ENVIRONMENTAL HEALTH & SAFETY OFFICE

ANNUAL REPORT

FY 2015-2016

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Environmental Health & Safety (EHS)

Mission Statement

The mission of the Environmental Health &Safety Office is to support the University's teaching, research and health care activities by providing guidance, training and services to the institution and its employees. Our goal is to promote and foster a safe working environment by incorporating health and safety into the daily operations of the University, resulting in the prevention of injuries and illnesses of faculty, staff and students, promotion of best practices as well as compliance with federal, state, and local regulations and laws governing the activities of the institution.

Responsibility Statement

The Environmental Health & Safety Office (EHS) is responsible for the administration of the biological safety, chemical safety, occupational safety, radiation safety, and specific environmental programs, and other programs deemed necessary for the health and safety of the University community. EHS program activities are organized into five sections that are supported by an administrative group. These sections are: 1) Biological Safety; 2) Occupational Safety; 3) Environmental Programs; 4) Radiation Safety; and 5) Chemical Safety.

Aspirations

The Environmental Health & Safety Office aspires to make significant contributions to the University by:

- Functioning as a major resource for environmental health, safety and environmental protection.
- Integrating health protection and safety practices into employee and departmental activities.
- Communicating effectively so staff can readily use the resources created and services provided.
- Providing quality service to foster a safe and healthful workplace.

Executive Summary

In addition to routine business activities, EHS focused on the following areas during the last fiscal year: (1) established a committee and process to review protocols for their potential dual use consideration, as required by the National Institutes of Health (NIH); (2) launched a new electronic Institutional Biosafety Committee (eIBC) form; (3) began using Campaign Monitor to create the bi-monthly EHS newsletter; and (4) created SharePoint sites for managing certain programs and documentation.

1. **Dual Use Research of Concern.** Dual use research of concern (DURC) is life sciences research, that, based on current understanding, can be reasonably anticipated to provide knowledge, information, products, or technologies that could be misapplied to pose a significant threat and have broad potential consequences across disciplines. A new US Government Policy required all institutions to have an internal program in place by September 2015 that serves to detect and oversee any such designated research. A new program was developed for the University of Iowa that met the deadline and policy's requirements. The UI's program includes an Institutional contact for DURC and an Institutional Review Entity (IRE) that assesses whether research should be considered DURC, and subsequently evaluates the risks or benefits of such research, as needed.

2. **New eIBC form is launched**. EHS biosafety staff worked with Research Information Systems to develop a new platform for registering projects involving rDNA and /or synthetic nucleic acids. The platform is modeled after eIACUC, which was built for researchers using animals. eIBC uses 'smart' technology and integrates features that assist the research community, the IBC reviewers, and EHS staff with the initial rDNA application process, amendment requests, and review and approval of projects. New questions were added to eIBC to capture additional information related to recombinant structures, as well as identify dual use research.

3. **Campaign Monitor for EHS LabNews**. To better assist our clients and partners in accessing and reading EHS LabNews, we began using a tool called Campaign Monitor to create our bi-monthly publication. With Campaign Monitor we have mobile accessibility, can easily add and remove clients, create email client lists, and view reports related to audience users and performance metrics.

4. **SharePoint sites**. A new SharePoint site has been developed for use by the Occupational Safety section staff and the group's clients for creating and maintaining the inventory of confined spaces on campus. All departments with confined spaces have access to the site. A separate site was created by Biological Safety section staff in order to administer biosafety cabinet scheduling for contracted services and maintain the documentation/ report of the services provided. Laboratories' biological inventories are maintained on this site as well, and SAT members have access to the site to view certain information and add documents such as respirator forms, hazardous animal resource forms, Army Grant information, USDA/CDC permits, etc. Through these sites, EHS is better able to manage and track documentation to meet regulatory requirements and program needs.

Biological Safety Section

The Biological Safety Section is responsible for the administration of programs in the research and non-research community that involves the management of biological or infectious agents and biohazardous materials used at The University of Iowa. The covered programs include general biological safety, bloodborne pathogens, recombinant DNA, select agents, and shipping/transportation of infectious substances/biological substances with or without dry ice. Administration of these is accomplished by developing, recommending, administering and implementing policies and procedures that promote the safe use of the types of materials covered by each program, as well as exercising surveillance and enforcing standards for health and safety within their jurisdiction.

Biological Safety Program

Scope: This program provides support to areas that work with biological materials or infectious agents, which primarily include clinical and research lab areas. The program consists of maintaining a biosafety manual and reference materials, providing health and safety consultation to the University's Biohazardous Waste Program, reviewing protocols where biosafety level 2 or 3 organisms are manipulated, providing biosafety signs, prescribing safe handling techniques, and conducting site visits for containment and/or regulatory assessments.

Activities and Accomplishments for FY16:

- Reviewed 311 protocols submitted primarily from Animal Protocols (AP) and Hazard Containment Protocols; in addition, one material transfer agreement (MTA) was reviewed.
- Reviewed grant notifications from Division of Sponsored Programs which involved use of human pathogens or stem cells.
- Updated the web-based Basic Biological Safety course.
- Updated the web-based Advanced Biosafety course.
- Updated the web-based Biosafety Cabinet course.
- Updated biosafety web documents.
- Wrote LabNews articles that were distributed to the research community.
- Updated biological agent inventories for research staff following their annual laboratory audit.
- Received requests from five investigators for documentation of their laboratories or other authorization, related to funding or ordering materials from suppliers.
- Completed training for the second Associate Biological Safety Officer.
- Evaluated eighteen injuries/possible exposures, non-bloodborne pathogen related.
- Reviewed registration documents for the human pluripotent stem cell committee and program; two proposed research projects were reviewed and approved.
- Developed and implemented a SharePoint site to track all biosafety/biohazard issues present in a laboratory.
- Reformatted the various manuals in the biosafety section to be more user friendly and searchable.
- Created a web-based document to assist research staff in responding to a biological spill.
- Created and implemented a program for the oversight of Dual Use Research of Concern,

nine PI registration forms were reviewed.

- Collaborated with Office of Animal Resources to review and revise procedures for the handling and disposal of animal waste from animals exposed to agents (non-recombinant) requiring ABSL1/2 housing.
- Monitored both the Iowa Administrative Bulletin and the Federal Register for regulatory changes which may impact the biological safety programs.

Biological Safety Equipment Certifications

Scope: This program involves overseeing the biosafety cabinet certification, repair and maintenance contract with ENV Services. Administration of the program involves coordinating the testing and repair of biological safety cabinets (BSCs) and horizontal flow equipment, in compliance with NSF Standard 49 and industry standards, for their safe operation and maintenance, scheduling cabinet decontaminations for repair or prior to a move, and billing for all services performed by ENV technicians.

Activities and Accomplishments for FY16:

- Reviewed use and approved the purchase of 11 new BSCs.
- Scheduled 550 BSCs and clean benches for certification.
- Scheduled formaldehyde or vaporous hydrogen peroxide (VHP) decontamination of 49 BSCs.
- Scheduled annual testing of other HEPA-filtered safety equipment including Thoren cage racks, an ultra-centrifuge, and roof-top exhaust HEPA filter units for the BSL3 labs.
- Scheduled troubleshoots and/or repair service for 53 cabinets.
- Worked with PIs and ENV to obtain 50 quotes for service.
- Validated 4 BSC decontaminations.
- Developed and implemented a SharePoint site to track BSC inventory and maintenance schedules.

Bloodborne Pathogens Program (BBP)

Scope: This program is intended to assist departments in meeting the requirements of OSHA's Bloodborne Pathogens Standard. This law, as defined by OSHA, covers individuals whose duties entail reasonably anticipated contact with blood and blood products and other potentially infectious materials. The purpose is to reduce or eliminate the risk of exposure to bloodborne pathogens in clinical, research, teaching, service and administrative units.

Activities and Accomplishments for FY16:

- Reviewed and/or updated 53 Exposure Control Plans (ECP) upon request.
- Updated the University's ECP template, and provided notice of the update to UI departments.
- Updated EHS' five online BBP training courses, and created a single site specific form for all programs.
- Evaluated four possible BBP exposures.
- Continued to contact departmental BBP Exposure Control Officers to ascertain status of their BBP Exposure Control Program (ECP), met with and trained 9 new Exposure Control Officers (ECO).
- Initiated 8 additional BBP Exposure Control Programs.

- Evaluated use of space for diagnostic sample testing in UIHC.
- Evaluated laboratory space in the College of Nursing for sample collection from research subjects.

DOT Transportation Compliance Program: Shipping/Transportation of Infectious Substances and/or Dry Ice

Scope: The Department of Transportation (DOT) and International Air Transport Association (IATA), which regulate the shipping of hazardous materials, require that individuals who ship materials defined as infectious substances or diagnostic specimens receive training to ensure they have knowledge of and are thus able to comply with shipping regulations. Since these often involve shipments using dry ice, a hazardous material, information on shipping with dry ice is included in this training course. A separate course for individuals who use dry ice to ship otherwise non-hazardous materials is also available.

Activities and Accomplishments for FY16:

- Reviewed the online Shipping Infectious Substances, With or Without Dry Ice course and the Shipping With Dry Ice course to ensure compliance with the 2016 updates to the IATA/DOT regulations.
- Updated shipping web documents, as necessary.

Recombinant DNA Program

Scope: The National Institutes of Health's *NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH Guidelines)* governs the creation of recombinant DNA molecules and their use in organisms, human subjects, animals, and plants. Compliance authority on campus is placed with the Institutional Biosafety Committee (IBC) for review of recombinant DNA use. EHS' Biosafety Officer and the Director are members of the committee and also coordinate the committee's review process; biosafety section staff generates the approval letters that are sent to PIs after IBC review and inspects laboratories for proper procedures, practices, facilities, and experience.

Activities and Accomplishments for FY16:

- Approved 114 new rDNA protocols.
- Approved 146 amendment requests to active rDNA protocols.
- Reviewed Animal Protocols (APs) and AP amendments to ensure all recombinant work is registered with the IBC.
- Received 353 grant notifications from Division of Sponsored Programs which involved recombinant DNA.
- Held 26 IBC meetings.
- Utilized the rDNA database to track and facilitate annual reviews of protocols.
- Conducted monthly reviews of protocols approved 1 and 2 years prior to assess status and ensure notification of any significant changes made by the PI. Protocols reviewed: 224.
- Each month, notified PIs of expired protocols. (Protocols are approved for a maximum of 3 years.) Inactivated 172 expired protocols from further review. In addition, inactivated 93 protocols before they expired (PI reported the rDNA work was no longer active or the PI left the University).
- As part of the laboratory audit program, conducted audits of all BSL2 laboratories using rDNA.

- Provided one-on-one assistance for faculty and staff that had issues when accessing/using the online registration process.
- Updated rDNA web documents.
- Updated our registration with NIH/OBA's online Institutional Biosafety Committee Registration Management System (IBC-RMS).
- Updated EHS' online training course for researchers using rDNA.
- Revised an internal program SOP and updated procedures for IBC review of rDNA documents.
- Collaborated with Office of Animal Resources to review and revise procedures for the handling and disposal of animal waste from animals exposed to recombinant agents requiring ABSL1/2 housing.
- Implemented the new eIBC rDNA Registration Document Management System.
- Created user manuals, navigations guides and other associated instructional documents for the eIBC Management System.

