Mishaps, Lessons Learned & Success Stories – January 2014 Report

SUCCESS STORIES

1. A BNBI employee attempted to shred CD's in the unclassified CD shredder in the first floor copier room at the NBACC; however, it spit out shards of material from the grinding teeth. The staff member found safety glasses and used them while shredding to prevent injury. They designated these safety glasses to be used with the shredder and left them next to the machine with an instructional sign for future use.

2. All of NBACC used first aid and near miss data to reduce similar incidents from occurring. The reductions were significant and represent savings from decreases in lost time due to job restrictions, lost work days, and disruptions in the scientific mission and/or support of the scientific mission. Each consequential event that is prevented from occurring again is a financial savings and success story for the staff of NBACC. Congratulations!

    a. From CY2012 to CY2013 – a 15% decrease in first aid injuries

    b. From CY2012 to CY2013 – a 69% decrease in PPE failures

    c. From CY2012 to CY2013 – a 53% decrease in Facility failures

EVENTS:

BY THE NUMBERS:

- Zero OSHA Injuries
- Zero First Aid injuries

NEAR MISSES

BY THE NUMBERS:

- Three Lab Process Failures (#1, #3, & #4)
- One Equipment Failure (#2)
- One PPE Failure (#5)

1. **LAB PROCESS FAILURE SUMMARY**: 12/03/2013; A BNBI employee dropped a glass vial of non-infectious, non-hazardous, latex solution on the floor of a BSL-3 suite. The staff member contacted [redacted] to request assistance from the NBACC H&S team. However, DHS guards could not contact any member of the Health

and Safety team by phone or radio. The spill was cleaned up by the staff member because they knew the contents were non-hazardous.

ROOT CAUSE: There is a lack of usable bench space in this lab which forced the employee to use the edge of the sink as a platform. The vial fell off the sink when the employee bumped into it by mistake. Contributing factors: "General Environmental Issues (tight spaces)". Root cause: "Design issues (flow/equipment layout)"

The DHS guard staff do not have the ability to call "individuals" on the radios. They can only make VOX calls. The H&S staff assumed that the DHS guards could radio individuals on individual channels. An individual call on the radio triggers a tone that gets the attention of the H&S staff member. Other calls may be missed if there is no tone (noisy environments, radio turned down due to meeting, etc).

CORRECTIVE ACTIONS:

- The LSM will be asked to evaluate the lab space to determine if any modifications to equipment layout or workflow can be made to improve bench space availability.
- The DHS guards were reminded to continue using radio, telephone and cellular telephone communications until contact with Health and Safety is made.

LESSONS LEARNED: This event highlights the "dangers" in making assumptions when interactions between organizations are critical for success of a process. Two incorrect assumptions combined to prevent potentially emergency information from reaching the correct individuals:

1. H&S staff assumed DHS security had the ability to use person-to-person calls on radios.
2. DHS security assumed that H&S staff used the safety channel on radios.

Organizations can have different cultures, procedures, and/or understanding of "common" terminology. In order to help ensure effective communication across organizational boundaries, staff should clearly discuss expectations before the process begins.

2. **EQUIPMENT FAILURE SUMMARY:** 12/6/2013; A BNBI employee's office chair failed while they were trying to adjust it. The failure caused the employee to catch themself in an awkward way that could have resulted in injury.

ROOT CAUSE: The chair's back support was fastened with only one of two bolts. The existing bolt sheared off and the back support snapped off the chair. It is unknown why the chair was assembled with only one bolt instead of two. Root Cause: "Design Issues (Faulty installation or repair)".

CORRECTIVE ACTIONS:

- The employee's chair was replaced with a new chair.
- The employee scheduled an ergonomic assessment of their workstation at both the Annex and the NBACC.

LESSONS LEARNED: Modern office chairs have multiple adjustments to allow them to be customized to an individual's specific size/shape. This feature has help create a more ergonomic work environment.

However, it has also created additional failure points in the chair that staff need to be aware of. If your chair starts to feel more "wiggly" or you find a mysterious bolt on your office floor, these are warning signs that you need to have your chair checked out.

3. **LAB PROCESS FAILURE SUMMARY:** 12/08/2013; A BNBI employee working after hours reported that they heard a loud noise coming from the electrical outlet of a cubicle. Further inspection by the NBACC electrician revealed that a loose fitting had been improperly installed in the outlet causing an electrical short to occur.

   ROOT CAUSE: "Design Issues (Faulty installation or repair)".

   CORRECTIVE ACTIONS: The electrician repaired the cubicle outlet and tested it for electrical short circuits.

   LESSONS LEARNED: The NBACC Laboratory is a "high tech" facility with multiple control systems that are needed to safely operate high containment research facilities. Many of these systems can make unique noises that can just become part of the background. It is important for staff to maintain an awareness of their work environment and to report any thing unique or different. In this event, the staff member reported the noise leading to the identification of an electrical wiring issue before it could result in serious damage or injury.

4. **LAB PROCESS FAILURE SUMMARY:** 12/11/2013; Two BNBI employees had to conduct an emergency exit out of a BSL-3 containment airlock. The two employees found themselves locked in a vestibule adjacent to an airlock that was about to undergo a VHP decontamination. There was no way to communicate with anyone and there were no other exits but through the taped airlock. There were no injuries. The RO notified the CDC of the incident. 236

   ROOT CAUSE: The FMO staff did not know that the doors to the vestibule would lock and not allow anyone to exit that space. They were under the assumption that only the airlock door would be locked. In addition, there was no assurance that the suite was cleared of personnel prior to the lock down of the doors. (The lab staff were also unaware that a VHP decon was to take place on this day due to the fact they entered the laboratory before an email notification was sent.) Contributing Factors: "Knowledge Issues (inadequate task knowledge) and "Methods and Work Instructions". Root cause: "Knowledge Issues (inadequate process)".

   CORRECTIVE ACTIONS: Several changes were made to the procedures for the VHP decontamination of airlocks outlined in 22-017-SOP. The changes addressed the responsibility to assure that the appropriate doors are locked at the appropriate time, as well as further assurances that all personnel have safely exited a suite prior to initiating VHP decontamination.

   LESSONS LEARNED: Many of the processes implemented at the NBACC rely on multiple organizations to complete the task. In order for the process to operate smoothly/correctly/safely, close coordination is needed between the different groups. The VHP decontamination process relies on coordination between facility operation staff, LSM's, and research staff. This incident revealed that the VHP decontamination process needed significant improvements in communications between LSMs, staff and FMO, to ensure proper decon is achieved as well as to provide necessary life safety assurances.

   The incident also highlighted that the proper review cycle for SOPs should be tied to start up, changes, and/or lessons learn and not just assumed to be annually. With the BSL-3 laboratories standing up in FY2013 and VHP decons just starting to be more routine, the SOP's should have been evaluated to determine if revisions were necessary based on the newly established operating history.

5. **PPE FAILURE SUMMARY:** 12/12/2013; A BNBI employee reported that their BSL-4 suit had a breach where the vent and visor meet. The breach was discovered while the employee was showering out of the suite. The CMA concluded that this was not a potential exposure. The incident was reported to the RO.

   ROOT CAUSE: "Design Issues (Faulty construction or repair)".

   CORRECTIVE ACTIONS: The suit was placed out of service until it can be repaired.

   LESSONS LEARNED: N/A

Definitions:

Event: An unintended situation that resulted in a negative impact.

Examples:

- A glove tear that resulted in a potential exposure
- OSHA recordable injuries and illnesses
- First aid only injuries
- Loss of property
- Loss of prestige

OSHA Recordable Incident or Accident {1904.7(b)(1)(i)]: A work-related injury or illness must be recorded if it results in one or more of the following:

Examples:

- Death
- Days away from work
- Restricted work or transfer to another job
- Medical treatment beyond first aid
- Loss of consciousness
- A significant injury or illness diagnosed by a physician or other licensed healthcare professional

Near Miss: An unintended situation that did not result in a negative impact. Anything that doesn't meet the definition of an "Event" should be categorized as a near miss.

Examples:

- A glove tear that did not result in a potential exposure
- Wearing jewelry into a containment lab

Categories:

- Lab Process Failure
- Facility Process Failure
- PPE/Equipment Failure

Mishaps, Lessons Learned & Success Stories – February 2014 Report

SUCCESS STORIES:

EQUIPMENT FAILURE SUMMARY: 1/15/2014; A BNBI employee reported that the rugs at the entrance to the NBACC were causing people to trip as they exited the building. The DHS guards also confirmed that one person nearly "tripped and fell through the glass doors" on one recent occasion.

ROOT CAUSE: After repeated cleaning cycles, the rugs did not lie flat on the floor and had to be removed from service. "Design issue: (faulty construction)"

CORRECTIVE ACTIONS: The rugs were removed from service and replaced with rugs that did lie flat on the floor. EO management was notified of the issue.

LESSONS LEARNED: Facility systems and equipment that is designed to improve the overall level of safety can become worn after repeated use and themselves become a safety hazard. In this case, the rugs are designed to increase safety by capturing moisture and debri thus reducing slip, trip, and fall hazards. However, through repeated washings, the rugs had become irregular and no longer laid flat. The same potential for degraded performance exists in other safety systems throughout the NBACC. Therefore, staff should remain alert for signs of wear on items you rely on daily in performance of your duties.

EVENTS:

BY THE NUMBERS:

- OSHA Injuries (N/A)
- First Aid injuries (#1)

1. **FIRST AID SUMMARY:** 01/07/2014; A BNBI employee reported a small paper cut while in BSL-3 containment. The paper cut was caused by the edge of a box of gloves. The laceration bled a bit and first aid was applied. After contacting Health & Safety, the employee exited the suite and reported to the CMA. The employee had not been working with any infectious materials at the time. The CMA ruled that there was no potential exposure. The RO was also notified.

   The employee contacted the Health & Safety team by calling (b) (6) Initially, the Security Command Center attempted to contact the Health and Safety Group on the (b) (7)(F) and "Safety" channels with no success. They then contacted the Infrastructure Operations Director via phone who informed the H&S staff.

   ROOT CAUSE: "Operational Issues; Equipment use"

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED:

NEAR MISSES

BY THE NUMBERS:

- Four Lab Process Failures (#2, #4, #8, #9)
- One Facility Failure (#5)
- Two Security Incidents (#3 and #7)
- Two Equipment failures (Success story and #6)

2. **LAB PROCESS FAILURE SUMMARY:** 01/02/2014; A BNBI employee reported that a bottle of Microchem Plus® leaked a small amount of liquid in a BSL-4 hallway.

