Lessons Learned & Success Stories – March to May 2015 Report

The NBACC 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.

SUCCESS STORIES:

1. During a recent snow storm, two EO employees were requested to assist with snow removal to clear a path for handicap access in the NIBC parking lot. The removal of snow from this parking lot is normally the responsibility of other organizations. Manned with shovels, salt and a snow blower the employees not only shoveled the walking path but completely cleared all the handicap parking spaces and sidewalk in front along the parking area. This work took over an hour to complete due to the large amount of snow and ice but the time was well spent to ensure a safe environment for staff and visitors.

2. Staff working in containment were experiencing glove tears resulting from tape sticking to them while taping plates together. Staff reviewed the process and identified a more efficient method of securing plates inside of a gas permeable sleeve was established as a result. The new method uses rubber bands to hold the bag closed rather than excessive use of tape (which was the cause of the glove tears). This is a good example of using continuous improvement to eliminate a hazard from the work place.

3. To access my backyard and backdoor, you must travel down an alley. This alley is not plowed or treated with salt following winter weather; because of this there are several spots along the alley that freeze quickly and ice over. In the past, I have fallen on ice that accumulated in the alley when I was returning from walking my dog. This year with the snow melting quickly during the day and then refreezing as the temperatures dropped I thought the alley seemed particularly icy. But, because of the safety gram that demonstrated how to properly walk across icy spots, I felt much more in control as I traversed the ice. "Walking like a penguin" certainly works!

4. Minor cuts remain one of the top reported mishaps at NBACC. While these breaks in the skin do not represent a significant health risk to staff members, they do represent an impact to operations because minor breaks in the skin prevent individuals from entering containment laboratories. A staff member identified the potential for use of Liquid Bandages® as a way to mitigate minor breaks in the skin without implementing a laboratory restriction. After evaluation by the CMA, the product has been approved on a case by case basis. Liquid Bandages® have been utilized with three mishaps this month to prevent work restrictions.

5. Faced with relocating several heavy furniture items, an employee brought into work several ergonomic products that ease sliding furniture and other heavy objects around carpeted surfaces. With the products in full use, the furniture was easily moved without issue. These devices reduce drag and resistance on

carpeted surfaces when working alone to move materials. They directly prevent repetitive motion injuries.

6. Recently a staff member reported that a neighborhood resident tripped and fell on an unleveled cement sidewalk pad outside their home. The resident unfortunately sprained her wrist in the fall. She did acknowledge that she wasn't paying attention while walking since she was aware that neighborhood sidewalks were uneven in areas. To prevent this from re-occurring in the future, the family contacted the township regarding sidewalk maintenance and learned the property owner was responsible for any repairs. The family next inquired with a cement contractor on how to remedy the situation. Since the cement pad was intact, the more logical approach to repair the problem was via "slab jacking", whereby the pad could be leveled out by grout being pumped underneath. The sidewalk has since been re-leveled and sealed in order to prevent this type of incident from re-occurring in the future.

LESSONS LEARNED:

1. BSL-3 airlock operations is an activity where a combination of multiple administrative controls are used to create a safe work area.
    a. Items approved for removal from a BSL-3 airlock through surface decontamination must be properly wiped down with the correct disinfectant, allowing for sufficient contact time.
    b. The line of containment (tape on the floor) separating the containment side from the non-containment side of the airlock must be respected.
    c. The 15 minute time limit on the countdown timer must be observed before opening the non-containment side door.