Select Agent Program

Scope: The program was developed in response to the 2001 Patriot Act and the 2002 Public Health Security and Bioterrorism Preparedness and Response Act to provide compliance oversight and administrative support to researchers who wish to use biological agents and toxins that present a severe threat to human, animal, or plant products (select agents). The program establishes requirements concerning registration, security risk assessments, safety plans, security plans, emergency plans, training, transfers, record keeping, inspections and notifications to CDC or USDA/APHIS. The regulations are designed to provide protection against misuse of select agents and toxins whether inadvertent or the result of terrorist acts against the United States homeland or in the commissioning of other criminal acts. Registering with the DHHS (CDC) or USDA involves submitting an application form, obtaining approval from the Department of Justice for each person who will have access to select agents, and the laboratory facility undergoing an inspection by DHHS/USDA. The UI has assigned Haley Sinn, Biological Safety Officer, as the Responsible Official (RO). Nyree Maes, Associate Biological Safety Officer and Carol McGhan, EHS Director, serve as alternate ROs. These individuals are authorized to receive or ship the agents and serve as the primary contact(s) with the registering agency. Principal Investigators are exempt from registering with the CDC or USDA if they possess toxins in quantities that are below the amount listed in the regulation. Clinical labs are also exempt from registering if they destroy or transfer agents after being isolated from clinical samples and required agency reporting.

Activities and Accomplishments for FY16:

- Maintained the list of current active/approved individuals who are allowed access to the BSL3 rooms/areas.
- Updated select agent campus inventory, as necessary.
- Held monthly meetings with two groups for safety/security issues related to select agent work.
- Performed an annual general biosafety and security inspection of the laboratories registered under 42 CFR 73.
- Audited the select agent inventory records annually.
- Audited the BSL3 training records for researchers, manager, director, emergency

response staff, support staff and RO/ARO.
- Revised internal SOPs for the Select Agent Program.
- Updated EHS' Select Agent Program website.
- Participated in annual drill/exercises at select agent facilities to test and evaluate the effectiveness of the three plans for each facility.
- Collaborated with the two groups to prepare and conduct annual training for individuals who are allowed access to the BSL3 rooms/areas.
- Submitted amendment requests to CDC in order to update our registration, as necessary.
- All new PIs sign a form declaring that they do/do not have any select agents or toxins. The declaration form is kept on file in EHS. Each PI using exempt quantities of toxins on the select agent list signs a separate form to attest that he/she knows there is a quantity limit and must maintain his/her toxin inventory below that limit to remain exempt.
- Three facilities were re-commissioned, as part of the annual requirement for the select agent program.
- Completed pre-assessment review of new users and on-going suitability review of current users, as necessary.
- Held annual Suitability Assessment Review meeting to review all Tier 1 users.
- Conducted monthly audits of all BSL3 laboratory facilities.
- Reviewed 8 protocols submitted with revisions and/or for annual review by the CCOM BLS3 Committee**.**
- Continued to scan select agent related documentation and update the Excel spreadsheet to record and track amendment submissions and transfer requests to CDC.
- Reviewed grant notifications from Division of Sponsored Programs which involved use of select agents or toxins.
- Submitted a new Form 1 to renew the University's Select Agent Registration with CDC.
- Submitted a request to CDC to exclude two Staphylococcal enterotoxin mutants from the requirements of the select agent regulations. The request was reviewed by the Division of Select Agents and Toxins (DSAT) and a decision was made to exclude both mutants as non-functional toxins.
- Participated in an unannounced inspection of all UI BSL3 laboratory facilities by the CDC Select Agent Program. Submitted a response letter following the inspection and the subsequent inspection report.

Biological Safety Program Goals for FY17:

- Conduct annual laboratory audits of BSL2/3 laboratories.
- Support Office of Animal Resources by providing biological assessment services for review of projects using pathogenic organisms with animals.
- Perform annual general and security inspection of the laboratories registered under 42 CFR 73.
- Perform an annual inspection of select agent toxins (exempt quantities) labs.
- Perform an annual drill/exercise at select agent facilities with emergency responders to test and evaluate the effectiveness of the three plans for each facility.
- Perform annual suitability evaluation with the Suitability Assessment Review Committee.

- Create and implement a program to track CDC/USDA import permits and assist research staff with compliance.
- Evaluate the interest level for in-person safety orientation or other training for laboratory employees, including summer students.
- Evaluate the feasibility to create or obtain videos for online posting for bio-related issues.
- Develop a new Standard Operating Procedure template for exempt toxin use.

Chemical Safety Section

Chemical Hazard Assessment Program

This program provides services for monitoring chemical exposures and, where possible, applying the knowledge gained from these assessments to "similar" exposures in other areas of the institution. Services are also provided for assessing safe material handling practices and providing guidance on minimizing or eliminating exposures to hazardous chemicals.

Activities and Accomplishments for FY16:

- Numerous hazard assessments were conducted throughout the year to evaluate safe material handling, review chemical use with animals, and investigate individual or area concerns. Examples include assessments for the safe use of isofluorane, an anesthetic agent, or safe use and handling of a variety of items such as hydrogen fluoride, acrylamide, 2,4-dichlorophenoxyaetic acid, and antineoplastic drugs.
- Numerous chemical hazard assessments were conducted in FY16; a significant number of these were conducted as part of the formal OAR ACURF Hazardous Agent Review process.
- The Surface III tablet computer was used in conducting all ER-RTK building audits.
- ER-RTK audits were done for all 324 UI buildings. This includes the Main Campus, Oakdale Research Park, McBride Nature Center and Hawkeye Campus. UI buildings located in Iowa City, Coralville, North Liberty and surrounding areas were also included.
- Trained new personnel on DNR Tier II program and how to gather information for completion of same. In addition, all owners of Tier II chemical inventories were contacted by phone or by onsite inspections to verify inventory amounts.
- Conducted chemical monitoring in several areas. The goal was to assess environmental conditions in labs and other spaces either related to personnel concerns or for chemical spill/incident investigations.
    - Mercury concentration in air was measured by a direct reading instrument. Samples were taken for VOCs at IATL by ICFD.
    - Mercury concentration in the air was measured using the Jerome. Five air sample were taken in MERF.
    - Air samples for organic solvents were taken in BB.

Chemical Inventory System

EHS has implemented a university-wide chemical inventory system using a web-based software program. The goal of this project is to have accurate inventory data online for research investigators in 108 departments and other chemical use areas. Implementation expanded to other campus areas where chemicals are used and stored. The inventory data are also available to emergency responders as needed.

Activities and Accomplishments for FY16:

- The chemical inventory system, OnSite's Chemical Safety Assistant (EHSA), was used throughout FY16. The following is a breakdown of some EHSA data categories:

- Number of chemical owners/PIs 568
- Number of total Users 1605
- Number of buildings 172
- Number of rooms 2223
- Number of inventory items 112,726

[#] Total number of users includes labs, non-labs, 15 BET groups and 2 emergency responder groups

- Progress continued on assuring newly entered and existing chemicals listed in the chemical inventory also appear in the associated EHSA Chemical Inventory Catalog. This is necessary to ensure that all Department of Homeland Security's Chemicals of Interest (DHS's COI) chemicals and TIER II chemicals can be included when running the appropriate reports.
- Created multiple chemical inventory reports, including some in Excel format, for EHS internal use.

Laboratory Assessments

This program was developed for the purpose of supporting the UI's research goals by promoting safe research and assuring sound laboratory safety, health and environmental management. This is accomplished by providing oversight of occupational and environmental safety programs with emphasis in the areas of biological, chemical, and radiation safety and waste management. As recommended by the University's Internal Auditors, the program is also intended to implement a more comprehensive assessment of programs and practices within the research community. Each principal investigator's (PI's) research area is reviewed in order to build a comprehensive picture of laboratory research operations, assess the current status of their safety programs, and build additional resources to assist the research community in implementing best safety practices and compliance-based programs, such as those required by the University, state and/or federal regulations.

Activities and Accomplishments for FY16:

Safety Advisor Team (SAT) Accomplishments

- Provided direction on how the team would consistently assess and record findings on items from the lab review checklist. Provided technical guidance to address issues and concerns arising from the lab review process.
- Team meetings were periodically held to discuss unique lab review findings and subsequent resolution, where applicable.
- Provided training for three new safety advisors.
- The team was utilized to collect and disseminate information throughout the year.
- Introduced four new training course requirements related to biohazardous waste, chemical fume hoods, risk group two agents and radiation safety training for non-radiation workers in radiation labs.
- Began a program for standardizing auditor training that includes annual shadowing by team leads, bi-annual ICON retraining, and periodic review and discussion of audit processes during team meetings.
- The safety advisors conducted 366 bio/chemical lab reviews. In addition, 11 new PI orientations were completed. The team also conducted radioactive materials user inspections for labs as described in the Radiation Safety Programs section of this report.

- Sixty-three (63) possible individual audit/review findings (areas that need improvement) were tracked for the bio/chemical lab reviews. In addition to being tracked individually, lab review findings were placed into eleven general categories and tracked to help correlate problems within general health and safety programs or areas. Of the eleven categories, the highest numbers of findings were in areas that included general lab safety, emergency preparedness, training, chemical management and personal protective equipment.
- Of the labs reviewed in 16, the most common number of findings per review was zero (28%), followed by one (20%), and two (15%).
- 72% of the labs reviewed had one or more findings.
- The top three annual lab review findings were: 'Incomplete training', 'PPE hazard assessment training not reviewed and signed by all staff', and 'Spill supplies not adequate or readily accessible'.
- Notable improvements in 16 include:
  - 57.5% improvement in the category entitled 'Lab staff are not familiar with the lab/department's Exposure Control Officer'.
  - 54.8% improvement in the category entitled 'Biological agent inventory was not accurate'.
  - 27.1 % improvement in the category entitled 'Chemical Hygiene Plan is not accessible or has not been reviewed annually'.
  - 39.0% improvement in the category entitled 'Laboratory has not reviewed the chemical inventory and completed a "Chemical Review Statement" in the past 12 months'.
- Notable trends toward improvement over five years (FY12 through FY16):
  - 18.2% improvement in 'PPE HAT is not complete.'
  - 27.1% improvement in 'Chemical Hygiene Plan is not accessible or has not been reviewed annually.'
- Safety advisors actively followed-up on a specific set of lab findings (including training and documentation) to ensure the outstanding items were completed after the lab review. 79%of the labs completed all outstanding items found during lab review in 16.
- The safety advisors conducted 325 Lab Safety Rounds (LSR), unannounced brief observation-only lab reviews.
- The top three LSR findings were 'evidence of food or drink in lab area', 'unlabeled containers,' and 'fume hood sash open when not in use.'

<u>Mobile Inspection Development Activities (FY16)</u>

- Created review questions pertaining to controlled substance inventories, safety data sheet availability and edited the questions pertaining to biological agent inventories to ascertain risk group two information.
- Updated the SOP for Safety Advisor Team users to reflect audit and database changes including training verification.
- Retired excel spreadsheets for the tracking of audit deficiencies.
- Added flagging of repeat violations on audit deficiency reports.
- Created reports to include warnings for items that were noted as deficiencies but were fixed immediately by lab staff.
- Reviewed On-Site's forthcoming browser-based system and decided to delay implementation until the full system upgrade is completed.

- Investigated alternate vendors of EH&S platforms such as Bioraft, Safety Stratus, Verifii by Landauer, but determined that their offerings did not provide the necessary functionality at this time.