   ROOT CAUSE: The bottle was on the bottom shelf of a rack in the hallway right next to a rolling tool cart. It appears that the tool cart rolled onto the bottle and caused a crack. "Design Issues; Flow/Equipment layout."

   CORRECTIVE ACTIONS: The spill was cleaned up on the spot and other bottles were removed from in front of the tool box.

   LESSONS LEARNED: When considering the layout of a work space, staff should give consideration to the potential for movement of equipment. This is especially true for work spaces used by multiple organizations and/or with limited space. In this case, the Microchem Plus was stored on a low shelf which is the correct chemical storage approach for larger chemical containers but next to a movable tool cart. Similar situations have been previously reported in the lessons learned document where moving equipment has resulted in damage to other items.

3. **SECURITY INCIDENT SUMMARY:** 01/10/2014; A BNBI employee noticed that a letter was hand written, addressed to the Annex facility with "Attn: Security Forces" on the front, and it was taped in the back. After transferring the letter to the NBACC, one of two tests on the letter came up positive for black powder but negative for explosives. The letter was negative for white powder. The NBACC Emergency Manager and DHS security were notified.

   ROOT CAUSE: Stochastic event; unpreventable.

   CORRECTIVE ACTIONS: N/A. The letter turned out to be a personal request from another federal facility security staff member.

   LESSONS LEARNED: The signs of suspicious packages can be very subtle. In this case, the term "Security Forces" combined with the delivery address of the Annex was enough for the staff member to feel that something wasn't quite right. It is important that staff remain vigilant for security threats from outside of NBACC and to not hesitate to report an uncomfortable feeling.

4. **LAB PROCESS FAILURE SUMMARY:** 01/13/2014; A BNBI employee reported that two ducted BSCs were in alarm within BSL-3 containment. The alarms were for low flow and not for complete failures. No one was working in the BSCs at the time of the low flow alarm.

   ROOT CAUSE: Exhaust fans (b) (7)(F) were being serviced at the time of the BSC failures. At the time not all individuals in FMO understood the nuances associated with the procedures for the start up and shut

down of these specific fans. The staff who executed the shut down and start up of these fans on the day of the incident did not have all of the information needed to prevent a a drop in the exhaust plenum negative pressure, which was the likely cause of the BSC alarm. "Functional Issues (inadequate organizational communication)."

CORRECTIVE ACTIONS:

- The BSC alarms were cleared and work resumed.
- FMO disseminated the information about the shutdown and start up procedures of fans (b) (7)(F) throughout their group.

LESSONS LEARNED: Experienced staff frequently develop best practices (i.e. "tribal knowledge") for completing routine tasks. While some practices are personnel preference to account for individual circumstances (i.e. left handed vs. right handed, tall vs. short, etc.) others are more tied to individual traits of the facility or piece of equipment. As staff learn more about the specific operating characteristics of systems, they should take steps to ensure that this information is institutionalized for all staff. Updating SOP's and/or posting operator aids are ways to prevent the next staff member from learning the "hard way."

5. **FACILITY PROCESS FAILURE SUMMARY:** 1/16/2014; A BNBI employee reported a small (100mL) leak of material on from a BSL-3 drain line. The leak occurred at a point where the drain line for the BSL-3 men's containment side toilet transitioned from cast iron to glass piping. FMO staff and Health and Safety responded to the site and then evacuated the area within 1 minute of examination of the leak. "DO NOT ENTER" signs were posted after the area was evacuated; however a staff member incorrectly entered the interstitial space after the signs were posted.

ROOT CAUSE: A metal band securing the rubber adapter connecting the glass and steel cast portions of the pipe together was not providing a proper seal. "Design/reliability Issues (Faulty construction or repair)."

CORRECTIVE ACTIONS:

- The area was immediately vacated and all access points to were posted as "Do not enter".
- A spill and repair plan was developed and approved by FMO and Health and Safety.
- The spill was cleaned up with appropriate disinfectant and the pipe was repaired and tested for further leaks.
- Interstitial spaces will continue to be monitored for issues with drain lines and/or leaks.
- Safety gram was sent out to remind folks to read posted signs.
- Caution tape and strobe lights were procured for use in posting interstitial spaces as "Do Not Enter."

LESSONS LEARNED: Signs are frequently used as a "management control" to convey important information to staff related to the operational status of a space. However, it has been recognized that signs can be ineffective for various reasons: 1. Not highly noticeable; 2. An over abundance of signs; 3. Changes not clearly identified; 4. Staff are focused on other things and don't notice. As a result, there are several key take aways for signs:

1. Signs should be considered a "last line of defense" for communicating information. Always look for another way to deliver a message.

2. Signs should be used for "routine" information.

3. If signs must be used for critical / emergency information, efforts should be made to make them as distinguishable as possible.

4. Staff should develop a habit of looking at signs every time they cross a threshold or door. Specifically looking for changes.

6. **EQUIPMENT FAILURE SUMMARY:** 1/24/2014; A BNBI employee's chair broke and was no longer serviceable.

   ROOT CAUSE: The Quantum Realspace PRO 900 Series chairs are under a safety recall due to seat back failures. "Design Issues (Faulty construction or repair)".

   CORRECTIVE ACTIONS:

   - The chair was removed from service and replaced with a safe alternative chair.
   - Three other employees were found to have these model chairs. These were also removed and replaced with safe chairs.

   LESSONS LEARNED: One of the goals for the near miss, lessons learned process at NBACC is to help improve the overall safety level of the company. By using the information learned from this one chair failure, three additional "potential events" were prevented. Staff members should routinely review the lessons learned information and consider how they can use the information in their own work (or home) environment to prevent the "next near miss" from occurring.

7. **SECURITY INCIDENT SUMMARY:** 1/27/2014; At approximately 6:20 AM a BNBI employee reported that a large black bag had been left at the outside entrance to (b) (6), (b) (7)(F). The police were notified and responded. A member of the Health and Safety Staff responded in the role of Emergency Manager.

   ROOT CAUSE: A vendor from (b) (4), (b) (6) dropped the bag (which contained promotional materials) off due to the fact that they did not have access into the building at night. The Clinic was not aware that other tenets of (b) (6), (b) (7)(F) have suspicious package protocols. "Judgment Issues (Work around)."

   CORRECTIVE ACTIONS:

   - The bag was moved to the (b) (4), (b) (6) office and the Office Manager was notified of the incident.

   LESSONS LEARNED: Sharing a work space — even an office building — requires some level of communication and cooperation in order to safely and securely do business. In this example, one office building tenet did not understand how their actions could potentially impact others in the work place. The same potential for miscommunication exists when multiple organizations within the same company share operational spaces. For example, information that may be communicated at one organization's staff meeting may not be communicated at another organization's. Whenever staff are sharing space with others, they should take the time communicate directly to help ensure that everyone who might need information, has the information.

8. **LAB PROCESS FAILURE SUMMARY:** 1/27/2014; A BNBI employee exited BSL-3 containment while wearing their nitrile gloves that had been used for entry (as part of an immunization waiver). The employee had been under escort while in the laboratory but became confused on proper exit procedures when they entered the change room on their own to exit the suite. They had not worked with any infectious material and had simply participated in a suite orientation while under escort.

   ROOT CAUSE: The employee had been through PAPR training, and a pre-job brief of how to don their PPE. The escort was a female and employee was a male. The female entered the male hot side change room to check on the employee prior to their entry into the suite. However, the female escort could not enter the male change room to help the employee doff their PPE which included the removal of scrubs. The escort did wait in the hot side hallway in case there were questions. The employee also reported that they were confused by the signage on the garbage in the hot side change room. The sign stated "Shoe Covers" and makes no mention of gloves or other trash. Knowledge Issues (inadequate knowledge of fundamentals).

   CORRECTIVE ACTIONS:

   - Any employees who enter containment for the first time should have a thorough walkthrough of the entry and exit procedures.
     - Same gender escorts can provide the walkthrough in the change room.
     - Opposite gender escorts should provide the walkthrough once just prior to entering through the clean side change room and once again just prior exiting through the hot side change room.
   - Signs outlining proper procedures for donning and doffing PPE will be posted in the cold and hot side of the change rooms as reminders of proper procedure.
   - The employee was retrained on how to correctly doff their containment PPE.
   - The signs on the hot side change room trash cans will be removed.

   LESSONS LEARNED: The first time a staff member performs an activity on their own presents an elevated risk for mistakes being made. Mentoring and hands on training can help to minimize the risk, but staff should not hesitate to ask for a refresher or further training if they are not 100% completely comfortable with the process to be completed. This should be considered for all activities from the simple (i.e. doffing PPE) to the complex (i.e. working in the BSL-4).

9. **LAB PROCESS FAILURE SUMMARY:** 1/30/2014; A BNBI employee reported a smell of sewer gas in an unoccupied animal room in ABSL-3. Four BNBI employees had entered the room on the day of the incident, prior to the report of the smell and did not notice any odor. The CMA was contacted and the issue was reported to the RO. The CMA concluded that there was no potential exposure from the loss of containment in the drain system.

   ROOT CAUSE: The sink drain had been disconnected for repairs and temporarily sealed with vinyl tape. The vinyl tape did not provide a sufficient seal to prevent the negative pressure of the room ventilation systems from drawing the odors from the vent portion of the BSL-3 drain system. "Design Issues (Faulty construction or repair)."

   CORRECTIVE ACTIONS:

   - The drain was completely repaired and placed back into service within one hour.

- A more suitable drain pipe plug is being implemented by FMO.

LESSONS LEARNED: Facility systems often work in conjunction with each other to create the safe working environment that staff rely on in the performance of their work. This may include doors being interlocked, redundant fans providing ventilation, or multiple traps isolating drain lines. Before one system is taken off line, consideration should be given to the potential impacts on other systems. In this case, the trap at the sink was taken off line (i.e. removed) and a greater reliance was placed on the containment boundary trap beneath the floor. However the second trap did not isolate the vent line for the sink allowing odors to be pulled into the room.

Definitions:

Event: An unintended situation that resulted in a negative impact.

Examples:

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- First aid only injuries
- Loss of property
- Loss of prestige

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- Days away from work
- Restricted work or transfer to another job
- Medical treatment beyond first aid
- Loss of consciousness
- A significant injury or illness diagnosed by a physician or other licensed healthcare professional

Near Miss: An unintended situation that did not result in a negative impact. Anything that doesn't meet the definition of an "Event" should be categorized as a near miss.