    Together, these controls form the basis for safe BSL-3 airlock operations the same way the legs of a chair help to create a safe place to sit. If the legs of the chair aren't functioning correctly, your safe "sitting zone" starts to represent an unsuspected hazard. Staff must remember that all controls need to be observed in order to prevent an unsuspected hazard.
2. Finger cuts continue to represent the #1 mishap encountered by staff at NBACC. While we have not been able to find the silver bullet for preventing cut fingers (at least not yet), the H&S team has been working with the CMA to find ways to minimize the impact. NBACC will be conducting a trial with liquid "New Skin" to see if it is possible to reduce the number of lab restrictions resulting from minor cuts.
3. Gloves often represent your hands first line of defense against many types of hazards. Staff should remember to always thoroughly check gloves prior to use.
4. A Class II type A2 BSC (the most common type at NBACC) is a free standing BSC that provides excellent biological protection. Their free standing nature makes them easier to install and maintain since they are not connected directly to any building systems (other than a standard electrical plug). Air that potentially contains biological contaminates is passed through HEPA filtration and is then recirculated back into the room. However, they only provide effective protection against particulate hazards. Chemicals that can vaporize and cause an inhalation hazard should NOT be worked within a Class II type A2 BSC since it will recirculate the chemical vapors back into the room. Use of hazardous chemicals should be limited to ducted BSC (type B1 or B2) or a chemical fume hood unless specifically approved by the Chemical Hygiene Officer (CHO)/NBACC Health & Safety.
5. NBACC staff have direct access to the subject matter experts (SME) that analyze risks and develop mitigation strategies for work activities. When unexpected situations are encountered, staff and supervisors should reach out to SME's (i.e. CHO, Health & Safety, Radiation Safety Officer, etc.) to reanalyze hazards before proceeding with the work.

6. Broken glass represents a hazard in containment laboratories that can occur unexpectedly and challenge our natural instinct to "just clean it up". In order to minimize risks, glass (preferably safety coated) should only be used inside laboratories if no other options are available. If glass does break, staff should remember to stop and fully consider the situation before taking action. If the glass contained biological material, remember to follow proper spill procedures. Any broken glass (whether its safety coated or not) should be reported to Environmental Operations staff.

EVENT SUMMARIES:

1. **FIRST AID SUMMARY:** 02/4/2015; A BNBI employee cut their hand on the sharp edge of a metal fire extinguisher while changing them out for service. The CMA was notified. The injury required first aid only and the employee was restricted for two days from BSL-3 and BSL-4 laboratories.
2. **OSHA RECORDABLE SUMMARY:** 02/10/2015; A BNBI employee cut their hand on the sharp edge of a clipboard while working in a BSL-3 lab. The CMA and RO were notified. The injury required first aid only, however the employee was restricted for three days from BSL-3 and BSL-4 laboratories.
3. **FIRST AID SUMMARY:** 02/10/2015; A BNBI employee spilled a cup of hot water on their leg while working at their desk. The CMA evaluated the injury and applied first aid. No restrictions resulted from the injury.
4. **OSHA RECORDABLE SUMMARY:** 02/12/2015; A BNBI employee cut their hand from an unknown source while moving materials into a BSL-2 lab. The CMA and RO were notified. The injury required first aid only, however the employee was restricted for one day from BSL-3 and BSL-4 laboratories.
5. **OSHA RECORDABLE SUMMARY:** 02/12/2015; A BNBI employee cut their hand on the sharp edge of a plastic cart while moving materials into a change room. The CMA was notified. The injury required first aid only, however, the employee was restricted for one day from BSL-3 and BSL-4 laboratories.
6. **FIRST AID SUMMARY:** 02/23/2015; A BNBI employee fell on ice in the parking lot while they were walking to their vehicle. They were not injured in the fall.
7. **FIRST AID SUMMARY:** 02/25/2015; A BNBI employee sustained a paper cut their finger while working in their office. The CMA evaluated the wound and determined that the injury required first aid only, and the employee was restricted from working with infectious materials until the wound scabbed over.
8. **FIRST AID SUMMARY:** 02/26/2015; A BNBI employee sustained a paper cut on their finger while working in the BSL-3. The CMA and RO were notified and it was determined that there was no potential biological exposure. The CMA evaluated the wound and determined that the injury required first aid only, and the employee was restricted from working with infectious materials until the wound scabbed over.
9. **FIRST AID SUMMARY:** 02/27/2015; A BNBI employee sustained an abrasion on their finger (under a glove) while working with sterile DNA in the BSL-2. The CMA was notified and it was determined that there was no potential biological exposure. The CMA evaluated the area two days after the event and found no injury.
10. **FIRST AID SUMMARY:** 02/27/2015; A BNBI employee fell on ice in the parking lot while they were walking to their vehicle. They were not injured in the fall.
11. **FIRST AID SUMMARY:** 3/12/2015; A BNBI employee sustained a laceration in the back of their foot as a result of being struck by a cart while in a buffer corridor. The employee reported to the CMA and was restricted from the containment work for the rest of the week.
12. **FIRST AID SUMMARY:** 03/25/2015; A BNBI employee experienced a medical emergency in the first floor atrium. The CMA and FD Emergency Services responded and the employee was transported to the hospital for treatment and observation. The event was not occupationally related.