Laboratory Chemical Safety and Chemical Hygiene Program

This program applies to all laboratory chemical use under normal working conditions or during a foreseeable emergency. This includes approximately 50 major departments with labs in research, medical and academic activities.

Occupational Health & Safety Support for Research Grant Submissions

Beginning in 2001 the US Army Medical Research and Material Command (USAMRMC) required two safety submittals for grants: an institutional facility safety assurance which is completed by EHS, and a safety assurance from the principal investigator. Effective FY16, these are annually reviewed (and compiled) by EHS.

Activities and Accomplishments for FY15:

- Completed the annually required Facility Safety Plan Status report; EHS provided site visits, follow-ups, and coordinated USAMRMC safety plan information for 14 UI investigators sponsored by USAMRMC or other DOD organizations.

Support and Services for Research Laboratory Contacts and Department Health and Safety Coordinators

EHS works directly with research laboratory investigators and their staff to provide consultation and assessment services, education, and laboratory site reviews to assess health and safety practices and compliance. EHS also provides support services to voluntary department personnel who serve as the primary administrative liaisons (coordinators) between EHS and their respective units. In addition, EHS provides general support services such as development of guidance documents or resource information to help researchers manage hazards in the laboratory.

Activities and Accomplishments for FY16:

- All chemical safety online training modules were reviewed/revised.
- Updated the emergency preparedness plan (EPP) in FY16.
- An overview of the Safety Advisor Team and the EHS research laboratory review program was added.
- Bimonthly Lab News articles were published on chemical safety topics.
- Provided chemical consultations and/or assessments for the research laboratory community upon request. Assisted with issues such as safe handling and controls for toxic or hazardous chemicals, review of lab experiment protocols for chemical safety issues, chemical reaction products related to safety and exposure, safe chemical segregation, grant application safety issues/questionnaires, formaldehyde use assessments, post-incident evaluations, chemical use in the Office of Animal Resources facilities, and moving lab chemicals.
  Examples of issues for which support was provided for FY16 included:
  - Met with FM and Chemistry Department to ensure teaching lab hoods will be given a priority on being repaired.
  - Met with Chemistry department about testing the teaching lab hoods immediately after spring semester ends so that extra time will be available for their repair.
- Several meetings were held by AirCuity to explain and demonstrate the air testing system in

PBDB. EHS worked with them to determine how to interpret the data from this monitoring and how to respond if/when issues arise. The new Occupational Safety Specialist was included in this training.

- Chemical safety and management issues were reviewed in 363 labs as a part of the annual biological/chemical lab review process. Chemical safety issues were also reviewed during Lab Safety Rounds unannounced walk-throughs.
- Sash face velocity against hood failure rate was evaluated for chemistry teaching lab fume hoods and new minimum face velocity values were implemented.
- Provided lab and waste regulation training to incoming grad students from the following departments: Chemistry, Biology and Biochemical Engineering.

Respiratory Protection Program for Laboratories

Implement a Respiratory Protection Program in research laboratories where respirators are available for use. See the Respiratory Protection Program report section for additional information.

Activities and Accomplishments for FY16:

- Approximately 32 new lab respirator use evaluations were completed in FY16. As of the date of this annual report, EHS records show there are approximately 187 respirator use labs.
- The status of respirator use in labs was tracked with the EHS bio/chemical lab reviews and lab walkthroughs. Labs were assisted with the following respirator use issues: storage, reuse, and disposal; use of single strap dust masks or the masks that are not approved by NIOSH; the use of surgical masks for handling chemical/biochemical powders.
- Respirator fit testing was conducted for one work area.

Personal Protective Clothing and Equipment (PPE) Program for Laboratories

This program is a component of the overall PPE Program and includes departments with research laboratories where PPE is used for hazard protection.

Activities and Accomplishments for FY16:

- Assisted investigators with completing the written PPE hazard assessment form and certification, whenever needed. The EHS Safety Advisors and chemical safety staff provides support for the PPE program in research labs. Safety advisors reviewed PPE hazard assessment and training documents during each EHS bio/chemical lab review.
- Chemical safety section staff provided personal consultations, coaching and education for individual laboratories on:
  - Cuts, punctures, and piercings while handling glass apparatus or razors.
  - Glove disposal issues related to improving safety at unattended chemical use benches and computer stations.
  - Improving storage of lab coats to minimize exposure to contaminants. Advice on laundering of lab coats.
  - Improving the types of gloves worn for a specific purpose (e.g., cut resistant gloves or thermal resistant gloves).
  - Improving the use of safety glasses or goggles, especially while working with liquids.
- PPE use was routinely reviewed or recommended as part of several hazard evaluations, spill consultations, and post-incident follow-ups.

Ventilation and Fume Hood Program

This program focuses on the fume hood as the major engineering control for chemicals used in laboratories. Annual airflow performance checks are performed on chemical fume hoods to assess inflow velocities. Results are communicated to users, departments, and Facilities Management. Support is provided to Research and Facilities Management (FM) for laboratory ventilation issues pertaining to new installations and renovations.

Activities and Accomplishments for FY16: Fume

Hood Program

- The list of departments receiving a copy of the fume hood report was greatly decreased in 2015. Each department on the 2014 distribution list was introduced to the fume hood website, asked if they wished to continue receiving the fume hood report; eight (8) departments/colleges requested to continue receiving the report.
- The annual test cycle of all fume hoods on campus was completed and the report was issued in January 2016 to 8 departments and colleges, as well as to FM, the Hygienic Lab, and UIHC.
- 942 hoods were visited, with 905 chemical fume hoods measured for hood face velocity:
  - 774 hoods passed
  - 73 hoods were designated for restricted use only
  - 44 hoods failed
  - 14 hoods were designated "Not Determined," meaning the hood could not be adjusted within normal airflow specifications due to its configuration.
- Two hundred and fourteen (214) referrals were made to maintenance (FM Work Control Center and UIHC) for issues such as failed hoods or other airflow problems (including repeat referrals), problems with lights, baffles, sashes or monitors.
- Smoke tests were performed on approximately every 5th conventional-type hood and each low flow high performance hood.
- Fume hoods were assessed throughout the year upon request or were re-assessed following notification that maintenance had been completed.

Fume Hood Program Report	1/2016
Number of departments receiving report	8
Total number of hoods tested	905
Number of hoods passed	774
Number of hoods failed	44
Number of hoods restricted	73
Number of unconventional/unadjustable hoods	14
Number of referrals made to FM	214
Number of hoods under construction	5
Number of hoods inaccessible	7
Number of hoods not in use	21
Number of hoods removed or decommissioned since previous year	3

Research and Facilities Management Project Support

The Chemical Safety section continued to provide support to both FM and Research staff for various projects. The majority of projects involve management of air flow in laboratories and, in particular, methods to reduce air exchange rates in labs to control cost or to directly reduce cost by managing the cost of conditioning lab air. The following projects were supported:

- PBDB Aircuity work group.
- Assessment for reduced lab ventilation in unoccupied labs.
- Amount of flammable liquids allowable per floor of the new COP building.
- Expedite testing of and repairs to Chemistry department teaching lab hoods.
- Identification of out of service/unused hoods to eliminate testing and repairs.

Materials Management - Regulatory Reporting

The Tier II and Emergency Response Right-To-Know (ERRTK) reports on hazardous materials locations within the institution are required to be submitted annually. EHS produces the reports and distributes them to the appropriate agencies. There are also reporting requirements for DHS Chemical Security Anti-Terrorism Standards for COIs.

Activities and Accomplishments for FY16: ER-

RTK

- RTK Report was completed and distributed to appropriate UI, local and state emergency authorities. AutoCAD files (in PDF format) are stored on a local drive for access by EHS personnel and transferred to thumb drives for non-UI emergency personnel. As building floor plans/maps were updated by UIHC ATG and Design & Construction (D&C), they were incorporated into the ER-RTK information collection. Examples of changes include building names and numbers as well as building addresses.
- The table below represents numbers for the ER-RTK effort for FY 2016.

Updated In AutoCAD	# Buildings	# Floor Plans	# New Maps
East Campus	81	352	175
Hawkeye Campus	32	57	21
Off Campus Coralville	15	23	5
Off Campus Iowa City	18	23	15
Off Campus Lake MacBride	10	11	0
Off Campus Muscatine	1	0	1
University Research Park	37	71	25
West Campus	84	417	83
New Buildings	15	44	44
Residence	39	68	18
TOTALS for ER-RTK AutoCAD	**324**	**1037**	**386**

- A total of 1037 floor plans were updated for the ER-RTK 2016 Report. 386 new floor plans were formatted for the ER-RTK 2016 report and 324 cover pages were updated for each building.
- Additionally, 324 buildings and 1037 floor plans were created as PDFs for internal and emergency responders' use. Flash drives were used to deliver the PDFs to UI personnel and local fire departments and emergency responders.
- A total of 324 buildings were audited.

The ERRTK improvement process for 2016 included:

- An MS Surface Tablet was used for all in the field inspections and map updates. It was noted the pdf editor worked well initially but its functionality has dropped to the point that it can't be used for map editing. ER-RTK map information as well as chemical inventory system and the Tier II report data were compared to assure they match as much as possible.
- Areas with inventories in the EHSA system but not marked as hazardous materials areas on ERRTK maps were identified. These rooms were then inspected to determine if they met the criteria to be designated as hazardous areas on the ER-RTK maps.

Tier II

- Completed the Tier II report; copies were provided to local, county and state emergency and disaster service organizations.
- Information from the chemical inventory system was used to verify locations and amounts listed in the Tier II inventories; the ER-RTK report data were also used for Tier II preparation.
- Thirty-seven Tier II reports were filed in FY16.
- There are currently 26 active participants who routinely provide updated chemical data for Tier II reporting with 34 chemicals in reportable quantities.
- Several diesel storage tanks were "re-added" to the list.
- The Tier II reporting process includes:
  - Verification of accurate chemical inventory quantities, storage container types and storage locations/periods from relevant participants across the UI campus; querying the UI chemical inventory database to identify all chemicals meeting certain criteria above regulatory reporting thresholds; data were extracted from the chemical inventory to create an Excel spreadsheet in which chemicals could be summed and physical property data for chemicals could be entered to allow calculation of final quantities in pounds.
  - Data were ultimately entered into an online regulatory agency-provided reporting tool.
  - In addition, all owners of Tier II chemical inventories were contacted by phone or by onsite inspections to verify inventory amounts.

DHS Chemical Facility Anti-Terrorism Standards (CFATS)

- Utilized the chemical inventory system as the primary compliance tool for this regulation. Worked with users to maintain and update the chemical inventory and track any change in amount of COIs at the University.
  - Maintained a listserv of chemical owners/users. The listserv functions as a means to regularly distribute reminders to chemical owners to update their chemical inventories annually. Currently, there are 1249 (this number has remained steady since FY 2012) individuals in the listserv.
- Improved search efficiency in the chemical inventory system for DHS-listed COIs.

- Continued using the vendor-created DHS Report which tracks 325 DHS regulated chemicals. The report sums COIs present in the EHSA system by building and by PI. It is estimated that over 2800 COI chemicals are tracked annually.
- Work continues to ensure the reliability of the report through spot checks on COI amounts in the report and those seen in inventory. EHS personnel continue to work with the vender to correct errors in the programming and data tables.

- No material was determined to exceed a threshold reportable quantity in FY16. Chemicals that will trigger reporting upon shipment were identified and issues surrounding shipping of these materials were discussed with chemical owners.