Examples:

- A glove tear that did not result in a potential exposure
- Wearing jewelry into a containment lab

Categories:

- Lab Process Failure
- Facility Process Failure
- PPE/Equipment Failure

Mishaps, Lessons Learned & Success Stories – March 2014 Report

SUCCESS STORIES:

1. An employee came to the aid of another employee in BSL-4 who had slammed their hand in a door. Due to pain, the injured employee became very pale and exhibited signs of syncope. The second employee recognized that a more serious medical event was imminent and helped the injured person into the chemical shower and out of the BSL-4. The injured employee made a full recovery and returned to work without restrictions.

2. An employee challenged another employee who was walking into the administrative area of the building with a biohazardous shipping container (blue top). The shipping container held a urine specimen only. The shipping container had been given to the employee by the safety office to be used as more appropriate secondary containment than a biohazard bag.

   This incident is a success story for two reasons: 1) an employee saw that a more robust secondary container might better contain a spill of urine; 2) a second employee viewed the more robust secondary shipping container as a perception issue for staff trained in shipping of dangerous goods.

3. An employee leaving later in the day walked out of the ECP toward their car that was parked in the last row of the parking lot. The parking lot was fairly empty, but there was an SUV that was parked in the space to the left of the staff member's car. As they walked towards their car, they noticed that the rear passenger door of that car was open and that there was no one in or around the other car. The employee stopped moving toward their car because it just didn't seem right. They scanned the parking lot for someone who might be talking to someone else around the area of the other car. When they didn't see anyone, they decided to go back to the ECP and notify the guards they weren't comfortable going to their car. The guards at the ECP were more than willing to go and check out the situation. One guard stood with the employee inside the ECP while another walked out to the parking lot to check out the situation. It turns out that the car belonged to a construction worker that was actually talking to someone else farther down the parking lot, just out of sight.

4. A new project was preparing to start that needed to be performed in a lab space that a group did not normally work in. Although the staff member had had access to that suite for a long time, they had not actually used the lab since it became a BSL-3. Before work was to start, the staff member made contact with the LSM to talk about the requirements for the suite (which are slightly different from the staff member's normal labs) and to find out if there was anything else that may be different when working in the new suite. The staff member also conducted a short walkthrough of the suite to make sure that all the supplies and reagents that would be needed were present. As it turns out, a particular size and type of glove they used was not present and supplies they we were going to use were running low. EO was contacted to request the supplies that were needed. The next day when work in the suite started, the staff member was glad that they had walked through the previous day because it made working in the new suite for the first time go a lot smoother. This story demonstrates the advantage of conducting a dry run before performing a new procedure or working in a new space.

5. A staff member reported that they recently completed some "Spring Cleaning" and wanted to purge some items (toxic/chemical) to make their home safer for their family. Some of the items were kept under the sink (cleaners, degreasers, etc.), but some are in the garage (paints, bug sprays, pesticides for the lawn). Since they will be spending more time outside/needing to access items in the garage, they wanted to get these items out of the house or at least out of reach of little ones. They took the action to move items up to top shelves where needed, and they were able to drop other items off in the county disposal/recycling recycling center. Practicing chemical safety at home can help to prevent serious injury to the people that matter most in our lives and it highly recommended for everyone.

EVENTS:

BY THE NUMBERS:

- OSHA Injuries (#3)
- First Aid injuries (#1, #2, #4)

1. **FIRST AID SUMMARY:** 02/11/2014; A BNBI employee slipped on some ice in the NBACC parking lot while getting out of their vehicle. The employee reported that they fell on their arm and experienced some bruising but declined going to see the CMA for treatment. First aid only and no work restrictions.

   ROOT CAUSE: "Knowledge Issues". Their traction on the ice was less than anticipated.

   CORRECTIVE ACTIONS: NBACC has limited ability for corrective actions as the parking lot and all walkways up to the ECP are the maintenance responsibility of the U.S. Army Garrison.

   LESSONS LEARNED: Weather (especially winter weather) can create hazards that require staff to recognize and adapt to changing conditions.

2. **FIRST AID SUMMARY:** 02/14/2014; A member of the DHS guard staff slipped on some ice while walking from the ECP to the NBACC building. Both the NBACC and Fort Detrick were closed on this day due to a snowstorm. The regular NBACC staff were not at work to effectively clear snow and ice from the walkway. The guard who fell did not seek medical attention.

   ROOT CAUSE: "Knowledge Issues". Their traction on the ice was less than anticipated.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: Staff who work at the NBACC when Fort Detrick is closed should understand that there is limited support services including snow and ice removal. Greater care than usual should be exercised during these times. (See corrective action for event #1)

3. **OSHA RECORDABLE SUMMARY:** 02/24/2014; An NBACC employee sustained three lacerations on their hand from a sliver of stainless steel that came off of an animal cage rack outside of containment. The employee reported the injury to the Health and Safety Office and the CMA. After a medical evaluation, the employee was restricted from laboratory work for two days.

   ROOT CAUSE: "Reliability Issues". Although smooth to the touch now, the cage rack was flaking in one area due to an unknown reason.

CORRECTIVE ACTIONS: The attending veterinarian gave the comparative medicine staff the option of using gloves while moving these cage racks.

LESSONS LEARNED: It is important to exercise continued vigilance and inspect equipment on a routine basis. It is reasonable to assume that, as equipment ages, it will lose performance or may deteriorate over time.

4. **FIRST AID SUMMARY:** 02/25/2014; A BNBI employee did not remove their hand in time to avoid a self-closing door within the BSL-4. The door slammed on their fingers and caused significant pain and bruising. The employee's glove was not breached during this event and they had not used infectious materials. The employee reported that they had not had anything to eat since the prior evening. As a result of the accident, the employee exhibited signs of syncope (pale skin, poor focus, dizziness). Another employee helped them into the chemical shower and out of the suite.

   This incident required first aid only and resulted in no work restrictions.

   ROOT CAUSE: "Attention Issues" The employee reported that they simply lost track of their hand while doing chores, and the door slammed shut faster than they anticipated. A contributing factor may have been the employee had not eaten prior to going into the suite and reported feeling weak.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: An important part of preparing for a work activity is to make sure that you are both physically and mentally prepared. Factors such as being distracted, tired, or hungry can prevent an individual from being able to achieve peak performance. Depending on the task, these types of factors can turn a routine activity (i.e. driving a vehicle) into a high hazard situation and a complex activity (e.g. working in a BSL-4) into an unacceptable situation.

   As a reminder, the NBACC PRP is specifically designed to allow for staff to self restrict if they feel that there are factors which could negatively impact their ability to work safely in the labs; this would include factors that affect their ability to concentrate or focus on daily tasks.

   NOTE: This is the same event which lead to the success story listed above.

NEAR MISSES

BY THE NUMBERS:

- One Lab Process Failures (#5,)
- Two Equipment Failures (#6, #7)

5. **LAB PROCESS FAILURE. SUMMARY:** 02/26/2014; A BNBI employee wore a necklace into BSL-3 containment while conducting a suite safety orientation.

   ROOT CAUSE: "Attention issues". The employee had to conduct a safety orientation and participate in a safety inspection at the same time, which were both novel events for this individual. There was a great deal to keep track of and remember.

CORRECTIVE ACTIONS: The necklace was sprayed with bleach, allowed to sit for an appropriate contact time, and removed from the suite through the personnel shower.

LESSONS LEARNED: Even for experienced staff, new events and/or changes in routine present a greater likelihood for errors. When working in situations that are either new or different than the normal daily activities, staff should make a point to conduct a double check of their routine (i.e. entry procedures, work preparation, etc) for themselves and others.

6. **EQUIPMENT FAILURE SUMMARY:** 02/06/2014; A BNBI employee reported that two ducted BSCs were in alarm within BSL-3 containment. The alarms were for "exhaust error" alarms, indicated low air flow, and not for complete failures. No one was working in the BSCs at the time of the alarm. However, staff were preparing to begin work with BSAT in that particular BSC in the next few minutes.

   ROOT CAUSE: The exact cause of this incident is still under investigation. It has been determined that FMO staff had been changing out a motor on exhaust fan (b) (7)(F) Because exhaust fan [redacted] is right up against (b) (7)(F), it was requested this second fan was also be turned off due to safety concerns. These two particular fans are not the exhaust fans that serve the ducted BSCs; they serve the actual lab spaces. Taking two of the four exhaust fans off line may have resulted in fluctuations in the room pressure that were sufficient to cause the BSC exhaust error. Since the fans did not directly serve the ducted BSCs, FMO did not coordinate with the lab staff to ensure work with live agent was not being performed.

   CORRECTIVE ACTIONS:

   - Because of a previous BSC exhaust error alarm (01/13/2014), and a subsequent one on February 13, 2014 (discussed below), NBACC FMO and Safety met to discuss possible reasons for the increase in the number of these types of alarms. All of the alarms had different initiating events. It was noted that the BSC HEPA filter life had been reported to be 17%, and a replacement of the filter had been scheduled in FootPrints. Since that time the remaining filter life has continued to decline (as expected). It is believed that a replacement of the HEPA filter may aid in preventing the airflow issues triggering the exhaust error alarm. The VHP decon required for the HEPA filter replacement has been scheduled.

   - The units were put out of service until the HEPA filters can be replaced and the units certified.

   - FMO discussed conducting HVAC testing on the BSCs once the HEPA filters are replaced in order to better understand what FMO activities are likely to impact the function of the ducted BSC. This will allow better communication between FMO and lab staff.

   - Current guidance as to when the HEPA filter replacement should be scheduled will be re-evaluated following the resolution of this issue. It should be noted that these are some of the first BSCs to require HEPA filter change out since NBACC began operation.

   LESSONS LEARNED: With the NBACC being a new facility, it does not have an extensive operating history so the timing for many preventative actions are based on industry standards. As systems are used and items such as filters start to near their end of life, staff have a better idea of how operations are impacted and can plan in advance to minimize disruptions. In this case, as the internal HEPA filters of the BSC start to load, the BSC may lose some of its ability to accommodate room pressure fluctuations.

7. **EQUIPMENT FAILURE SUMMARY:** 02/13/2014; A BNBI employee reported that two ducted BSCs were found in alarm within BSL-3 containment. The alarms were for "exhaust error" alarms and not for complete failures. No one was working in the BSCs at the time of the exhaust alarm.

ROOT CAUSE: "Equipment Failure". An extremely heavy snowstorm with high winds packed the supply pre-filters with snow and caused the NBACC HVAC system to stop functioning normally. The supply fans shut down and the exhaust fans ramped down to 20%, keeping the labs slightly negative.

