018; A staff member working in a BSL-3 laboratory was pipetting MicroChem into tubes containing a RG2 agent when they noticed a small tear in their outer glove near the palm of their right hand. They removed the outer gloves and tested their inner glove, and found them to be intact. There were no breaches in their skin or spills of agent and the BSC was functioning properly. The CMA ruled no potential exposure.

30. **SPILL SUMMARY**: 07/26/18; A staff member working in the BSL-4 laboratory reported a spill outside of the BSC. A microtube of a RG4 agent fell out of the BSC and onto the floor. The tube remained intact and there was no spill of the contents. Staff remained hooked up to air during the spill and did not report any issues with their suits or gloves. The area where the microtube landed was cleaned with MicroChem. The CMA ruled no potential exposure.

31. **SPILL SUMMARY**: 07/26/18; A staff member working in the BSC of a BSL-3 laboratory bumped the waste reservoir of a robot and spilled 25mls of the contents inside of the BSC. The waste reservoir contained a mixture of MicroChem and a RG2 agent. The spill occurred prior to the appropriate decon time. At the time of the spill, the staff member immediately left the room and called Health and Safety. After speaking with Health and Safety, the staff member returned to the room and cleaned up the spill. The CMA ruled no potential exposure.

32. **SPILL SUMMARY**: 07/31/18; A staff member working in the BSC of a BSL-4 laboratory bumped the waste reservoir of a robot and spilled 20mls of the contents inside of the BSC. The waste reservoir contained a mixture of MicroChem and a RG4 agent. The spill occurred prior to the appropriate decon time. The staff member was hooked up to air at the time of the spill and reported no issue with their suit or gloves. After speaking with Health and Safety, the staff member cleaned the spill. The CMA ruled no potential exposure.

OTHER OCCURENCES:

33. **PROCEDURAL FAILURE SUMMARY:** 05/04/2018; A staff member wore a necklace across the line of containment. The necklace was bleached out.

34. **PROCEDURAL FAILURE SUMMARY**: 05/10/2018; A staff member reported that an iPhone charger that was connected to the iPhone kiosk was taped and not functioning properly. Upon removing the tape, a member of Safety noted that the non-electrical tape was covering a section of the charger that was frayed and had exposed wires. The cord was discarded and a member of Safety spoke to the owner.

35. **PROCEDURAL FAILURE SUMMARY:** 05/17/2018; A subcontractor entered two BSL-3 laboratories without having a signed 'Escorted Laboratorian Form' and card. The subcontractor had completed all appropriate trainings, had an approved immunization waiver on file and was considered medically fit for duty prior to the visit. The staff member escorting the subcontractor was retrained by a member of Safety.

36. **PROCEDURAL FAILURE SUMMARY:** 06/04/18**;** A member of facilities reported that the Job Hazard Analysis (JHA) for the Pall filter decontamination process was not being followed. During the certification of the Pall filters in the Effluent Decontamination System (EDS) room, the first filter in the series failed. Health and Safety was not contacted prior to the decontamination process as per the JHA and an inappropriate disinfectant was chosen for the failed filter. When Health and Safety was notified, staff were directed to don respiratory protection, drain the machine and swap out the full waste container for an empty one charged with the appropriate disinfectant. The used waste container was capped, carried into containment and disposed. The EDS room stayed posted for respiratory protection for an hour after the lines were opened and the process was completed with the correct disinfectant.

37. **PROCEDURAL FAILURE SUMMARY:** 06/26/2018; A staff member erroneously entered their home address on a Purchase Request instead of the NBACC address and the staff member received the package of lab supplies at their home.

38. **PROCEDURAL FAILURE SUMMARY**: 06/27/2018; A staff member entered the irradiator room without their thermo-luminescent dosimeter (TLD). They were informed by a passing staff member that their dosimeter was missing. They immediately exited the room and donned their TLD to finish their work.

39. **EQUIPMENT FAILURE SUMMARY**: 07/09/2018; A staff member received a BAS notification from a refrigerator in a BSL-3 laboratory and accidently silenced the notification. The next day, staff discovered that the refrigerator was not functioning and that the compressor had overheated and caused smoldering of the wires. Information is still being gathered on the potential cause of the malfunction.

40. **PROCEDURAL FAILURE SUMMARY**: 07/12/2018; A staff member failed to don close-toed shoes prior to entering the buffer corridor. Upon realizing their mistake, they left the corridor, returned to their desk and changed their shoes.

41. **PROCEDURAL FAILURE SUMMARY**: 07/25/2018; A staff member discovered blood on the floor of a women's bathroom. The staff member reported the incident to Health and Safety and then, wearing gloves, cleaned the blood with bleach.

42. **PROCEDURAL FAILURE SUMMARY**: 07/25/2018; A staff member working in a BSL-3 laboratory mistakenly wore their lab coat into the hallway while retrieving a phone list. The staff member immediately went back into the room, removed their lab coat and reported the incident to Health and Safety. The staff member had not experienced any spills on their lab coat prior to exiting the room.

43. **PROCEDURAL FAILURE SUMMARY**: 07/26/2018; A staff member working in a BSL-2 laboratory reported that an all glass impinger fell off of the benchtop and shattered onto the floor. The staff member contacted Health and Safety, cleaned the broken glass and discarded it in a sharps container.

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) or represented a CDC Form 3 submission.

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

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