Emergency Preparedness

This program is intended to improve hazardous materials management practices and emergency preparedness for departments and assess the expanded use of the Emergency Preparedness Plan (EPP) for a broad range of incidents. EHS works with volunteer building occupants to establish and maintain Building Emergency Teams (BETs) who can coordinate building and response issues related to incidents involving hazardous materials.

Activities and Accomplishments for FY16:

- To date, 21 Building Emergency Teams, representing 23 campus buildings, have been established.
- Added three new spill supply carts in Dental Science Building (DSB) clinical area, one in Multi Tenants Facility (MTF), two in Pappajohn Biomedical Discovery Building (PBDB), and one in Trowbridge Hall (TH).
- Worked with individual BETs throughout the year, as issues arose.
- Individual meetings were held with BETs to review the past year's incidents, discuss learning opportunities, and promote idea sharing.

University Spill Resource (USR) Group

The University Spill Resource Program (USR) was instituted in 1993 to be a resource unit and provide coherent support services within the University's Emergency Preparedness Program. The nine members of the Spill Resource Group provide consultation and advice to spillers on safe and appropriate response actions. Additionally, the Department of Public Safety (DPS), the Iowa City Fire Department and Johnson County HAZMAT Team provide campus emergency response services.

Activities and Accomplishments for FY16:

- Administration of the spill resource group was maintained, e.g., written guides, appropriate levels of equipment and supplies, and annual refresher training.
- Spill resource members provided consultation services for 12 campus incidents/inquiries.
  - Four incidents involved chemical spills, including one with mercury, and one incident for each of the following substances: hydraulic oil, a lead acid battery, and isoflurane.
  - Two of the incidents involved odors; one unknown odor in an office and one in an autoclave area. The origin of both odors remained unidentified.
  - Two incidents involved leaks; one from a hood drain that leaked onto the floor below and one from an improperly shut valve on a liquid nitrogen tank.
  - Four of the incidents involved fires; one from improper use of a drying oven, one from a

non-ventilated vacuum pump, one from contractors working on a ceiling and one from sodium metal put into an incompatible waste container.
  - Nine of the incidents involved research laboratories, two incidents involved FM areas of buildings, one incident occurred on a dock.
  - DPS was involved in four of the incidents.
  - ICFD/JCHMT was involved in four of the incidents.
  - UIHC S&S was involved not involved in any incident.
  - The IDNR was notified of a potential release in one incident.
- EHS maintained and revised Resource Unit Contact Information provided to DPS.
- Continued to foster lab management of spills by reviewing lab preparedness supplies and sharing guidance and information on spill preparedness during the annual lab reviews.
- Spill resource group members completed an eight-hour online HAZWOPER refresher training through Safety Unlimited, Inc.

Chemical Safety Section Goals for FY17

- Provide support for the further implementation of mobile lab auditing and lab web access to inspection information.
- Continue to use the EHSA inventory system to remain compliance with DHS COI reporting requirements. Monitor the EHSA system to ensure accuracy.
- Continue to improve the quality of chemical inventory data entered by researchers through EHS administrative methods. Data are reviewed to assure it appears in or matches chemical information in the associated chemical catalog. This allows capture of materials when searches are conducted and/or regulatory reports generated that might otherwise be missed due to spelling or other entry errors.
- Update user information on EHSA i.e. workers, chemical storage space etc.
- Continue to support the laboratory ventilation and energy reduction projects initiated by FM.
  - Support the energy reduction goals for FM in labs by contributing EHS reviews of lab hazard material use in selected labs to determine if ventilation rate reductions can be safely implemented.
  - Periodically monitor the demand-controlled ventilation data dashboard for a new research building to gain a better understanding of volatile chemical and particulate concentrations in air during routine research activities as well as during accidental/non-routine upsets
- Inspect all of the University buildings listed as containing hazardous material and those purchased or leased in FY16-17
  - Review each building map/floor plan available from FM for changes prior to conducting physical audits of buildings for 2017 RTK Report.
- Conduct site reviews for USAMRMC-funded principal investigators; submit annual Facility Safety Plan Status report.
- In support of the animal care and use review process, provide chemical assessment services for review of projects using hazardous chemicals with animals.
- Work with OAR to standardize common chemical protocols.

- Assist labs and departments in compliance with SDS regulations.
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Laboratory Assessments/ Safety Advisor Team Goals for FY17:

- Continue to develop and refine the mobile auditing process for the laboratories.
- Complete Biological, Radiation and Chemical internship for new field safety advisors.
- Initiate training of the Chemical Safety Specialist, who will serve as members of the safety advisor team.
- Initiate training of the Associate Biosafety Officer to serve as the primary trainer for safety advisors and to review post-audit reports for the biological safety section.
- Continue unscheduled lab visits (Lab Safety Rounds) to improve lab follow-ups and to create opportunities to interface with researchers and answer their questions.
- Continue building the website for audit preparation and follow up capabilities.
- Continue training opportunities for SAT leaders (CSHEMA conference, etc.)
- Complete applicable training opportunities as they become available.

Environmental Programs Section

The Environmental Programs Section is responsible for facilitating compliance with pertinent environmental regulations by managing biological, chemical, and radioactive wastes, conducting waste generator compliance assessments, facility inspections and audits, institutional waste generation and minimization assessments, and annual reporting to the Environmental Protection Agency of these compliance-based activities. Environmental programs are focused on two areas: operational and compliance.

Summary of Major Environmental Program Initiatives

- Completed review and updated the EHS Health & Safety Plan.
- The Environmental Section's recycling program, recycled 129 lbs. of mercury containing devices; 2875 lbs. of PCB ballasts; 627 lead-acid batteries weighing 5,949 lbs.; 2800 other hazardous batteries weighing 1535 lbs.; and 1878 pieces of lead shielding weighing 2441 lbs.
- The Environmental Section's DEA Controlled Substance destruction program properly disposed of 176 containers of controlled substances.

Operational Programs

Hazardous, Radioactive, and Biohazardous Waste Management Programs These programs cover requirements that are imposed on the University by federal and state regulations, and the conditions imposed on the University in order to operate a permitted treatment, storage and disposal facility (TSDF) on the University of Iowa Research Park campus. Program activities are defined and regulated by the following agencies: U.S. Environmental Protection Agency (EPA), U.S. Department of Transportation (DOT), Iowa Department of Public Health-Bureau of Radiological Health (IDPH-BRH), Iowa Department of Natural Resources (DNR), Iowa Occupational Health & Safety Administration (IOSH).

Waste Collection, Container Tracking, Transportation and Storage

Hazardous waste chemicals are identified, inventoried, collected and transported to the University of Iowa Research Park for processing and storage prior to contractor collection and disposal. EPA prohibits the entry of unknowns into a TSDF. For unknown chemicals, a chemical analysis service is offered to clients that will then allow the identified chemical to be entered into the waste management system. In addition, EHS facilitates the management of unstable and/or explosives by contracting with a high hazard technical team that stabilizes and deactivates such chemicals.

Radioactive wastes are collected from University research operations and UIHC patient treatment areas. The wastes are transported to the University of Iowa Research Park for processing, decay in storage, and storage prior to contractor collection and disposal.

Biohazardous waste collection is managed by EHS as follows:

- EHS oversees contractor collection and disposal of wastes generated at major UI research, academic and support facilities (~ 10-15 areas).
- EHS collects waste from the remaining facilities and subsequently disposes of those through contractor collection. EHS does not participate in the collection and management of

biohazardous waste generated at University of Iowa Hospitals & Clinics, but does manage and oversee the vendor contract for this service.

Activities and Accomplishments for FY16:

- Hazardous chemical waste: a total of 30,079 containers were collected from 699 waste generators during 3,478 visits. Waste amounts varied in size from a few milligrams to 55 gallons.
- Radioactive waste: a total of 850 containers were collected from 71 waste generator sites during 208 visits. Waste consisted of liquids, solids, and patient therapy waste.
- Biohazardous waste: a total of 23,576 containers were collected (excludes waste generated at UIHC); 21,257 collected by contractor; 2,319 collected by EHS.
- Unknown analysis: 52 unknowns from 10 locations were analyzed and identified.
- Cleanouts: completed 79 laboratory cleanouts generating 11,118 items of hazardous chemical waste.
- See attachments for statistical and graphical information.

Waste Processing, Contractor Shipment and Disposal Activities

Hazardous chemical waste collected throughout the University is transported to the Environmental Management Facility (EMF) located at the University of Iowa Research Park and stored prior to processing, recycling, treating, or disposal. Chemicals are disposed of through a contractor who received a single contract covering both labpack and bulk disposal. The contract is a Board of Regents coordinated, cooperative contract that includes the University of Northern Iowa, Iowa State University (ISU) and the University of Iowa (UI). The contract is issued through ISU and UI and reviewed by the Risk Management Department with input from the section manager.

Radioactive waste is intensively micro-managed through the segregation of wastes into 45 separate streams and subsequent processing to achieve maximum cost savings. The foundation of radioactive waste management is decay-in-storage. This technique is used to reduce the amount of radioactivity contaminating a particular waste stream to background levels.

Activities and Accomplishments for FY16: Hazardous Chemical Waste

- Processing:
  - Bulking – 14,816 items were commingled together into 599 drums last fiscal year.
  - Recycling – 129 lbs. of mercury containing devices; 2,875 lbs. of PCB ballasts; 627 lead-acid batteries weighing 5,949 lbs.; 2,800 other hazardous batteries weighing 1,535 lbs., and 1,878 pieces of lead shielding weighing 2,441 lbs.
  - DEA Controlled Substance destruction – 176 containers of controlled substances were disposed of through a DEA-approved method and completing the required reports.
  - Waste processing generates a large amount of regular trash to be disposed of at a landfill. Last year 25 truckloads containing such waste were taken to the Iowa City Landfill.

- Other:

	FY14		FY15		FY16	
Process	**Weight (kg)**	**Items**	**Weight (kg)**	**Items**	**Weight (kg)**	**Items**
Neutralization	1,138	1,20	999	651	754	500
Non-hazardous Gases Vented	148	15	92	57	60	33
Non-hazardous-to IC Landfill	1,273	1,584	928	1,823	1,004	1,351
Sewered	6,753	3,790	4,282	2,783	3,595	2,846

- Cost Containment:
  - Labpacks are a considerably more expensive disposal option, but are necessary due to extenuating factors such as chemical compatibility, stability, or EPA-mandated treatment methods. Because of their high cost [bulk solvents cost $0.72/kilogram (kg), labpacks cost $20.88/kg], EHS makes every effort to minimize the number of labpacks that are created.
  - Last year 190 labpack drums were filled with 4,566 items weighing 2,324 kg.
- Contractor Shipments and Disposal:
  - Eleven shipments of hazardous chemical waste were completed and sent to off-site EPA permitted facilities.
  - Two mixed waste (chemical and radioactive hazards) shipments of a total of 2 drums.
  - Eight barrels/labpack shipments totaled 749 drums.
  - One shipment of PCB light ballasts of 7 drums.
- See attachments section for statistical and graphical information.