CORRECTIVE ACTIONS: On-call FMO staff responded to the NBACC. The snow was cleared the fans were restarted.

Additional corrective actions can be found above in the February 6, 2014 event.

LESSONS LEARNED:

This event highlighted the fact that during an NBACC office closure, the labs remain open for staff to perform critical work. However, during such instances, FMO and Safety may be less available to respond, simply due to the nature of the event that led to the office closure. Extreme weather conditions should be evaluated for their likelihood to impact building systems, and lab work restricted or additional support or instructions to lab staff provided.

Definitions:

Event: An unintended situation that resulted in a negative impact.

Examples:

- A glove tear that resulted in a potential exposure
- OSHA recordable injuries and illnesses
- First aid only injuries
- Loss of property
- Loss of prestige

OSHA Recordable Incident or Accident {1904.7(b)(1)(i)]: A work-related injury or illness must be recorded if it results in one or more of the following:

Examples:

- Death
- Days away from work
- Restricted work or transfer to another job
- Medical treatment beyond first aid
- Loss of consciousness
- A significant injury or illness diagnosed by a physician or other licensed healthcare professional

Near Miss: An unintended situation that did not result in a negative impact. Anything that doesn't meet the definition of an "Event" should be categorized as a near miss.

Examples:

- A glove tear that did not result in a potential exposure
- Wearing jewelry into a containment lab

Categories:

- Lab Process Failure
- Facility Process Failure
- PPE/Equipment Failure

Mishaps, Lessons Learned & Success Stories – April 2014 Report

SUCCESS STORIES:

A Lab Space Manager realized that a staff member was using beads to infect plates within BSL-3. The LSM had enough institutional knowledge to realize that beads had been prohibited as a means to store and infect (inoculate) plates per a Memorandum dated 8/23/2011, "*Summary of near miss Investigation involving infected beads on 12 August 2011.*" Following explanation of the policy, the lab staff immediately ceased using beads and removed them from the suite.

A strong safety culture starts at home and is best started young. A staff member recently reported the following situation. As all good "9 year old big brothers" do, this young man recognized it was time to teach is four year old sister to play baseball. Since his batting helmet didn't fit her and recognizing that safety is important, they used the best alternative available, her bike helmet. I see a future safety professional in the making.

EVENTS:

BY THE NUMBERS:

- OSHA Injury (#6)
- First Aid Injuries (#1, #2, #3, #4, #5)

GENERAL LESSONS LEARNED: Five of the six events that occurred during the month involved a break in the skin of a staff member working inside containment. Staff should remember that a person's skin represents the primary barrier against infections. When working in biological containment laboratories, it becomes very important to protect this barrier from any breach the same way you would protect other PPE that may be used. When staff review their work area and the activity to be conducted for hazards prior to beginning work, in addition to "real hazards", everyone should also be considering ways to minimize risks to their skin (i.e. pinch points, corners, edges, etc.). Staff should also remember that if they experience a skin "event" (i.e. cut, blister, tattoo, etc), whether at home or work, they should discuss it with the CMA to ensure that containment lab work is allowed.

1. **FIRST AID SUMMARY:** 03/05/2014; A BNBI employee sustained a paper cut in BSL-3 while faxing out an inventory of a shipment of material. The CMA and RO were notified. The CMA determined that this was not a potential exposure.

   ROOT CAUSE: N/A

   CORRECTIVE ACTIONS: N/A

LESSONS LEARNED: See general lessons learned.

2. **FIRST AID SUMMARY:** 03/06/2014; A BNBI employee experienced a nose bleed in BSL-3 containment. The CMA responded to the event at the non-containment side, and the CMA determined that this was not a potential exposure. The CMA refers to this incident as a "personal event," i.e., not work related.

   ROOT CAUSE: Unknown cause.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: N/A

3. **FIRST AID SUMMARY:** 03/07/2014; A BNBI employee tore a blister open (outside of containment) while pulling a band aid off the blister. The employee had entered containment with their own band aid on the existing blister.

   ROOT CAUSE: "Knowledge Issues." The employee was not aware that a blister is a skin imperfection and should have been reported to the CMA.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: See general lessons learned.

4. **FIRST AID SUMMARY:** 03/10/2014; A BNBI employee pinched their finger in the handle latch of a low voltage electrical cabinet in the BSL-4 cabinet lab. The employee was attempting to retrieve stored material from the cabinet. The RO was notified, and the employee was evaluated by the CMA who determined that this was not a potential exposure and released the employee to continue to work.

   ROOT CAUSE: "Attention Issues." Materials should not be stored in the electrical cabinets and staff should also be aware that there is a pinch point in the cabinet latch.

   CORRECTIVE ACTIONS: All stored materials were removed from the cabinet and additional shelves were purchased for storage use.

   LESSONS LEARNED: See general lessons learned.

5. **FIRST AID SUMMARY:** 03/24/2014; A BNBI employee struck their head on a metal shelf while standing upright after putting tacky mats down in the BSL-3. The employee exited the suite and reported to the CMA for evaluation. CMA determined that this was not a potential exposure.

   ROOT CAUSE: "Attention Issues."

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: See general lessons learned.

6. **OSHA RECORDABLE SUMMARY:** 03/25/2014; A BNBI employee scrapped their knuckle on the surface of the floor in the non-containment side change room (b) (7)(F) The employee was evaluated by the CMA and was restricted from working in the laboratories for two days.

   ROOT CAUSE: "Attention Issues."

CORRECTIVE ACTIONS: N/A

LESSONS LEARNED: See general lessons learned.

NEAR MISSES

BY THE NUMBERS:

- Lab Process Failures (#7, #9, #12, #15, #16)
- Equipment Failure (#13)
- PPE Failures (#8, #10, #11, #14, #17, #18)

7. **LABORATORY PROCESS FAILURE SUMMARY:** 03/04/2014; A BNBI employee noticed that a laboratory staff member was transporting ice from the third floor kitchen using buckets from the BSL-2 laboratories. The ice machine is for human use, although ice can be taken from the kitchen area into the laboratories.

   ROOT CAUSE: "Knowledge Issues"

   CORRECTIVE ACTIONS:

   - The ice machine was emptied and cleaned using a 1:10 dilution of bleach.
   - An email was sent out by the Laboratory Operations Manager to several LSMs reminding them to only use new plastic bags as transport vessels for ice from the kitchen.
   - FMO installed a shelf near the ice machine and Health and Safety put a container of Ziploc bags on the shelf that could be used to transport ice.

   LESSONS LEARNED: BSL-2 laboratories are often seen as being less "hazardous" than the high containment BSL-3 and BSL-4 laboratories. The requirements for entry/exit are less onerous, some personal items are allowed in/out of them, and the facility controls are not as robust. However, BSL-2 laboratories can still represent a significant risk to both laboratory and non-laboratory staff. Staff working in BSL-2 laboratories should remember that they have as much responsibility for ensuring the safety of themselves and their coworkers as staff working in BSL-3 and BSL-4 labs.

8. **PPE FAILURE SUMMARY:** 03/06/2014; A BNBI employee experienced an outer glove breach in the BSL-4. No infectious work was performed. The employee followed an emergency glove change out and exited the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: It is likely that the glove breach occurred while the employee moved a heavy instrument.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: Most people are familiar with the phrase "get the right tool for the job". This same phrase could be applied to the selection of PPE. While many people see gloves as "just" a layer of PPE to protect against potential contamination, the selection of which type of glove is "just" as important as picking the right tool. In this near miss, the movement of a heavy instrument put the glove at a much higher risk of failure. A more detailed review of the equipment move may have determined that this risk might have been mitigated by getting assistance from another staff member or putting heavier duty gloves over the BSL-4 suit gloves.

9. **LAB PROCESS FAILURE SUMMARY:** 03/10/2014; A BNBI employee dropped a 96 well plate onto the floor of a BSL-4 laboratory while they were attempting to put the plates into secondary container for transport. About 14 mL of material spilled.

   ROOT CAUSE: "Attention issues"

   CORRECTIVE ACTIONS: The spill was cleaned up with appropriate disinfectant.

   LESSONS LEARNED: In October 2013, an almost exact same near miss occurred in a BSL-3 laboratory. As a result of the October near miss, considerable effort was put into identifying safer ways to move items outside of primary containment (i.e. between BSC's and incubators/centrifuges). A broader dissemination of this effort may have lead to improved methods inside the BSL-4. As a reminder, when reading the monthly lessons learned, staff should look for ways to incorporate the lessons learned by others into improvements for their own work areas.

10. **PPE FAILURE SUMMARY:** 3/14/2014; A BNBI employee noted an outer glove tear (latex) while plating a BSL-3 agent. They stopped work and immediately changed out their gloves. The inner gloves were intact. The CMA and RO were notified. The CMA determined that this was not a potential exposure.

    ROOT CAUSE: Unknown cause.

    CORRECTIVE ACTIONS: N/A

    LESSONS LEARNED: N/A

11. **PPE FAILURE SUMMARY:** 03/12/2014; A BNBI subcontractor reported that a screwdriver slipped and cut through both the inner and outer gloves of their BSL-4 suit. The subcontractor was attempting to pry the plastic covers off of the screws holding on circuit boards. The subcontractor was not working with any infectious materials and they also did not cut their hand during the event. The RO was notified and the CMA determined that this was not a potential exposure.

    ROOT CAUSE: "Knowledge Issues." This was the first time the subcontractor had removed the circuit boards and was unfamiliar with the task of removing the covers.

    CORRECTIVE ACTIONS: It was recommended that the subcontractor wear leather gloves during this part of the circuit board maintenance.

    LESSONS LEARNED: See the lessons learned from #8 (i.e. selection of the right tool/glove for the job).

12. **LAB PROCESS FAILURE SUMMARY:** 03/13/2014; A staff member under escort, who was not immune to (b) (3) (B), self-reported that they worked with a group of forensic samples that were potentially contaminated with (b) (3) (B). As part of the restrictions noted on their immunization waiver, the employee was restricted from working with known samples of (b) (3) (B) or unknown samples.

    ROOT CAUSE: "Attention Issues." Neither the escort nor the staff member fully understood the restrictions of the immunization waiver.

    CORRECTIVE ACTIONS: Suggestions were made to the Health and Safety Office for improvements in helping escorts and employees understand the restrictions in place on immunization waivers.