13. **FIRST AID SUMMARY:** 03/25/2015; A BNBI employee experienced an allergic reaction on their skin attributed to a type of glove that is lined with chlorinated product. The product (Microflex® Ultraform nitrile gloves) has a warning on the part of the box that is removed in order to access the gloves. The CMA treated the employee with first aid. A safety flash was distributed to all staff to be aware of skin allergies when using this model of glove.

14. **FIRST AID SUMMARY:** 4/15/2015; A BNBI employee sustained a back muscle strain while donning shoe covers at the threshold to a forensics laboratory. The CMA administered first aid, and no restrictions resulted from the injury.

15. **FIRST AID SUMMARY:** 04/22/2015; A BNBI employee sustained a small laceration on their finger from the cover of an autoclave printer located outside of containment. The CMA applied Liquid Bandage® to the wound and this allowed the employee to work in containment wearing a waterproof bandage.

16. **FIRST AID SUMMARY:** 04/22/2015; A BNBI employee worked in a Class II type A2 BSC for about 1 hour in the presence of a hazardous chemical odor. After consultation with their supervisor, it was determined that they should take a break prior to continuing work. A Health & Safety employee noticed the odor and reported the incident to their supervisor and the Chemical Hygiene Officer. The operation was stopped and the employee working in the BSC reported to the CMA for evaluation. First aid was administered and no work restrictions resulted from this mishap.

    CORRECTIVE ACTIONS:
    - The open material within the BSC was transferred into closed containers and placed in the satellite waste accumulation point. Personnel were placed in RPE as protection.
    - The room was placed off limits overnight until the odors dissipated.
    - A new MFR for the project was drafted requiring the use of a CFH for any operations involving the hazardous chemical.
    - The staff on the project were re-trained on the requirements of handling particularly hazardous chemicals in a CFH as well as their own "Stop Work" authority.

17. **FIRST AID SUMMARY:** 04/27/2015; A BNBI employee sustained a bruise on their arm when the cover of an overhead cubicle bin closed unexpectedly on their arm. No first aid was administered.

18. **FIRST AID SUMMARY:** 04/27/2015; A BNBI employee scratched their finger on the sharp edge of the outside edge of a Class III mobile glovebox. The CMA applied Liquid Bandage® to the wound and this allowed the employee to work in containment wearing a waterproof bandage.

19. **FIRST AID SUMMARY:** 04/27/2015; A BNBI employee scratched their finger on a pallet while working in a BSL-2 lab. The CMA applied Liquid Bandage® to the wound and this allowed the employee to work in containment wearing a waterproof bandage.

NEAR MISS SUMMARIES:

1. **PPE FAILURE SUMMARY:** 02/02/2015; A BNBI employee reported an outer glove tear (yellow Marigold) in the BSL-4. The employee noticed the tear in the chemical shower. The incident was reported to the CMA and the RO. The CMA determined that it was not a potential exposure. The BSL-4 laboratory manager placed a 1 month expiration date on all of the open packages of yellow marigold gloves.

2. **FACILITY PROCESS FAILURE:** 02/04/2015; A BNBI employee noticed that water had sprayed all over the wall and floor in front of the toilet in a BSL-3 lab. The exact cause of the water spill has not been determined.