Radioactive Waste

- Saved approximately $14,600 in contractor disposal costs by using labor-intensive practices to process radioactive waste.
- Aqueous liquids are held for varying periods of isotope-dependent decay times prior to being discharged to the sanitary sewer. Last year, 33 containers in 1 drum along with 32 individual smaller containers were discharged for a total of 108 gallons.
- Mixed wastes are stored on shelves, allowed to decay, surveyed, reclassified as hazardous waste, and then disposed of through the hazardous waste program. This reduces the toxicity of the waste, eliminates the “mixed waste” classification and affords a large cost savings. Last year no containers of mixed waste were released after decay-in-storage; several containers will become available for processing in FY17.
- Lead shielding is surveyed for contamination and recycled through the hazardous waste program if no contamination is present. Last year, 994 pieces were collected.
- Refuse is created during the extensive processing of RWMP, which is disposed of through landfilling. Last year, 25 truckloads of such waste were taken to the Iowa City Landfill.
- A sorting station is used to sort dry waste for review and removal, if necessary, of inappropriate items prior to disposal in the Iowa City Landfill. Last year 16 drums of short-lived waste were processed.
- A compactor is used to compact short-lived dry waste to minimize storage space prior to being sorted; 32 drums of dry waste were filled and compacted to reduce the volume of waste being stored until it is ready for sorting, etc.

- Completed three radioactive waste shipments of 47 shipping containers, including:
  - 2 – Animals containers;
  - 1 – dry waste barrel;
  - 1 – hazardous scintillation cocktail vial;
  - 1 – mixed hazardous/radioactive liquids;
  - 34 – non-hazardous scintillation cocktail vials;
  - 5 – dry waste in yard-boxes, and
  - 2 – sharps in a yard box.
  - 1 – sealed sources
- See attachments for statistical and graphical information.

Biohazardous Waste

- Operated the program that manages biohazardous waste, excluding waste generated by UIHC, which operates a separate program.
- Established procedures in which a vendor collects waste from dock areas at twelve buildings that are large quantity generators; EHS collects waste from twelve small quantity generators.
- Disposed of 23,576 containers of waste (excludes waste generated at UIHC); 21,257 collected by contractor; 2,319 collected by EHS.

Monitoring Activities

The radioactive waste management program performs significant internal monitoring directed toward contamination control, environmental monitoring, and personal dosimetry. Contamination control includes extensive use of wipes and survey instruments.

Activities and Accomplishments for FY16:

- Surveys - more than 8,000 surveys are performed annually.
  - Vehicle – surveyed after each use – 103 times – using 1,030 wipes.
  - Facility – surveyed on a weekly basis – 52 surveys – using > 1,500 wipes.
  - Containers – surveyed > 800.
  - Lead shielding – surveyed prior to disposal – 1,878 pieces.
- Environmental dosimeters – no significant doses were released in the facility operations.

Quality Assurance Activities

The waste section maintains an extensive quality assurance program regarding waste records and waste section practices. Audits are conducted to ensure the accuracy and completeness of generated records used for tracking wastes from generator to final disposal.

Activities and Accomplishments for FY16:

- Daily review of data collected during waste collections; ongoing record audits.
- Periodic review of drum contents for quality assurance and annual barrel record review.
- Weekly review of individual storage location contents and periodic inventory checks.
- Quarterly self-RCRA inspections.
- Barrel check and item inventory checks after every waste shipment.
- Reviewed drum contents for quality assurance.

Regulatory Compliance Programs

Environmental Reporting/Permit Management

The Environmental Section manages a permitted TSDF that allows the University to store hazardous waste at several locations on the University of Iowa Research Park campus. This permit dictates an extensive recordkeeping network of information that documents the condition of the facilities and allows EHS to track each container of waste from a specific generating site within the University to the ultimate disposal site. Information from generators, transportation manifests, in-house storage records, packaging and container information, contractor transportation records, and contractor disposal records are merged into an operating record. The operating record is the basis of assessing compliance with applicable regulations. This program includes submitting required regulatory reports to the appropriate agencies.

The University of Iowa's TSD operating permit also requires a Waste Minimization Plan focused on reducing generation and subsequent release to the environment of the most persistent, bio accumulative and toxic constituents in hazardous wastes. The plan's three inherent goals are to reduce the most hazardous substances, avoid transferring these constituents across environmental media, and ensure these constituents are reduced at their source.

Activities and Accomplishments for FY16:

- Completed annual EPA report, as required by our EPA operating permit. EHS is required to submit an "Annual Report to EPA on the Status of Waste Reduction Techniques" and a signed Certification that a program is in place.
- Performed the following waste minimization activities:
  - Conducted regular solicitation of waste coordinators at each generator site.
  - Performed waste segregation and micro-management.
  - Conducted waste training and education activities.
  - Performed waste generator assessments, which allowed direct one-on-one communication with generators. To date, thirty-one different waste minimization techniques are in use.
  - Micro-managed the bulk fluid portion of the waste stream to allow fuel-blending as the preferred method for disposal. Fuel-blending allows recovery of the heat value from the waste.
  - Generated an annual historical summary of waste disposal costs and submitted it to the Associate Vice President for Research, Regulatory Affairs.
  - Generated graphical information on waste minimization of liquid scintillation cocktail, mixed waste, benzene, chromic acid, and lead shielding for the Annual Report to EPA on the Status of Waste Reduction.

EPA Compliance

The EPA Compliance Program is intended to promote compliance with select environmental programs. The program consists of participating in regulatory agency inspections, conducting waste generator assessments, and managing a Safety Data Sheets (SDS) inventory used for conducting hazardous waste determinations. The purpose of waste generator assessment/audits is to evaluate waste generator sites, confirm generator identity, identify waste generating processes, evaluate regulatory compliance, promote waste minimization efforts, disseminate information on

new methods and technology to reduce waste, promote disposal of unwanted chemicals and proper chemical management. The audit program focuses on large quantity generators, groups targeted by EPA for inspection, and generators with disposal issues that have been identified during waste collection.

Activities and Accomplishments for FY16:

- Completed written response to EPA for the results of the compliance evaluation inspections conducted by EPA on July 30 - 31, 2015 and April 26, 2016. The two inspections covered the permitted waste storage facilities, and waste generators on the UI Research Campus. EPA's reply to the response is still pending.
- The Iowa Department of Public Health conducted an inspection of the facility during the last fiscal year as part of the University's annual radioactive materials license inspection. No violations were identified.
- Continued the implementation of programs to perform audits or assessments for select areas that generate hazardous waste. Audits are alternated between lab and non-lab areas.
  - Completed 184 audits of laboratories that generate hazardous waste.
  - Completed 94 audits of non-laboratory areas that generate hazardous waste.
  - Completed 234 audits of areas where Universal Waste is accumulated.
- SDS solicitations: over 1,500 SDS were solicited from manufacturers; currently, over 23,000 separate SDS are part of the EHS' collection of this information.

Goals and Initiatives for FY17:

- Facility operations: receive no violations from EPA; complete quarterly self-RCRA inspections.
- Conduct additional spill exercises that implement use of an SCBA.
- Conduct facility reviews for local emergency personnel.
- Review and update Environmental Programs Sections Health and Safety Program.
- Complete training for new staff.

Occupational Safety Section

The Occupational Safety (OS) section is committed to the promotion of a safe and healthy workplace for University of Iowa (UI) faculty, staff, and students through the development and implementation of programs and procedures to minimize occupational hazards.

The Occupational Safety Section provides services to a broad range of departments and staff on campus. Its focus is on people and how they interact within their workplace in regard to occupational safety and health. The programs and services are designed to evaluate job hazards, help individuals and departments reduce or eliminate these hazards, and comply with state and federal occupational safety and health regulations. The OS section provides campus wide oversight for the following programs:

- Occupational Safety Programs such as Machine Guarding, Personal Protective Equipment, etc.
- Illness and Injury Prevention.
- Industrial Hygiene Programs such as Indoor Environmental Quality, Respiratory Protection, Hearing Conservation, etc.
- Exposure Assessments and Maintenance of Exposure Records.
- Support for the University of Iowa Hospital and Clinics (UIHC) and the UI Department of Human Resources (HR) by partnering with the Iowa Occupational Safety and Health Administration (IOSH) during routine or incident based inquiries and inspections.

Upon request, additional services may be provided for the UIHC and include industrial hygiene exposure assessments, indoor environmental quality investigations, and subcommittee work associated with the Environment of Care Committee. Such services are coordinated through the UIHC Safety and Security Office.

Safety Reviews

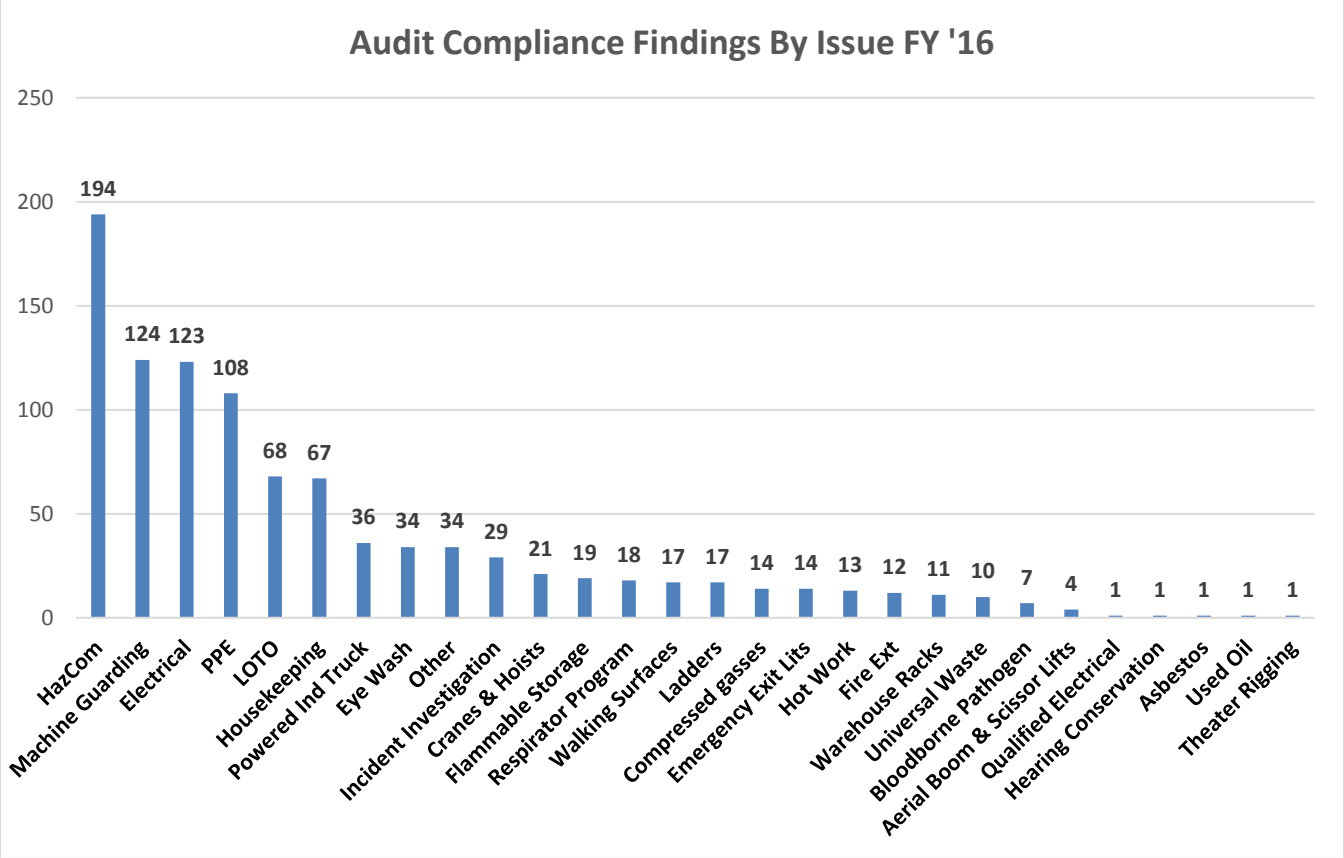
The OS section performs annual safety reviews of a variety of departments across campus including Facilities Management, Housing & Dining, Animal Resources, Business Services, Recreational Services, Studio Arts, Athletics, and some Academic areas. The purpose of the review is to look at the major occupational safety and health topics associated with a unit or department, and to ensure that controls are in place to eliminate or reduce risk.