LESSONS LEARNED: Access requirements for entry into BSL-3 laboratories can at times be complex. Depending on the status of the individual involved, waivers may be in place, work restrictions may be established, and/or additional PPE may be required. And this is on a person by person basis. It is important to remember that work restrictions must be understood by everyone in the work area (both escorts and staff members). Staff simply cannot rely on what everyone else in an area is doing as an indication of what they can or should do. Every individual must understand what the requirements are that they are working under and what the authorized work is that they are allowed to perform.

13. **EQUIPMENT FAILURE SUMMARY:** 03/7/2014 and 3/14/2014; An autoclave leaked sterile water into the non-containment autoclave mechanical space on two different occasions.

    ROOT CAUSE: "Design Issues." The technician determined that there was an equipment design error.

    CORRECTIVE ACTIONS: The issue with the autoclave will continue to be monitored by the technician. Various solutions are being considered for this autoclave.

    LESSONS LEARNED: N/A

14. **PPE FAILURE SUMMARY:** 03/19/2014; A BSL-4 Mentor noticed that another individual had a breach in their outer glove (canners). The individual was not working with infectious material and was repairing a mechanical lock on a BSL-4 door. RO was notified and the CMA determined that this was not a potential exposure.

    ROOT CAUSE: Unknown cause

    CORRECTIVE ACTIONS: N/A

    LESSONS LEARNED: This is an excellent example of staff members looking out for each other. As a result, the mentor was able to notify the other staff member and the situation was corrected before additional risks were encountered. Also, see lessons learned #8 (i.e. selection of the right tool/glove for the job).

15. **LAB PROCESS FAILURE SUMMARY:** 03/19/2014; A BNBI employee reported that a laptop computer was autoclaved out of the BSL-4 as an experiment to see how it would survive the process. Although the hard drive was removed prior to the event, the lithium battery was not removed. Lithium batteries are water reactive and can explode under certain conditions. It was noted that the battery was breached sometime during the autoclave cycle. As expected, the computer was completely destroyed during the autoclave cycle.

    ROOT CAUSE: "Knowledge Issues." This process was not planned as carefully as it could have been with the coordination of Health and Safety, the CHO and the IT staff.

    CORRECTIVE ACTIONS: The battery was placed into universal waste.

    LESSONS LEARNED: Autoclaves use a combination of heat and pressure to sterilize materials. While this combination is very effective in sterilizing, they also have the ability to accelerate chemical/physical reactions thus turning innocuous situations into hazardous ones. Any "testing" that involves the use of an autoclave or any "new" items going into an autoclave should be thoroughly reviewed by both the Chemical Hygiene officer (if chemicals are involved) and the Health and Safety group.

16. **LAB PROCESS FAILURE SUMMARY:** 03/20/2014; A BNBI employee reported that two laundry bags taken from a BSL-4 autoclave (complete cycle) did not have their thermal indicator strips on them. After further investigation, it was determined that the laundry was safe to handle and process.

    ROOT CAUSE: It is unknown why the thermal indicator strips were not present. It is likely that they fell off during the autoclave cycle.

    CORRECTIVE ACTIONS: An email was sent out by the BSL-4 LSM reminding staff to firmly adhere thermal indicator strips to laundry bags prior to autoclaving and to look for any that may have fallen off during the autoclaving process before removing the bags from the area.

    LESSONS LEARNED: N/A

17. **PPE FAILURE SUMMARY:** 03/24/2014; A BNBI employee reported a 1-2 inch rip in their PAPR hood while they were in ABSL-3. The hood had slipped up on the employees' head while they bent over repeatedly and, in the process of putting it back into place, they caused the PAPR hood to rip. The employee immediately sprayed down the hood with disinfectant and closed the rip with tape. They exited the room and disposed of the PAPR hood. The RO was notified and the CMA determined that this was not a potential exposure.

    ROOT CAUSE: "Attention Issues." The employee's actions caused the rip in the hood.

    CORRECTIVE ACTIONS: Further modifications to keep the PAPR hoods from slipping off are being implemented.

    LESSONS LEARNED: PPE is selected and used based on the hazards represented by the materials being used and the manner they are worked with. It is recognized that PPE is not always comfortable or easy to work with. However, the use of PPE should always results in an overall lowering of the risks involved in working with/around a hazard. It is important to remember that PPE only lowers risks when it is used properly, it fits correctly, and it is protected from damage. If PPE doesn't fit correctly, is interfering with work, or is introducing an unexpected hazard, staff should take a "time out" and re-evaluate the situation, involving Health & Safety staff as needed.

18. **PPE FAILURE SUMMARY:** 03/25/2014; A BNBI employee reported a tear in an inner glove (nitrile) while working in the BSL-4. The employee was not working with infectious material and the outer glove was not breached. The RO was notified and the CMA determined that this was not a potential exposure.

    ROOT CAUSE: Unknown cause.

    CORRECTIVE ACTIONS: N/A

    LESSONS LEARNED: N/A

Definitions:

EVENT: ***An unintended situation that resulted in a negative impact.***

Examples:

- A glove tear that resulted in a potential exposure
- OSHA recordable injuries and illnesses
- First aid only injuries
- Loss of property
- Loss of prestige

OSHA RECORDABLE INCIDENT OR ACCIDENT {1904.7(b)(1)(i)]: ***A work-related injury or illness must be recorded if it results in one or more of the following:***

Examples:

- Death
- Days away from work
- Restricted work or transfer to another job
- Medical treatment beyond first aid
- Loss of consciousness
- A significant injury or illness diagnosed by a physician or other licensed healthcare professional

NEAR MISS: ***An unintended situation that did not result in a negative impact. Anything that doesn't meet the definition of an "Event" should be categorized as a near miss.***

Examples:

- A glove tear that did not result in a potential exposure
- Wearing jewelry into a containment lab

Categories:

- Lab Process Failure
- Facility Process Failure
- PPE/Equipment Failure

Mishaps, Lessons Learned & Success Stories – May 2014 Report

SUCCESS STORIES:

1. A staff member recognized that the dirty laundry containers on Loading Dock #1 were not securely restrained from rolling off the loading dock surface onto the concrete pavement below causing an unsafe storage condition. They asked if a more substantial restraint device could be installed to chock the wheels and minimize the container from rolling. FMO will fabricate an angle-iron stop or equal type of stop and bolt it into the concrete which will chock the wheels.

2. A staff member recently reported that while on vacation that they were going to be doing a lot of hiking and outdoor activities. Before leaving, they double checked their hiking and car first aid kits. Noticing that items were missing (i.e. tweezers and anti-inflammatories) from the hiking first aid kit, they re-stocked it accordingly. (Tweezers later to remove a tick). Also, even though only planning for short day hikes, they put headlamps with extra batteries in our backpacks, just in case something happened and we were out in the dark. The staff member further reported that this level of preparation, thinking ahead, and attention to detail regarding safety and first aid supplies was a direct result of reading NBACC's lessons learned each month and having a higher-level awareness of safety.

EVENTS:

BY THE NUMBERS:

- First Aid Injuries (#1, #2)

1. **FIRST AID SUMMARY:** 04/01/2014; A BNBI employee reported to the health and safety team with a headache and a burning nose from a very strong bleach smell after pouring 300mL of buffer and bleach down a drain followed by hot water. The employee declined evaluation by the CMA.

   ROOT CAUSE: The hot water caused the release of chlorinated vapor to rise into the breathing zone of the employee. "Knowledge issues"

   CORRECTIVE ACTIONS: An email was sent out to all LSMs to remind staff to use cold water when rinsing bleach down a drain.

   LESSONS LEARNED: The use of many products we use every day at work (and at home) can become very routine and it's possible to lose sight of the hazardous properties they might have. In this case bleach, which is one of the most common disinfectants used at NBACC and at home, created a momentary hazardous environment for staff. The energy added by the hot water probably accelerated the off-gassing resulting in a higher than normal "bleach odor". It is important to remember that many of the everyday products used have hazardous properties that must be accounted for while completing tasks.

2. **FIRST AID SUMMARY:** 04/03/2014; A BNBI employee reported a ¼ inch minor cut on their right thumb that occurred while in BSL-3 containment. The injury occurred while the employee was moving sterile materials from the airlock into the suite. No infectious work was occurring at the time. The CMA and RO were notified. The CMA determined that there was no potential exposure. The CMA determined that the employee could put a band aid on the wound and still enter containment safely.

   ROOT CAUSE: Unknown cause.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: N/A

NEAR MISSES:

BY THE NUMBERS:

- Biosecurity Issues (#3, #4)
- Lab Process Failures (#8, #9)
- Facility Process Failure (#10)
- PPE Failures (#5, #6, #7, #11)
- Equipment Failure (#12)

3. **BIOSECURITY NEAR MISS SUMMARY:** 3/26/14; A LSM found a set of un-secured freezer keys in [redacted] while preparing for a VHP decontamination.

   ROOT CAUSE: Keys were not removed at the time the unit was initially placed into service in the lab.

   CORRECTIVE ACTIONS: Unsecured keys were dunked out and given to alternate KCO for adding to the key control system until someone has a need to use that freezer as a long-term storage unit for BSAT. Un-used keys should be stored with the KCO.

   LESSONS LEARNED: Before new equipment is brought into any BSAT area (BSL-2, BSL-3 or BSL-4 suite), the keys should be located and given to the KCO for safekeeping until there is a need for staff to begin locking the unit. This should be coordinated with EO staff and can be checked by the LSM when the equipment is ready to move into the lab. This will ensure they follow the proper key and code control procedures for sign-out of the keys and a key safe, if needed.

4. **BIOSECURITY NEAR MISS SUMMARY:** 3/26/14; BSL-4 employee reported finding a bag of samples in a storage unit which were not clearly marked as BSAT working stocks. They were also unable to find a working stock form in the area. The RO was notified.

   ROOT CAUSE: "Attention issues".

CORRECTIVE ACTIONS: The PI was contacted and verified the status of the working stocks as well as the location of the required WS form. The PI met with project staff members and re-iterated the correct way to label working stocks.

LESSONS LEARNED: Many of the processes used at the NBACC require detailed documentation to demonstrate that requirements are being followed correctly, to provide an operating history of the labs, and/or to create official records. If staff do not understand the purpose of a form/checklist, they are encouraged to ask questions about the "why" not just the "what". When the underlying reason for a form is better understood, it can be easier to keep the importance of completing the form correctly in the front of your mind. Remember that no one is a fan of paperwork, but it is very important to complete it accurately and timely. As a reminder to all staff, BSAT working stocks must be labeled with the creation date, PI name, and BSAT name unless the project plan requires the strain to be coded.

