Interdepartmental Initiatives to Improve Campus Safety

DIVISION OF CHEMICAL HEALTH AND SAFETY & SAFETY STRATUS AWARD SYMPOSIUM

University of Nevada, Reno Environmental Health and Safety Department & Department of Chemistry Joint Submission

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About Us

- 20,000 students
- Mountain West Conference (Go Pack!)
- Approx 287 research PIs
 - All major basic sciences, engineering, medical school, Nevada State Health Lab, 2 BSL-3 facilities
- In 2021:
 - Treated 38,934 lbs of biohazardous waste onsite and sent 8,345 lbs off site
 - Collected and disposed of 63,513 lbs of chemical waste



Chemistry Department TA Training

- "Supervised Teaching in College Chemistry" course
 - CHEM 700 mandatory
 - Taught by Chemistry staff
 - Enforce safety rules, practices, proper waste management
 - Periodic meetings discussing hazards
 - Communicate hazards to students





EH&S Safety Training for Chemistry TAs

- Orientation for all new campus TAs:
 - Introduction to EH&S services
 - Evacuation procedures
 - Incident and injury reporting
- EH&S Laboratory Safety Training
 - Laboratory Safety Online Training (Part 1 of 2)
 - Laboratory Biosafety Training (Supplement to Part 1)
 - Laboratory Safety Hands-On Training (Part 2 of 2)



Safety Training for Academic Research (STAR) Lab



- Dedicated lab space for training
 - 2 chemical fume hoods
 - 1 biosafety cabinet
- Class size: 12 16 students/session
 - 2 EH&S instructors
 - Variable class size as needed
 - COVID concerns
 - Availability of instructors
 - 1.5 hour total class time

www.unr.edu/nevada-today/news/2017/star-lab



Safety Training for Academic Research (STAR) Lab Stations

- 1. Hazard Information
 - Computer Work SDS, CHP
- 2. Lab Ventilation
 - Visualize airflow, proper hood use
- 3. Lab Operations
 - Lab inspection, document issues
- 4. Incident Response
 - Chemical spill clean-up
- 5. Biosafety (if needed)
 - Use of BSC and spill response





EH&S "Safest Chemistry TA Awards"

- EH&S staff evaluate teaching labs and TAs while classes are in session.
 - Assessment checklist: PPE, work practices, housekeeping, etc.
- TAs with best "issues/student" scores receive letter of thanks, framed certificate, and gift card to bookstore (\$25).
 - Students in safest classes get custom button (new designs all the time!).
- "Safest TA" awarded each semester for:
 - 1st semester general chemistry
 - 2nd semester general chemistry
 - Introductory organic chemistry
 - Organic chemistry
 - Analytical chemistry





Campus Chemical Inventory Management



- Implemented in 2004
- 100% performed by EH&S staff
- 2004 2009 in-labs
- 70 80K items in inventory
- Wash, rinse, repeat



Campus Chemical Inventory Management

- Daily inventory of new chemicals at Central Receiving
 - Started in 2009
- Chemicals delivered by EH&S staff directly to labs
 - ~8 to 10K chemicals delivered annually
 - Gases/cryogens not delivered by EH&S





Campus Chemical Inventory Management

• 2004 – 2018

- Laser optical barcodes
 - Pre-printed linear numerical sequence
 - Affordable & durable
- Requires EH&S staff to handle all containers
 - Intrusive, tedious, slow
 - Low but not negligible risk to EH&S staff
 - Liability of damaging research samples





Chemical Inventory Management

• 2018 – present

- Radio Frequency ID (RFID) barcodes
 - Preprinted linear sequence
 - ~9x more \$\$\$ vs. optical
 - Longevity? (TBD)
- All new incoming chemicals tagged with RFIDs





RFID Barcodes



- Convert old laser barcodes to RFID in lab
 - Tedious, hands-on project
 - Handle every container, affix new RFID
 - Associate old barcode # to new RFID #
 - Update database manually
 - 3 years and counting (85% done)
 - COVID drastically impacted the process
- Re-inventory of RFID labs is extremely fast
 - "Mostly" hands off containers
 - Entire lab, thousands of chemicals in minutes vs. days
 - EH&S staff love the speed and less handling
 - Reduced risk for EH&S staff



RFID Barcodes



- RFID scanners affected by materials of construction
 - Reflect off metals
 - Penetrate thin non metal walls, concrete
 - Range depends on adjustable power setting
- Inventory adjacent rooms/entire floor at same time
- Compare data in Excel, look for duplicates in one or more room
- Return to "seek" out specific barcodes
 - Determine final room



Help me EH&S, you're my only hope...

• RFID scanners have "seek" mode.

- Dial in bar-code number, scan...
 - Audible beeps increasing speed when getting close to barcode
- Researchers lose chemicals or can't find what they need...
- Very useful, very powerful!
 - Can search for specifically dangerous or regulated containers
 - Helps EH&S ensure proper room location





Fixed RFID Scanners in Waste Facility

- Automatically capture RFIDs entering the building
 - Transmits data to internal web site
- Custom in-house software compares scanned barcodes vs. active in database
 - Email send daily of scanned barcodes needing to be deleted

• About 85% of all RFIDs captured

- Lots of barcodes in crowded plastic bins sometimes don't get scanned
- Looking to re-locate for better capture





Thanks!



Brock A. Young EH&S



Chet Carpenter

EH&S





Rose Beeler Chemistry



Ben Owens EH&S