The OS auditor initiates the review by sending the department contacts a meeting request that explains the review process and schedules an onsite visit. The visit consists of a review of written programs, training documents, injury reviews, and a walk-through of the area. Once this is complete a letter containing the results is sent to the department. Unless otherwise noted, the standard time-frame for completion of all identified items is 30 days from the receipt of the letter. The auditor then schedules a 30-day follow-up visit to review progress on these items. If anything is still open at that time, the auditor will schedule a 45-day final follow-up to determine the status. It is the goal that all items identified will be completed and closed at the end of this 45-day time-frame. A final letter is sent to the department and its director summarizing the findings at the end of this process.

Activities & Accomplishments for FY16

During fiscal year 2016, the OS section conducted ninety-nine (99) departmental reviews. All units were reviewed for compliance with the following Iowa Occupational Safety and Health (IOSH) and National Fire Protection Agency (NFPA) standards. These include:

- Personal Protective Equipment
- Machine Guarding
- Electrical Safety
- Control of Hazardous Energy - Lockout/Tagout
- Flammable and Combustible Storage and Compressed Gas Cylinders
- Hazard Communication
- Hot Work
- Bloodborne Pathogens
- Cranes and Hoists
- Theater Rigging
- Hearing Conservation
- Powered Industrial Trucks (Fork Trucks)
- Aerial Booms and Scissor Lifts
- Asbestos Awareness
- Hazardous Waste
- Emergency Preparedness and Access/Egress
- Housekeeping- Facility Cleanliness and Organization
- Walking/Working Surfaces
- Warehouse Safety



Hazard Communication Program Updates

The Occupational Safety & Health Administration (OSHA) substantially revised the Chemical Hazard Communication standard through the adoption of the Global Harmonization System (GHS) of classifying and labeling chemicals. In response to the new standard, the OS section reviewed University practices to revise the existing programs, guidelines, and course offerings. The revision criteria were phased into department reviews and audits in concert with regulatory deadlines for implementation. 2016 HazCom program updates include:

- Working with departments to ensure that they replaced their old Material Safety Data Sheets (MSDS) with updated Safety Data Sheets (SDS);
- Working with departments to verify that their chemical inventories are up to date and reviewed in the EHS Assistant data base;
- Providing departments with templates so that they can customize the program for their needs; and
- Set up a process with the University Printing Office so that departments can order GHS compliant secondary labels.

Hot Work

The OS section has been working with a committee comprised of representatives from Risk Management, Public Safety, and Facilities Management to update the UI written Hot Work Program. Some of the key program updates include:

- Clearly defining roles, responsibilities, and procedures for both UI employees and outside contractors in regards to both "Designated" and "Temporary" Hot Work sites;
- Updated the Hot Work Permit form and procedures to obtain and use it;
- Working on a new University specific training program; and
- Setting up quarterly committee meetings to review the status of the program on campus

Electrical Safety

The OS Section is coordinating meetings with representatives from Facilities Management, Housing and Dining, University Hospitals and Clinics, Athletics, and Recreational Services to standardize processes around our electrical safety program; and more specifically Arc Flash and NFPA 70E Compliance. The following results have been achieved so far:

- A vendor has been selected to provide arc flash PPE to campus.
- When updating arc flash hazard assessments all vendors will provide the following "deliverables":
    1. Photos of existing electrical equipment and panels including exterior, breaker layout and existing circuit schedules.
    2. Arc flash report.
    3. Arc flash labels files.
    4. Arc Flash labels. (Installed by design professional with escort of area maintenance.)
    5. Arc flash model. (Native Power*Tools by SKM Systems Analysis, Inc. files.)
    6. Arc flash model one-lines.
    7. Simplified one-lines.
    8. Panel schedules.
- Developing a standard process to satisfy the 5-year update requirement of NFPA 70E.

Training

Occupational Safety online training courses are offered by EHS for thirty-one (31) topics. These programs are reviewed on an annual basis and updated as needed.

Students Working with Machinery & Equipment

The Occupational Safety & Health Administration (OSHA) regulates the use of machinery, equipment, and mechanical power transmission apparatuses that are currently used in maintenance operations, machine, and repair shops. In some departments within the University, it is common for students, as well as faculty and staff, to use equipment of this sort including metal and wood turning lathes, band saws, drill presses, radial arm saws, and floor mounted grinders. This program covers departmental areas and activities in which students use large industrial powered equipment as part of professor-led academic class projects.

If students are allowed to use the equipment, the following guidelines must be adhered to by the department:

- **Training**.
  Students are trained on the use of powered equipment, which includes:
  a) Completing an ICON training course on general machine safety.
  b) Site-specific training that includes discussion of departmental shop rules & procedures, and machine or equipment-specific training.
- **Supervision**.
  While the equipment is in use by students, supervision is provided at all times by an employee who has knowledge and experience with the equipment.
- **Personal Protective Equipment (PPE)**.
  Proper PPE is worn. No dangling jewelry is allowed. Long hair must be tied back/restrained so that it cannot get pulled into equipment.

Activities & Accomplishments for FY 16:

A total of 10 areas were audited that allowed students to work with machinery and equipment. These areas spanned the following 4 colleges and departments: School of Art, College of Engineering, Division of Performing Arts, and Physics and Astronomy. When necessary, follow-ups were performed to ensure that all items covered in the audit were in compliance with safety requirements.

Safety Processes, Collaborations, Regulatory Inspections

University-wide procedures have been put in place to provide a more consistent institutional response to potential health and safety issues raised by OSHA and to implement timely action to ensure a safe environment for employees. The safety and regulatory inspection processes are managed by the OS section and include management systems that increase the effectiveness of departmental processes and committee collaborations to identify and control risks.

Activities and Accomplishments for FY16:

The OS section participated in the following University and UIHC department committees:

- The UI Pharmaceuticals Safety Committee
- The College of Dentistry Nitrous Oxide Oversight Committee
- UIHC Staff Safety & Health Council
- The Workplace Occupational Safety and Health Work Group

- Hot Work Committee

In addition, the OS section maintained Occupational Safety and Industrial Hygiene web publications for the campus covering twenty-seven (27) regulatory areas and online courses.

The OS section has started a collaboration with the Occupational and Environmental Health department in the College of Public Health. The collaboration will give researchers access to areas on campus that provide unique and under studied exposure scenarios and provides EHS with industrial hygiene samples at no cost to the University.

Injury and Illness Analysis

The OS section investigates injuries and illnesses that occur at the University in order to reduce the potential for similar recurrences in the future, the number of injuries and illnesses that occur, and to limit the severity of these incidents. The Injury and Illness Analysis program includes review and tracking of the First Report of Injury (FROI) claims submitted through the central HR database. The claims are classified due to the mechanism of injury, outcome, and the department in which they have occurred. During administrative reviews, the OS section provides each department with reports of the OSHA recordable incidents occurring in their department and conducts an analysis with a focus on addressing loss control activities.

Activities and Accomplishments for FY16:

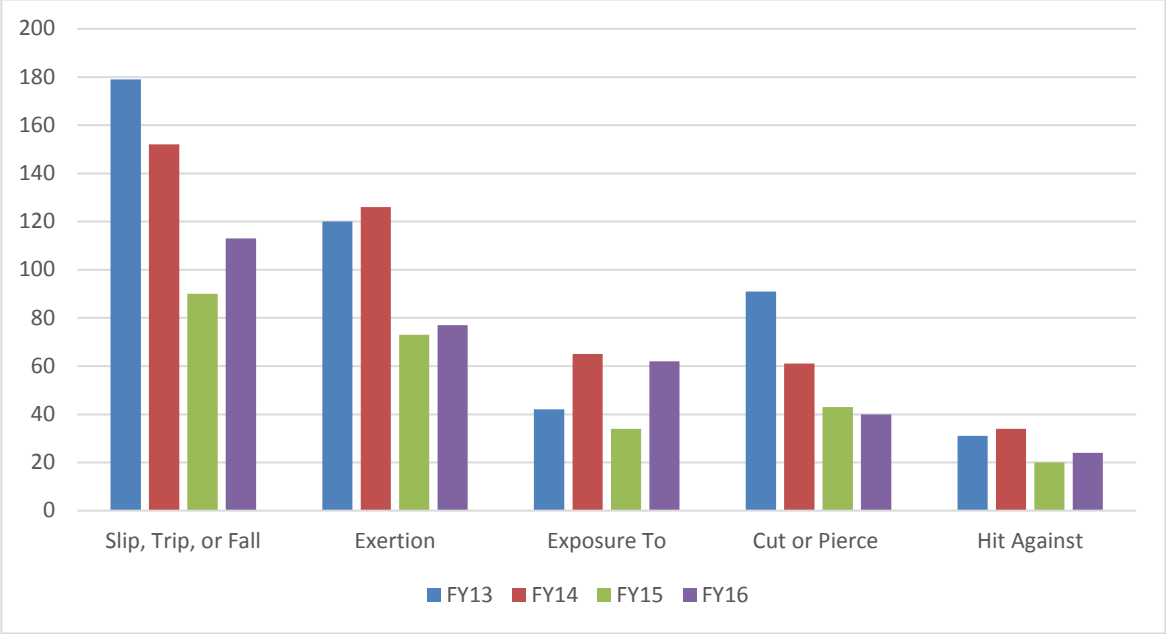
Incident investigation reviews. The OS section meets with safety representatives from Facility Management, Housing & Dining, and UI Ergonomics on a monthly basis to review the First Reports of Injury and incident investigations for the prior month. The ultimate goal of the investigation process is to identify corrective actions and help lower our incident rate over time. As a result, 1523 First Report of Injury (FROI) reports were reviewed over the course of the year.

Listed below is a comparison of the most frequently reported types of injuries by UI employees (excluding UIHC) by year:

Table 1: Comparison of injuries by type and fiscal year

Injury Type	FY13	FY14	FY15	FY16
Slip, Trip, or Fall	179	152	90	113
Exertion	120	126	73	77
Exposure To	42	65	34	62
Cut or Pierce	91	61	43	40
Hit Against	31	34	20	24

Figure 1: Comparison of Injuries by Type and Fiscal Year



The OS section reviews the number of OSHA recordable injuries by year in comparison to the number of recordable injures with lost time only. These comparisons allow for the identification of trends in time and severity as well as a measure of the effectiveness of the current safety programs. The next four graphs show OSHA recordable and lost-time data for UI employees.