5. **PPE FAILURE SUMMARY:** 04/04/2014; A BNBI employee reported a pinhole breach at the seam of their BSL-4 suit (Sperian #87) where the zipper meets the faceshield. They did not experience a spill or loss of positive pressure to their suit while they were in the suite. The employee was working with a BSL-3 agent in BSL-4 containment. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: PPE failure

   CORRECTIVE ACTIONS: The suit was repaired and placed back into service but has since been retired from service.

   LESSONS LEARNED: N/A

6. **PPE FAILURE SUMMARY:** 04/04/2014; A BNBI employee reported a leak through their suit zipper (Sperian #66), around the shoulder area. The employee had been working with a BSL-3 agent in BSL-4 containment, but did not experience a spill or loss of positive pressure to their suit while they were in the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: PPE failure

   CORRECTIVE ACTIONS: The suit was retired.

   LESSONS LEARNED: N/A

7. **PPE FAILURE SUMMARY:** 04/09/2014; A BNBI employee reported that the "pigtail" (HEPA filter attachment and hose) fell off of their BSL-4 Dover suit (#34). The employee under escort by another worker and together they were able to hold the hose in place and immediately exited the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: It is likely that the swivel on the "pigtail" assembly became bound allowing the assemble to slowly ratchet off (unscrewed itself) due to the normal action of connecting/disconnecting from airlines.

   CORRECTIVE ACTIONS:

- The "pigtail" assembly was screwed back on the suit and the suit was placed back into service. All other "pigtail" assemblies were verified as tight on all BSI-4 suits.
- The BSL-4 Manager inspected and made notes on the general condition of every BSL-4 suit. Some preemptive patching to Sperian face shields was performed with vinyl tape.

LESSONS LEARNED: Engineering controls are frequently used to protect staff from hazards. Some of these controls have routinely performed preventative maintenance activities completed as part of specific job responsibilities (i.e. fans and motors). Other controls rely on the individual users to inspect them prior to use. Airlines for BSL-4 suits have a known weakness in that through normal use, the airlines can unthread themselves and come loose. To mitigate this risk, NBACC installs swivels that allow the airlines to freely rotate 360°. In this near miss, the swivel did not function correctly allowing the airline to come loose. Staff should remember to routinely verify that controls, which could be taken for granted, are working correctly.

8. **LAB PROCESS FAILURE SUMMARY:** 04/15/2014; A BNBI employee reported that they had mistakenly opened a BSL-3 airlock door before the 15 minute air wash was complete. The CMA and the RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: The employee reported that they actually looked at the timer but did not see the numbers moving. Upon a second look, the numbers were still moving. Opening doors to a BLS-3 airlock prior the 15 minute air wash has happened before. "Attention issues".

   CORRECTIVE ACTIONS: NBACC Facility staff are working to replace the timers with a 15 minute outer door lock out.

   LESSONS LEARNED: In order to be completely effective, administrative controls (i.e. signs, timers, SOP's) require staff to be 100% compliant and to never have a bad day. Whenever you are developing a process, risk mitigation should always be approached in the following manner: 1. Eliminate the hazard; 2. Provide an engineering control; 3. Rely on an administrative control; 4. Use of PPE.

   Whenever implementing a process, staff should understand all of the controls that have been established and remember to always follow/implement each control.

9. **LAB PROCESS FAILURE SUMMARY:** 04/15/2014; A BNBI employee reported that a small beaker of bleach was spilled (10-15mL) within an anaerobic chamber. The spill was immediately cleaned up by the worker and the issue reported to Health and Safety. The worker reported that there is a little room in the anaerobic chamber, and that the beaker of bleach is normal and required part of the safe operation of the device.

   ROOT CAUSE: "Attention issues".

   CORRECTIVE ACTIONS: The spill was cleaned up immediately because the employee knew the contents of the beaker and the spill occurred in a containment device.

   LESSONS LEARNED: N/A

10. **FACILITY PROCES FAILURE SUMMARY:** 04/16/2014 and 04/22/2014; A BNBI employee reported that autoclave 1-620 was leaking sterile water. This is the second and third times this autoclave has leaked onto the non-containment side. The cause of the leak is being investigated.

ROOT CAUSE: Unknown cause.

CORRECTIVE ACTIONS: N/A

LESSONS LEARNED: N/A

11. **PPE FAILURE SUMMARY:** 04/25/2014; A BNBI employee noticed a suit breach (Sperian #87) in the BSL-4 chemical shower. The breach was a ½ inch hole in a reinforced crotch seam. The employee had been working with a BSL-3 agent in the BSL-4. The employee did not experience a spill or loss of positive pressure to their suit while they were in the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

    ROOT CAUSE: PPE failure.

    CORRECTIVE ACTIONS: The suit was retired.

    LESSONS LEARNED: N/A

12. **EQUIPMENT FAILURE:** 04/29/2014; A BNBI employee reported that a lithium battery on a MAC computer expanded and cracked the battery case open. The computer was located in a BSL-2 laboratory. The computer was not exposed to moisture or any other extreme conditions.

    ROOT CAUSE: The cause of expanding battery is unknown.

    CORRECTIVE ACTIONS: The battery was placed into universal waste and given to the USAG Hazardous Materials Management Office for disposition. The computer and battery were retired from service.

    LESSONS LEARNED: Staff should continue to be vigilant for anomalies in all devices that contain lithium batteries and they should take particular care to never expose these devices to water or other liquids.

Definitions:

EVENT: ***An unintended situation that resulted in a negative impact.***

Examples:

- A glove tear that resulted in a potential exposure
- OSHA recordable injuries and illnesses
- First aid only injuries
- Loss of property
- Loss of prestige

OSHA RECORDABLE INCIDENT OR ACCIDENT {1904.7(b)(1)(i)]: ***A work-related injury or illness must be recorded if it results in one or more of the following:***

Examples:

- Death
- Days away from work
- Restricted work or transfer to another job
- Medical treatment beyond first aid
- Loss of consciousness
- A significant injury or illness diagnosed by a physician or other licensed healthcare professional

NEAR MISS: ***An unintended situation that did not result in a negative impact. Anything that doesn't meet the definition of an "Event" should be categorized as a near miss.***

Examples:

- A glove tear that did not result in a potential exposure
- Wearing jewelry into a containment lab

Categories:

- Lab Process Failure
- Facility Process Failure
- PPE/Equipment Failure

Mishaps, Lessons Learned & Success Stories – June 2014 Report

SUCCESS STORIES:

- The NBACC Laboratory Director called in ill to work and missed a CDC in-brief rather than expose employees to an infection. This shows a consideration for the health and safety of others even in the midst of a serious compliance audit.
- During recent fire alarm testing at the NBACC, a mentor took the opportunity to use the alarms sounding to quiz a new staff member on actions to be taken if you are inside a containment lab during a real alarm (both during normal and after hours). The new staff member was able to correctly answer the actions to be taken.
- After updating signs relating to the transition of a laboratory space to a new LSM, a staff member took the time to review the door signs on other labs that they have access to. As a result, they identified another door sign that contained outdated information, which was reported to Safety for updating.
- An NBACC laboratory technician and PI found that the tip of an ultrasonic generator within an (b) (7)(F) became very hot during use. The employees agreed to make it a requirement to move and secure the Class III gloves out of the way of the tip when the gloves are not used. This action will ensure that gloves are not melted or compromised in any way by the heated tip of the ultrasonic generator.
- During a recent mentoring session with a new staff member, the mentee took the opportunity to quiz the mentor on work with toxins. This is an example of training making a great, lasting impression on staff.
- An NBACC laboratory technician and PI secured a six foot step ladder to a rack after they found that the ladder could potentially fall and either injure someone or damage the Class III BSC. The ladder was secured with a bungee cord.
- Two NBACC employees noticed that a CDC inspector wore a chain with a medal into containment. Past near miss events and lessons learned reports had prepared the employees for what to do in the event that someone wore a piece of jewelry into containment. The employees immediately recognized the error and took action to decontaminate the chain.
- With summer in full swing, a staff member took the opportunity to hand down lawn mowing responsibilities to their son. The first step taken was to teach him the safety aspects of the job (e.g. eye protection, hearing protection, and proper foot wear). This is a good example of the fact safety is not just something you do at work.

EVENTS:

BY THE NUMBERS:

- First Aid Injuries (#1, #2, #3, #4)

  LESSONS LEARNED (General): One of the goals of the Lessons Learned document is raise the awareness level of staff to help create a safer work environment, including even the small seemingly innocent events. During multiple occasions this month, an employee experienced a minor cut on their finger or bruise from a seemingly "safe" activity (assembling equipment, walking, unknown, moving a tray). While individually,

a minor cut to a finger or "fat lip" may seem like "no big deal", the frequency of minor cuts at NBACC is quite high compared to similar types of operations. Staff should strive to maintain a high level of hazard awareness at all times to help prevent both major and minor events.

1. **FIRST AID SUMMARY:** 05/16/2014; A BNBI employee reported a small cut on the back of their index finger. Although the employee noticed the injury outside of containment, they did not know how the injury occurred and they had just exited from BSL-3. It is likely that the cut was caused by the edge of a locker. The employee was evaluated by the CMA and the injury did not result in any restrictions.

   ROOT CAUSE: Unknown cause—possibly the edge of a locker.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: See "LESSONS LEARNED (General).

2. **FIRST AID SUMMARY:** 05/21/2014; A BNBI employee reported a cut on the back of their index finger. The employee was walking down the hallway and their hand swung into the metal edge of the corner guard that is on the way to the bathrooms. The employee washed the wound and applied a Band-Aid.

   ROOT CAUSE: The hallway by the first floor bathrooms constricts down from a width of 66 inches to a width of 43 inches. These widths may cause people to walk very close to walls and corners. "Attention Issues".

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: See "LESSONS LEARNED (General).

3. **FIRST AID SUMMARY:** 05/27/2014; A BNBI employee reported that they cut their left index finger with their right thumbnail while in BSL-3. No infectious material had ever been used in the room. The employee washed the wound and exited the suite. The CMA evaluated the wound, applied first aid, and ruled that this injury did not constitute a potential exposure. There were no restrictions.

   ROOT CAUSE: The employee was connecting hose that had a barb connect attachment. This connection required considerable force to push the hose onto the barb and their hand slipped and cut their other hand. "Attention Issues".

   CORRECTIVE ACTIONS: This connection, although tight, is now in a position that requires no further manipulation.

   LESSONS LEARNED: See "LESSONS LEARNED (General).

4. **FIRST AID SUMMARY:** 05/27/2014; A BNBI employee reported that they sustained a contusion on their lip while working in the clean side of the Vivarium cage wash area. The employee declined to see the CMA and used first aid only on the injury.