3. **PPE FAILURE SUMMARY:** 02/05/2015; A BNBI employee reported an outer glove tear (nitrile) in the BSL-3. The tear was noticed as the employee was putting their hands into a recently disinfected BSC. The incident was reported to the CMA and the RO. The CMA determined that it was not a potential exposure.

4. **PPE FAILURE SUMMARY:** 02/05/2015; A BNBI employee reported an outer glove tear (yellow Marigold) in the BSL-4. The employee noticed the tear after working with a plate washer. The incident was reported to the CMA and the RO. The CMA determined that it was not a potential exposure.

5. **LABORATORY PROCESS FAILURE SUMMARY:** 02/06/2015; A BNBI employee reported that they forgot to remove their watch after they had entered the containment side change room. The watch was decontaminated and removed from containment.

6. **PPE FAILURE SUMMARY:** 02/12/2015; A BNBI employee reported an outer glove tear (nitrile) in the BSL-3. The employee noticed the tear while they were taping bacterial plates. The incident was reported to the CMA and the RO. The CMA determined that it was not a potential exposure.

7. **PPE FAILURE SUMMARY:** 02/19/2015; A BNBI employee reported an outer glove tear (Alphatech) in the BSL-4 while loading waste into the autoclave. The incident was reported to the CMA and the RO. The CMA determined that it was not a potential exposure.

8. **PPE FAILURE SUMMARY:** 02/20/2015; A BNBI employee reported an inner glove tear (nitrile) in the BSL-3 while the employee was removing the outer gloves after they had decontaminated and removed all items from the BSC. The incident was reported to the CMA and the RO. The CMA determined that it was not a potential exposure.

9. **PPE FAILURE SUMMARY:** 02/19/2015; A BNBI employee reported a suit breach (Sperian #108) while in the chemical shower. The suit had developed a pin hole. The CMA determined that it was not a potential exposure. The suit was repaired and put back into service.

10. **LABORATORY PROCESS FAILURE SUMMARY:** 02/25/2015; A BNBI employee reached over the line of containment from the non-containment side to retrieve a bag of items that had been placed on the floor of the containment side. The items were then moved to another airlock for a gaseous decontamination. The group was retrained on how to remove items from BSL-3 airlocks.

11. **LABORATORY PROCESS FAILURE SUMMARY:** 02/27/2015; A BNBI employee reported a spill of bleach solution inside the airlock of an anaerobic chamber. Some of the bleach spilled out of the chamber onto the table and the floor of the lab. The bleach was cleaned up and the Health and Safety Department was notified.

12. **PPE FAILURE SUMMARY:** 03/11/2015; A BNBI employee reported an inner glove tear (purple nitrile) in BSL-3. The employee noticed the tear in the inner glove while they were removing the outer gloves. All infectious material had been put away and the BSC had been surface disinfected when the tear was discovered. The incident was reported to the RO and the CMA determined that it was not a potential exposure.

13. **PPE FAILURE SUMMARY:** 03/11/2015; A BNBI employee reported an outer glove tear (latex) in BSL-3. The tear was noticed when the employee was working with infectious material in the BSC. The inner glove was tested and found to be intact. The incident was reported to the RO and the CMA determined that it was not a potential exposure.

14. **PPE FAILURE SUMMARY:** 03/11/2015; A BNBI employee reported an outer glove tear (latex) in BSL-3. The tear was noticed when the employee was working with infectious material in the BSC. The inner glove was tested and found to be intact. The incident was reported to the RO and the CMA determined that it was not a potential exposure. The entire box of gloves was discarded after the second tear in the same day.

15. **FACILITY FAILURE SUMMARY:** 03/12/2015; During scheduled work with the building automation system (BAS), the power was turned off to a BAS panel. When power was restored the BAS switch rebooted,

temporarily going offline resulting in high negative pressure in the labs. All staff were told through the One-Call system to stand down their activities until the negative pressure was stabilized. The One-Call Messaging System was further refined as a result of this event.