Figure 2: OSHA Recordable Injuries, Total and Lost Time Only

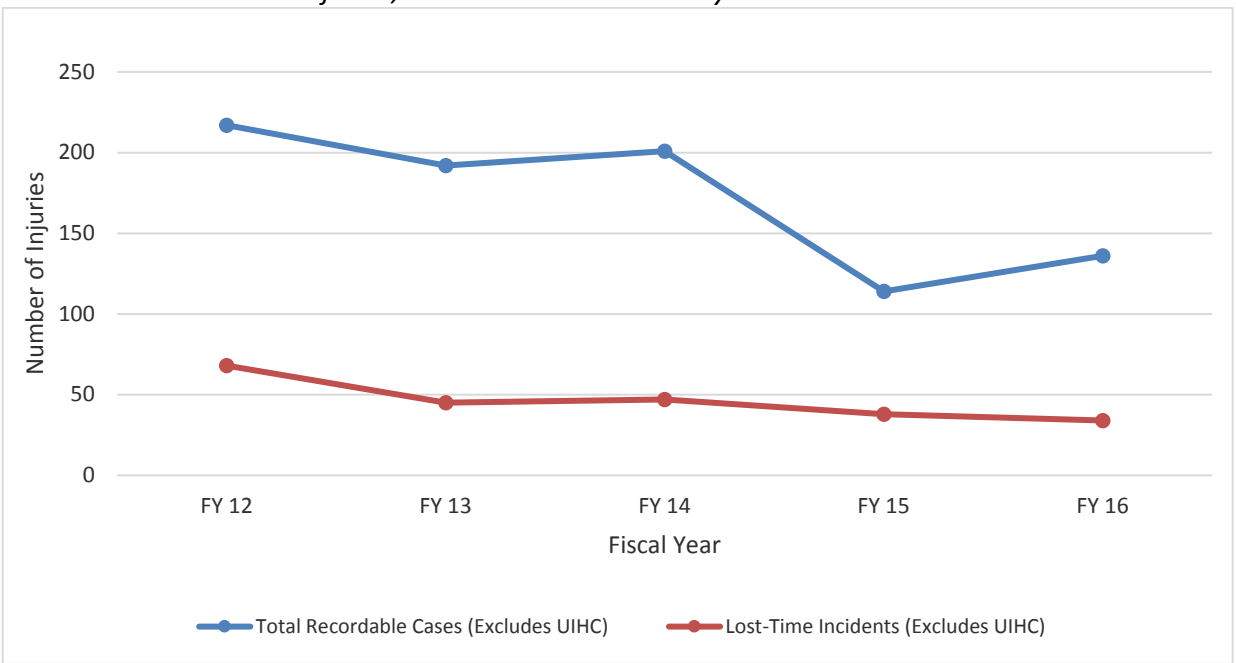
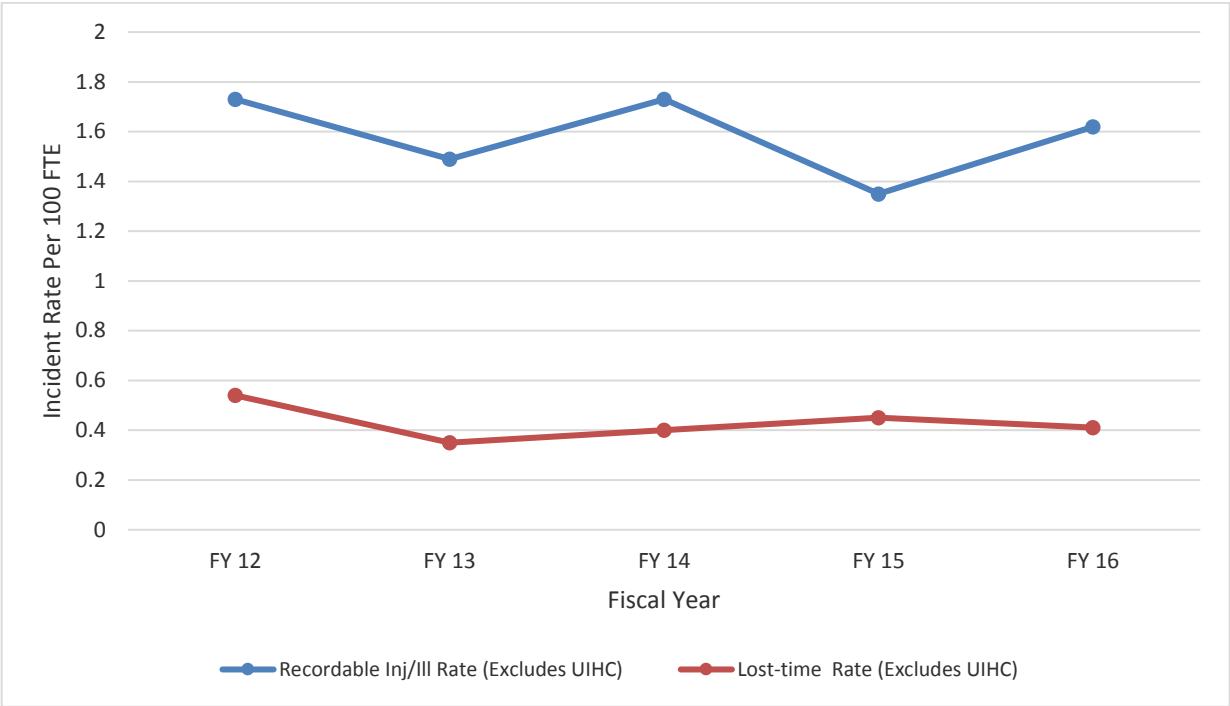


Figure 3: OSHA Recordable Injuries Rate, Total and Lost Time Only



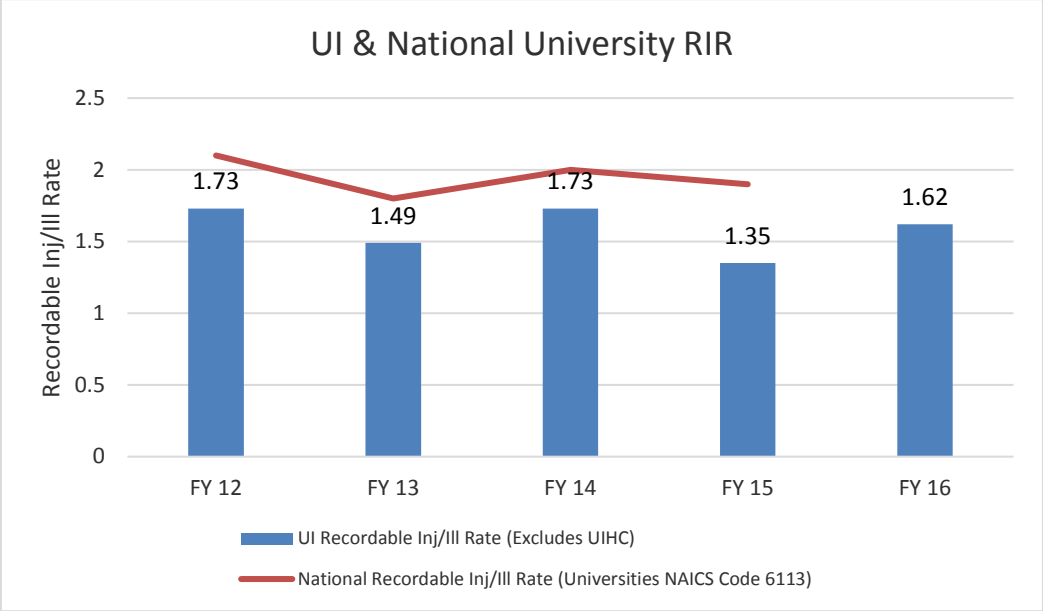
The Incident Recordable (IR) case rate represents the total recordable cases for a given year per 100 full-time employees (FTE). The incident rate is a metric to standardize the year's safety performance against the national and state average. The equation is as follows:

$$\text{OSHA Incident Rate} = \frac{\text{Total number of injuries x 200,000}}{\text{Number of hours worked by all employees}}$$

Lost Time Cases (LTC) represents the number of OSHA recordable injuries that resulted in lost time. The LTC rate is the number of cases in a given year per 100 full-time employees. The rate is calculated using the OSHA Incident Rate calculation outlined above, however the total number of injuries are only those resulting in lost time.

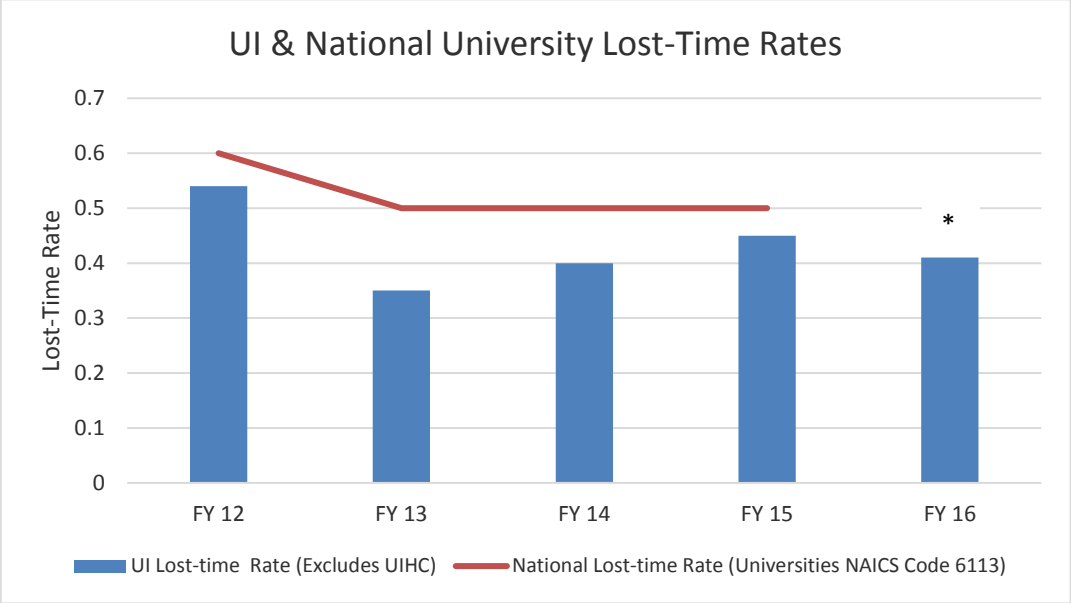
In comparing of the 5-year Recordable Injury/Illness and Lost-Time Rates for UI to the average rates for universities nationwide (NAICS Code 6113 - Figures 4 and 5), UI has consistently been below the national average.