   ROOT CAUSE: The injury was caused when the tray rebounded after the employee misjudged the distance between the tray and the cage rack and mistakenly hit it against the cage rack. "Attention Issues"

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: See "LESSONS LEARNED (General).

NEAR MISSES

BY THE NUMBERS:

- Lab Process Failures (#12, #14, #16)
- Equipment Failure (#9)
- Facility Process Failure (#5)
- PPE Failures (#7, #10, #11, #13, #15)
- Security Failures (#6, #8)

5. **FACILITY PROCESS FAILURE SUMMARY:** 05/05/2014; A BNBI employee reported a small (100mL) leak of material on [redacted] from a BSL-3 drain line. The drain line is made of glass piping and it is connected to the BSL-3 men's containment side toilet. FMO staff and Health and Safety responded to the site and then evacuated the area within 1 minute of examination of the leak.

   ROOT CAUSE: The gasketted metal band connect the steel cast portions of the pipe together. This design allows for greater flexibility in the direction of the pipe length, but it can lead to separations in the gasket if the gasket becomes compromised or the band becomes loose. Over time the band on the pipe may loosen and a gap may result leading to leaks in the system. This design is less favorable than a continuous length of pipe without bands. "Design/reliability Issues (Faulty construction or repair)"

   CORRECTIVE ACTIONS:

   - The area was immediately vacated and all access points to [redacted] were posted as "Do not enter".
   - A spill and repair plan was developed and approved by FMO and Health and Safety.
   - The spill was cleaned up with appropriate disinfectant and the pipe was repaired and tested for further leaks.
   - The event is a repeat event from 1/17/2014. These pipe connections will continue to be monitored.
   - A permanent solution to the drain line leak is being investigated.

   LESSONS LEARNED: As part of the learning culture that we cultivate at NBACC, corrective actions are often identified to drive continuous improvement. Whether the corrective action is driven internally by a near miss event or externally by an audit, staff should consider the effectiveness of the corrective action. In this case, the potential for leaks was thought to have been corrected after the first set of corrective actions was initiated in February. When staff are identifying/implementing corrective actions, there should be consideration given to the need for follow up verification of the effectiveness of the correction.

6. **SECURITY FAILURE SUMMARY:** 05/06/2014; Escorts forgot to sign in two DHS inspectors on the SAT Area access sheets when taking them into the labs. The RO was notified immediately.

   ROOT CAUSE: "Attention issues"

   CORRECTIVE ACTIONS: There are no suggested changes to procedures.

   LESSONS LEARNED: One of the topics discussed during the Functional Area review conducted in May touched on the concept of "deviation drift". The drift occurs when actions that are outside the policies/procedures of an organization become common or even accepted. Once this happens, the overall safety culture of an organization can become downgraded. Every staff member should be aware of the potentials for deviation drift and strive to hold themselves, co-workers, and management

accountable for following all processes and procedures. In this event was forgetting to sign the correct forms an attention issue or a sign of deviation drift? If viewed as "not a big deal", it is most likely both.

7. **PPE FAILURE SUMMARY:** 05/08/2014; A BNBI employee reported an outer glove breach (black neoprene) in the ABSL-4. Although they had been working with mice infected with BSL-4 agents, the employee believes that the glove tear occurred after infectious work was completed. They followed the glove change out procedure and exited the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: The cause of this indent is unknown.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: N/A

8. **SECURITY FAILURE SUMMARY:** 05/08/2014; A BNBI employee forgot to sign the SAT Area access sheet as they entered a BSL-2 lab as well as the daily safety inspection check sheet. The event was reported by the LSM who noticed the discrepancy.

   ROOT CAUSE: "Attention issues"

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: See Lessons Learned for #6.

9. **EQUIPMENT FAILURE SUMMARY:** 05/12/2014; A BNBI employee found standing water coming from a leak under the hand washing sink in (b) (7)(F) (BSL-3). After further investigation, a slow leak was observed coming from the de-ionized water filter.

   ROOT CAUSE: The cause of the leak was a cracked regulator seal on the DI water sterilization unit. "Equipment failure"

   CORRECTIVE ACTIONS: The employee cleaned up the water and notified FMO to order the part and repair the unit.

   LESSONS LEARNED: N/A

10. **PPE FAILURE SUMMARY:** 05/15/2014; A BNBI employee reported a suit breach (#77 Sperian) in the BSL-4 chemical shower. The breach was a small hole near the bottom corner of the face shield. The employee had been working with a BSL-4 agent but experienced no spills or losses of positive pressure to their suit while they were in the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

    ROOT CAUSE: PPE failure.

    CORRECTIVE ACTIONS: The suit was retired from service.

    LESSONS LEARNED: N/A

11. **PPE FAILURE SUMMARY:** 05/15/2014; A BNBI employee reported a suit breach (#74 Sperian) in the BSL-4 chemical shower. The breach was a small hole in a previously patched area in the shoulder of the suit. The employee had been working with a BSL-4 agent but experienced no spills or losses of positive

pressure to their suit while they were in the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

ROOT CAUSE: PPE failure.

CORRECTIVE ACTIONS: The suit was repaired and placed back into service.

LESSONS LEARNED: N/A

12. **LAB PROCESS FAILURE SUMMARY:** 05/20/2014; A BNBI employee broke and spilled a 500 mL glass bottle of 35% HCl acid while working in a BSL-2 lab. The employee was reaching into a chemical storage cabinet to retrieve a smaller bottle of another chemical. The lid of the bottle broke and approximately 300mL of HCl spilled on to the floor; a small amount also spilled on their shoes and pants. The employee exited the room and called the Safety Office. The employee reported to the CMA and returned to work without restrictions. Their shoes and pants were discarded.

    ROOT CAUSE: Attention issues"

    CORRECTIVE ACTIONS:

    - The employee was instructed to remove their clothing and take a shower—they did this in the BSL-4 change room.
    - The Health and Safety Officer and the CHO developed a spill plan and cleaned up the HCL in respiratory protection.
    - The lab was returned to service within 30 minutes.

    LESSONS LEARNED: Exposure to chemicals can present a significant health concern to staff. Staff members who are personally exposed to hazardous chemicals should report to the CMA for evaluation immediately after contact for chemical removal and evaluation. Clothing, including shoes, can be removed in the Occupational Health Suite. The emergency chemical showers can be used at any time to remove hazardous chemicals from skin or clothing.

13. **PPE FAILURE SUMMARY:** 05/21/2014; A BNBI employee reported a suit breach (#74 Sperian) in the BSL-4 chemical shower. The breach was a small hole in a previously patched area in the shoulder of the suit. The employee had been working with a BSL-4 agent but experienced no spills or losses of positive pressure to their suit while they were in the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

    ROOT CAUSE: PPE failure.

    CORRECTIVE ACTIONS: The suit was retired.

    LESSONS LEARNED: N/A

14. **LAB PROCESS FAILURE SUMMARY:** 05/27/2014; A BNBI employee reported that the lid of a 96 well plate containing BSL-4 material was mistakenly bumped and exposed to the air while inside an incubator. The wells were exposed for about 1-2 seconds only and no material spilled out.

    ROOT CAUSE: The cuff of the suit struck and dislodged the lid of the plate. "Situational Awareness"

    CORRECTIVE ACTIONS: N/A

    LESSONS LEARNED: N/A

15. **PPE FAILURE SUMMARY:** 05/27/2014; A BNBI employee reported a suit breach (#73 Sperian) in the BSL-4 chemical shower. The breach was located at the seam of the fabric around the air inlet on the lower abdomen area. The employee had been working with a BSL-4 agent but experienced no spills or losses of positive pressure to their suit while they were in the suite. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

    ROOT CAUSE: PPE failure.

    CORRECTIVE ACTIONS: The suit was retired.

    LESSONS LEARNED: N/A

16. **LAB PROCESS FAILURE SUMMARY:** 05/28/2014; A BNBI employee reported that a shipment of BSL-3 material (non-BSAT) was mistakenly stored in a BSL-2 laboratory. The shipment was left on the loading dock for most the day and in the late afternoon, a storage solution had to be found for the shipment. The responsible PI did not have access into BSL-3, and everyone else had gone home for the day so they contacted another PI for assistance who agreed to store it in BSL-2 overnight. After storing the material in a BSL-2 freezer and wanting to know more about the agent, the second PI used information from the packing slip to verify that the BMBL recommended BSL-2 practices for working with the agent. However, the vendor's catalog identified the agent as a BSL-3 item. Since the laboratory was not registered for the agent and the BSL storage level was incorrect, the second PI notified the Safety Department.

    ROOT CAUSE: The cause of this incident was inadequate communication. The second PI was not aware of the BSL designation on the shipment.

    CORRECTIVE ACTIONS: The agent was moved into BSL-3 the next day.

    LESSONS LEARNED: While striving to be helpful is admirable, staff should take the steps necessary to ensure that they have all of the information needed to provide help in a safe, compliant manner. In this case, an end of the day time crunch and willingness to help a coworker left a staff member in an awkward position. It wasn't until after the material was moved that all of the relevant information came to light at which time they were playing catch up.

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Categories:

- Lab Process Failure
- Facility Process Failure
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Mishaps, Lessons Learned & Success Stories – July 2014 Report

SUCCESS STORIES:

1. A BNBI employee went on vacation to a place where they'd be doing a lot of hiking and outdoor activities. Prior to their departure, they checked their hiking first aid kit and their car first aid kit. They noticed that they were missing tweezers and anti-inflammatories in their hiking first aid kit, so the kit was restocked. They ended up using the tweezers later to remove a tick. Additionally, even though they were only going on short day hikes, they put headlamps in their backpacks in case something happened and they were out in the dark unexpectedly. The employee notes that this preparation, thinking ahead, and attention to detail regarding safety and first aid supplies is a direct result of reading NBACC's lessons learned each month and having a higher-level awareness of safety.

2. A BNBI employee questioned the temperature durability of a bottle made from PET (polyethylene terephthalate). They had looked on the website and found nothing, but was concerned because the plan was to put these bottles in a -80; the employee had seen plastic items crack in low temperatures before. After further investigation the employee learned that the temperature suitability for these particular bottles was only rated to -40C. This is extraordinarily useful and pertinent to ALL lab groups, as we highly encourage the use of plastic ware in labs when possible but staff should recognize that all plastics are not created equal – plain polyethylene (for example) is safe to use at -100C. Certain polymers have different durability at high and low temperatures. The website below is a great resource to provide to laboratorians using plastic in their work.

   http://m.grainger.com/content/qt-types-of-plastics-213.