16. **EQUIPMENT FAILURE SUMMARY:** 03/16/2015; A BNBI employee noticed a spill of water in an autoclave service pit. The spill was traced to a leak in a vacuum pump. The vacuum pump was changed out**.** No infectious material was spilled.
17. **PPE FAILURE SUMMARY:** 03/16/2015; A BNBI employee reported a suit breach (Sperian #143) while in the chemical shower. The incident was reported to the RO and the CMA determined that it was not a potential exposure. The suit was repaired and placed back into service.
18. **PPE FAILURE SUMMARY:** 03/23/2015; A BNBI employee reported a suit breach (Sperian #89) while in the chemical shower. The incident was reported to the RO and the CMA determined that it was not a potential exposure. The suit was repaired and placed back into service.
19. **LAB PROCESS FAILURE SUMMARY:** 04/01/2015; A BNBI employee put their ungloved hand into a BSC in order to retrieve a bag. Both the BSC and the bag had been decontaminated with bleach immediately prior to the employee retrieving the bag. The incident was reported and the CMA determined that it was not a potential exposure.
20. **PPE FAILURE SUMMARY:** 04/02/2015; A BNBI employee reported a BSL-4 suit breach in the crotch area (Sperian #39). The incident was reported and the CMA determined that it was not a potential exposure. The suit was repaired and put back into service.
21. **LAB PROCESS FAILURE SUMMARY:** 04/06/2015; A BNBI employee reported that a small amount of bleach residue was discovered in a storage area. The incident was reported and the spill was cleaned up using appropriate PPE. The spill was most likely caused by a leaking bleach bottle.
22. **PPE FAILURE SUMMARY:** 04/07/2015; A BNBI employee reported a BSL-4 suit breach (Sperian #129). The incident was reported and the CMA determined that it was not a potential exposure, and the suit was repaired and put back into service.
23. **PPE FAILURE SUMMARY:** 04/09/2015; A BNBI employee reported a BSL-4 suit outer glove tear (Green, Nitrile Mapa). The incident was reported and the CMA determined that it was not a potential exposure.
24. **LAB PROCESS FAILURE SUMMARY:** 04/16/2015; A BNBI employee reported that an EDS glass ampoule biological indicator fell and broke on the floor. The vial contained a non-infectious biological material. The process, *Validation of Effluent Decontamination System* was amended to include the use of a tube rack and closable bags for the transport of glass ampoules.
25. **FACILITY PROCESS FAILURE SUMMARY:** 04/20/2015; A BNBI employee reported that an autoclave failed 12 minutes into a cycle containing contaminated waste for destruction. The load of contaminated waste was moved into another autoclave from within the suite and subsequently destroyed. When the door of the autoclave was opened, a small amount of condensate water spilled on the floor of the containment space. The spill of material was cleaned up with personnel in RPE.
26. **LAB PROCESS FAILURE SUMMARY:** 04/20/2015; A BNBI employee reported that they forgot to don safety glasses in BSL-3 containment (after removing a PAPR hood). The employee realized their mistake after a few minutes of work and went back into the change room to don them again.
27. **FACILITY PROCESS FAILURE SUMMARY:** 04/30/2015; A BNBI employee reported a spill of condensate water from an autoclave that had a leaking gasket. Although the cycle passed, the load

and spill were treated as if they were contaminated. The spill of material was cleaned up with personnel in RPE. The leak was caused by broken glass lodged in the door gasket.

28. **LAB PROCESS FAILURE SUMMARY:** 04/30/2015; A BNBI employee reported that they forgot to don safety glasses in BSL-3 containment after showering out and then re-entering containment. No hazardous work was performed during the entry.

29. **FACILITY PROCESS FAILURE SUMMARY:** 04/30/2015; A BNBI employee reported a drop of water on the back of their neck while working in an interstitial space. The water came from a leak of an Enfield BSL-2 vent line. The incident was reported and the CMA determined that this was not a potential exposure. The vent line was repaired and put back into service.