3. During the set up phase of a training exercise, a new employee noticed that the conical tubes were composed of a different material than the ones previously used. After looking at the packaging they noticed that the tubes were polystyrene, not polypropylene. They discussed the matter with their mentor to see if the new tubes were okay to use; to find out that we no longer use polystyrene tubes due to the risk of them breaking when placed into freezers. While the conical tubes were fine to use during the training exercise, EO was asked to bring polypropylene conical tubes to replace the polystyrene ones.

4. A newer employee was holding a door open for another employee when they noticed that the other employee did not scan their badge at the reader. A polite reminder was given and the other employee scanned their badge.

5. At the end of the day, an employee noticed a stairwell door propped open. Since this was an unusual condition, they took the time to verify with their management that the situation was OK. It was able to be confirmed that the door had been propped open due to an elevator outage.

6. While attending an off-site training, an employee took the time to read the door signs before entering the training area. One of the signs stated "No Food or Drinks Past This Point" so they asked the trainer where to put their water bottle. The trainer was then able to identify that several other trainees had not read the sign and were taking food and drinks into the restricted area. As a result of asking the question, the entire group was able to safely store their food/drinks before entering the area.

7. An employee found CD's in the regular garbage and turned them over to Security staff. Security was able to locate the owner of the information and confirm that the CD's should be destroyed. REMINDER: CD's should never be disposed of in regular garbage. A CD shredder is located in (b) (7)(F) floor copier room.

EVENTS:

BY THE NUMBERS:

- OSHA recordable injury (#1)
- First Aid injury (#2)

1. **OSHA INJURY SUMMARY:** 06/10/2014; A BNBI employee sustained lacerations on two fingers when a BSL-4 door (non-APR) closed on their hand. The employee's gloves were breached during the event, and upon recognizing blood in their gloves, they exited the suite through the chemical shower. The employee reported to the CMA and received 3 stitches to close the wound. The event resulted in 8 days of restricted duty.

   ROOT CAUSE: "Attention issues". The employee was attempting to hold the door with his foot when the door closed. Their foot slipped on the wet floor and closed on their hand.

   CORRECTIVE ACTIONS: Retraining staff on the use of care with self-closing doors.

   LESSONS LEARNED: Life safety and BMBL standards require the use of self closing doors in many places throughout the NBACC. During normal use, self closing doors greatly increase the overall safety of NBACC staff. However, staff need to be constantly aware of the pinch point hazards presented by self-closing doors and should use several techniques for mitigating the hazard. When working around self-closing doors staff should consider:

   - Using a cart to carry bulky objects
   - Asking another person to hold the door or help with carrying loads through the door.
   - Making two trips rather than one trip to move materials

2. **FIRST AID SUMMARY:** 06/20/2014; A BNBI employee reported a small cut on their middle finger while in a BSL-2 lab. The injury occurred while lifting (b) (7)(F) chamber. The employee immediately

washed the wound and exited the suite. The employee was evaluated by the CMA and the injury did not result in any restrictions.

ROOT CAUSE: The injury was caused when their finger contacted the sharp edge of (b) (7)(F) base.

CORRECTIVE ACTIONS: The edge was covered with an adhesive rubber barrier.

LESSONS LEARNED: When preparing to move objects by hand, staff should consider potential hazards (e.g. weight, sharp edges, awkward shape, etc.) and consider appropriate mitigating steps. Staff should inspect the edges of objects they intend to move, or conduct a practice run with lifts. This is especially important in regards to where employees put their hands, how long their hands will hold the weight and how they will put the weight down when the lift is over.

NEAR MISSES

BY THE NUMBERS:

- Lab Process Failures (#3, #4, #9)
- Equipment Failure (#10)
- PPE Failures (#5, #6, #7, #8)

3. **LAB PROCESS FAILURE SUMMARY:** 06/03/2014; A BNBI employee reported that the barrier tape that sealed the door into a BSL-3 area failed and allowed BSL-3 air to enter a newly decontaminated space (BSL-0). This failure brought the validity of the recent VHP decontamination into question.

ROOT CAUSE: It is likely that the tape failed when the HVAC system was turned back on to clear the VHP resulting in a heavy negative.

CORRECTIVE ACTIONS:

- The new decontaminated area was VHP decontaminated again (passed on 9 June 2014)
- A new Lexan barrier was fabricated for use during decons to provide a more rigid taping surface. When installed and taped into place it will prevent the tape from pulling loose when the HVAC system is turned on after a VHP decontamination.
- The new Lexan piece will be kept in containment and used for future BSL-3 suite specific decontaminations within this space.

LESSONS LEARNED: The NBACC decon process has been used numerous times without issue and is considered to be a mature process. However, this was the first time it had been used in this particular space and the space itself introduced a new combination of variables that had not been previously encountered. The tape seal needed to be placed on the recessed side of the door jam, the ventilation controls had to be manipulated by hand, and the space included animal rooms which are the most negative spaces at NBACC. These combinations of factors lead to the tape seam being unable to hold.

When staff are encountering anything "new" in a process, they should be sure to consider the possibility of unplanned outcomes. They should also remember that "new" could include things like new staff, new equipment, new location, new reagents, or new time of day.

4. **LAB PROCESS FAILURE SUMMARY:** 06/16/2014; A BNBI employee opened the BSL-3 containment side door of an airlock while another employee was on the non-containment side of the airlock. The two staff members had been working together but when but communication was difficult due to the need to talk through the door.

   These doors were also being used as a test case for a 15 minute timed lockout. That is, when the containment side door is opened, the non-containment side door cannot be opened until 15 minutes have elapsed. This engineering control was not communicated to staff, and as a result, the person on the non-containment side was locked in the airlock for 15 minutes after the employee on the containment side closed the door. The only way to exit earlier was to push the emergency release button, which is what they did.

   ROOT CAUSE: "Attention issues". Staff are not permitted to open both airlock doors at the same time or access the airlocks from the both sides at the same time to control for cross contamination. Staff have been trained to wait 15 minutes prior to opening the non-containment side airlock door after the containment airlock door has been opened.

   "Communication issues" – this engineering control (15 minute lock out) was not communicated to staff.

   CORRECTIVE ACTIONS:

   - Employees were retrained on airlock operations.
   - Further use of 15 minute lock out is under review.

   LESSONS LEARNED: The term "attention to detail" is frequently used at the NBACC but it is not a term that should be considered lightly. Between safety, security, and quality requirements, there are a lot of process steps that need to be remembered. In this case, a simple instinctive reaction (opening a door to hear better) created a potentially hazardous situation. Staff should remember that normal, everyday stressors (e.g. distractions, frustrations, habits, etc.) can compromise anyone's attention to detail. Recognizing these stressors is the first step in preventing them from interfering with your attention to detail.

5. **PPE FAILURE SUMMARY:** 06/18/2014; A BNBI employee reported an inner glove breach (nitrile) while in the BSL-4. The employee had been cleaning the BSC following working with BSL-4 agents, and does not recall the cause the inner glove tear. The outer glove did not tear. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: The cause of this indent is unknown.

   CORRECTIVE ACTIONS: N/A

   LESSONS LEARNED: N/A

6. **PPE FAILURE SUMMARY:** 06/20/2014; A BNBI employee reported an outer glove breach (black neoprene) while in the BSL-4. The employee had not worked with BSL-4 agents, and there was no breach

of the inner glove. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

ROOT CAUSE: The cause of this indent is unknown.

CORRECTIVE ACTIONS: N/A

LESSONS LEARNED: N/A

7. **PPE FAILURE SUMMARY:** 06/25/2014; A BNBI employee noticed a suit breach (#77 Sperian) while in the BSL-4 chemical shower from wet scrubs (back of leg area). The leak was determined to be from the back of the leg where a previous patch had been installed. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: PPE failure.

   CORRECTIVE ACTIONS: The suit was retired.

   LESSONS LEARNED: N/A

8. **PPE FAILURE SUMMARY:** 06/27/2014; A BNBI employee noticed a suit breach (#98 Sperian) while in the BSL-4 chemical shower from wet scrubs (crotch area). The leak in the suit was never located. The CMA and RO were notified and the CMA determined that this was not a potential exposure.

   ROOT CAUSE: PPE failure.

   CORRECTIVE ACTIONS: The suit was put back into service.

   LESSONS LEARNED: N/A

9. **LAB PROCESS FAILURE SUMMARY:** 06/30/2014; A BNBI employee reported that a glass vial containing James Reagent (hydrochloric acid), fell, broke and spilled approximately 15 ml of material on the floor of a BSL-3 airlock. The employee was not exposed to the James reagent.

   ROOT CAUSE: The glass vial was not in secondary containment and was placed precariously on a wire metal rack in the airlock following a VHP decontamination. It fell when a technician struck the wire metal rack lightly with a compressed gas cylinder as they were moving it..

   CORRECTIVE ACTIONS: The spill was cleaned up immediately. The LSM was retrained in the proper containment of glass vials.

   LESSONS LEARNED: When working, staff should be cognizant of how the condition they leave the work area in can have a direct negative or positive impact on their coworkers. Taking the last towel in the change room without getting more is annoying to the next person. Leaving a file drawer open can result in the next person taking a trip to the hospital. Leaving a work area clean and orderly can make the next person's day go safe and smooth. In this case, leaving a glass vial precariously set on a shelf resulted in a chemical spill that could have had a different ending.

10. **EQUIPMENT FAILURE SUMMARY:** 06/30/2014; A BNBI employee noticed a loud hissing sound while working in a BSL-4 room. The sound was determined to be from a ruptured CO2 incubator line.

ROOT CAUSE: The CO2 regulator in the room was set at 50 psi when it should have been set at 15 psi. The Tygon tubing has a maximum rating of 20 psi. It is unknown why the incubator was set at the wrong setting. In addition, the regulator was found to be unreliable (broken).

CORRECTIVE ACTIONS:

- The CO2 line was locked and tagged out of service, the Tygon tubing was completely replaced, and the regulator was replaced.
- All future calibrations of CO2 incubators will include an inspection of the tubing and the regulator.
- This issue will be discussed at the next LSM meeting.

LESSONS LEARNED: As staff become more accustomed to their work environments, things that are out of the ordinary become easier to notice. Taking the time to identify what is different and why can greatly increase the level of safety for everyone. In this event, CO2 leaking into a BSL-4 room posed little hazard (breathing air suits, high ventilation rates) to staff. However under different circumstances, leaking CO2 could result in a very hazardous situation.

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