Figure 4: OSHA Recordable Injuries Rate, National and UI rates by Fiscal Year



**National Data was not available for FY16 at the time of this report*

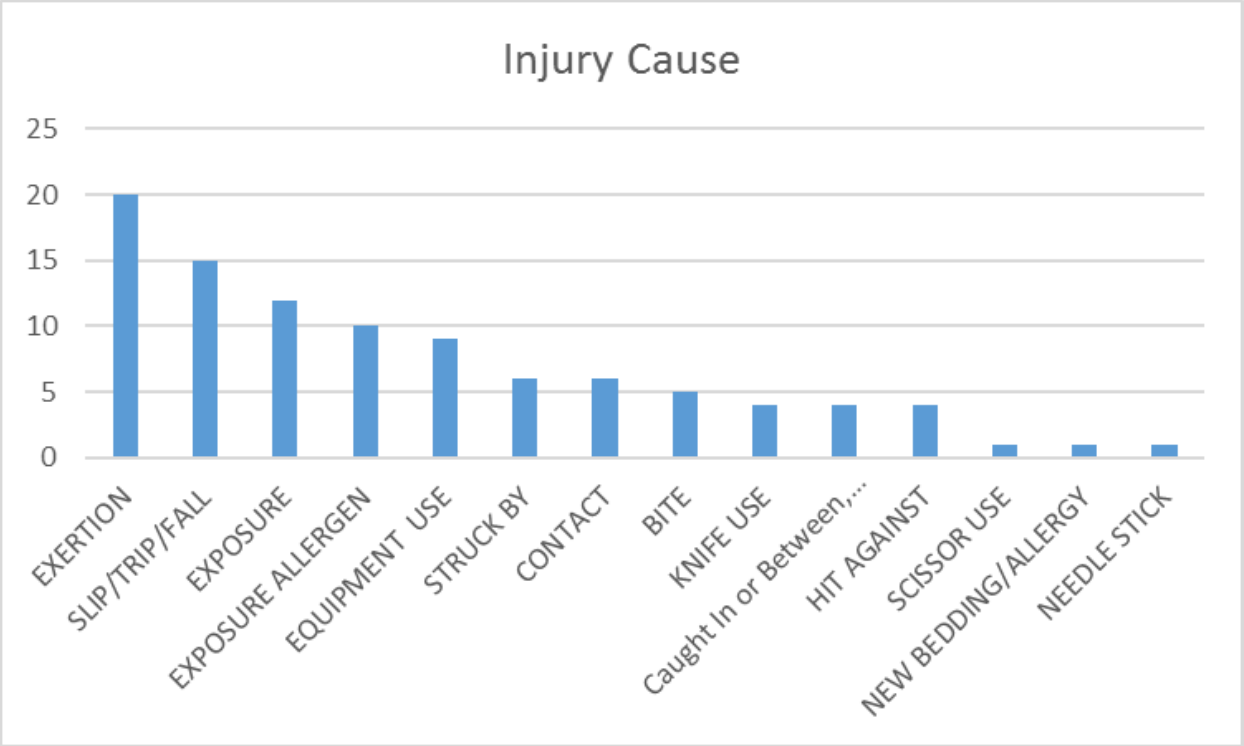
Figure 5: OSHA Lost Time Case Rate, National and UI rates by Fiscal Year



**National Data was not available for FY16 at the time of this report*

EHS formally investigates a subset of injuries each year. In FY16, the OS section was involved in ninety-eight (98) investigations outlined by type of injury in the following table:

Table 2: FROI Investigations by Injury Type FY16



The OS Section staff reviews incident and injury trends with non-laboratory and non-UIHC departments during the annual administrative audit. In addition, monthly incident reviews are done with Safety Representatives from Facility Management and Housing & Dining. The following topics are reviewed:

- The number of OSHA Recordable Injuries;
- Near miss incidents;
- The most common type of injury;
- The direct and indirect contributing factors including facilities, equipment, work practices, procedures, active management leadership, and employee involvement;
- Overall safety culture;
- The status of the department's injury investigation process and return to work program;
- Opportunities for corrective actions; and
- Areas of focus for department administrators, including day to day performance management and safe work practices.

Indoor Air Quality

The indoor air quality (IAQ) program addresses issues associated with indoor environmental quality for campus buildings. Requests are made by individuals, departments, administrators, medical providers, and staff involved with building maintenance, renovation, or construction. Issues that arise include general air quality, odors, mold, allergens, dust, and thermal comfort. Underlying issues are facilitated to resolution and may include the overall office environment, construction impacting occupied areas, and unique or aged structures.

Investigations often include assessing the building and/or Heating, Ventilation, and Air Conditioning (HVAC) system for moisture intrusion since that is the primary facilitator of mold growth indoors.

Sampling may include carbon monoxide, carbon dioxide, relative humidity, temperature, dust levels, formaldehyde, volatile organic compounds (VOCs), and biological samples when indicated or requested to identify and rule out background substances more commonly associated with individual sensitivities or allergies.

Activities and Accomplishments for FY16:

- Conducted five (5) indoor air quality investigations.

Industrial Hygiene

Industrial hygiene services are provided to evaluate various chemical and physical hazards, recommend means of hazard elimination or control, and evaluate ongoing program effectiveness.

Activities and Accomplishments for FY16:

- Performed Respirator Program Administrator services for EHS respirator programs; and provided a summary report to the EHS Director.
- Conducted a program review of thirteen (13) departments with required respirator programs.
- Provided thirty-five (35) respirator fit test to twenty-seven (27) employees in five (5) departments.
- Conducted administrative reviews of five (5) asbestos management program.
- Performed an additional twenty- four (24) industrial hygiene evaluations for a variety of purposes on miscellaneous issues to assess hazards, conducted air or noise monitoring when needed, and recommended appropriate controls.
- Provided input on safety related issues to FM PD&C on four (4) building projects.
- Revised and updated the UI Hearing Conservation Program.
- Updated the UI Confined Space Program. This included simplifying the entry permits and moving the inventory system to an online database.
- Updated training programs for Confined Space.
- Began updating the Occupational Safety Industrial Hygiene Case File database. The update included standardization of department names, adding noise monitoring reports to the database, moving the data from Excel to SharePoint, and linking the report database to separate databases for individual results.

Occupational Safety Section Goals for FY 17

- Participate in University, UIHC, and department committees for risk control related to occupational safety and health.
- Participate in the Workplace Occupational Safety and Health Work Group and sub work groups.
- Support University and UIHC needs in the occupational safety including injury and illness prevention, training, annual safety reviews and follow-ups.
- Roll out the updated Confined Space Program across campus and assist departments in implementation as needed.
- Partner with safety personnel across campus such as Facilities Management, Housing/Dining, Fire Safety, Recreational Services, Athletics and UIHC to continually improve our safety program throughout the University.

Radiation Safety Program

The Radiation Safety Section is responsible for administrating the University's radiation safety program. This includes maintaining the radioactive material license, registration and compliance testing of radiation producing machines, assessing program performance, providing training and program services, and managing regulatory and policy compliance.

Administrative Programs

Radioactive Materials License Maintenance

The Environmental Health & Safety Office's (EHS) Radiation Safety Section maintains the University's single academic/medical radioactive materials license of broad scope that covers all uses of radioactive materials for both research and medicine. The license is issued by the Iowa Department of Public Health - Bureau of Radiological Health (IDPH-BRH) and is subject to annual IDPH-BRH on-site inspection and five-year renewal.

Activities and Accomplishments for FY16:

- Completed review of the University's Radioactive Materials License. The license is up to date and not due for renewal until May 1, 2018.
- Filed and received approval from the IDPH-BRH for one license amendment authorizing the use of radioactive materials at the UIHC's Iowa River Landing East, 920 East 2nd Avenue, Coralville, Iowa.
- Completed IDPH-BRH annual registration of Radiation Oncology medical physicists, personnel servicing X-Ray machines (Radiology Engineering and EHS), and personnel conducting health physics activities (EHS).
- Completed annual inventory and registration of the University's and UIHC's radiation producing machines and generally licensed sources with the IDPH-BRH.
- Revised the University's program for managing security and access to Category I & II quantities of radioactive material to meet the new requirements in IAC 641-37 (Physical Protection of Category I & II Quantities of Radioactive Material) which went into effect in March 2016 (this program was formerly under the NRC's Increased Control Order and a condition of the University's RAM license.
- Maintained access control programs and audited compliance for each of the sites under the requirements of IAC 641-37 Physical Protection of Category I & II Quantities of Radioactive Material.
- Negotiating with the DOE's Defense Nuclear Nonproliferation – Office of Radiological Security to install voluntary security enhancements for the sites under IAC 641-37 requirements, which are paid for and maintained for years under a DOE funded grant.
- Routinely monitored both the Iowa Administrative Bulletin and the Federal Register for regulatory changes which may impact the radiation safety programs and notified stakeholders who are or may be affected.

License Inspection Activities for FY16

- EHS Radiation Safety staff participated in the IDPH-BRH's on-site inspection of the University's radioactive material license and radiation safety program from October 12 – 15,

2014. The inspection included reviews of the following: Physical Protection of Category 1 & 2 Radioactive Materials; Laboratory Security Personnel Monitoring & Exposure Control; Laboratory Audits & Surveys; PET Production & Imaging Center; Radioactive Waste Disposal; RAM Receipt & Delivery; RAM Use Approval Process; and Instrument Calibration. No violations or concerns were identified within the scope of this inspection.

- EHS Radiation Safety staff participated in the IDPH-BRH's on-site Mammography Quality Standards Act (MQSA) inspection and stereotactic breast biopsy inspections at the UIHC on November 23 - 24, 2015. No violations or concerns were identified within the scope of these inspections.
- EHS Radiation Safety staff participated in the IDPH-BRH's on-site Mammography Quality Standards Act (MQSA) inspection at the UIHC's Iowa River Landing (IRL) clinic on November 23, 2015. No violations or concerns were identified within the scope of this inspection.

Radiation Safety Committees

The University's Radiation Safety Committee (RSC) is comprised of five interrelated committees that function to provide radiation protection program oversight, review, policy development, and radioactive materials use authorization under the management of the Assistant Vice President for Research. The radiation safety program is delegated to the RSC and the Radiation Safety Officer (RSO) who have the authority to enforce and direct University personnel regarding radioactive material regulations, license conditions, and University radiation safety policies.

1. Radiation Protection Executive Committee

The Radiation Protection Executive Committee is responsible for providing oversight and review of the University's radiation protection program and establishing radiation safety use and enforcement policies. The Executive Committee is comprised of representatives of University administration and EHS, and the chair and vice-chairpersons of the Basic Science Radiation Protection Committee, the Medical Radiation Protection Committee, and the Hospital Radiation Safety Review Group.

Activities and Accomplishments for FY16:

- Meetings were held on December 7, 2015 and June 28, 2016.
- Reviewed and approved four quarterly UI/UIHC ALARA reports.
- Reviewed and approved RSO's evaluative summaries of each of 24 radiation safety audits, noting and initiating corrective action for a total of 11 items of non-compliance (3 items at the UIHC, 3 items at UIHC Outreach Clinics, and 5 security violations in UI research labs). All violations were corrected and follow-up checks noted no repeat occurrences.
- Reviewed the 2015 COMPLY radionuclide air emissions report noting that the UI/UIHC emissions (0.003 mrem/yr) were well within regulatory limits (10 mrem/yr).
- Reviewed and approved the Annual Radiation Safety Program Report for FY15.
- Reviewed the 2015 annual radioactive materials license inspection report and UIHC & IRL Mammography Inspection reports.

2. Hospital Radiation Safety Review Group (HRSRG)

The Hospital Radiation Safety Review Group is responsible for the review of the University Hospital's radiation protection program as well as the review and approval of medical authorized users and clinical uses of radioactive materials under the conditions of the University's radioactive materials license. The membership of the HRSRG is comprised of representatives of the UIHC's administration, nursing service, licensed physicians, and other individuals with specialized training and knowledge as

necessary, and a representative from EHS. The chair and vice-chairpersons serve as representatives to the Executive Committee.

Activities and Accomplishments for FY16:

- Four quarterly and three special meetings were held during FY16.
- Reviewed and approved 4 quarterly UIHC ALARA reports.
- Reviewed 4 quarterly reports on special procedure fluoroscopy patient skin doses. No skin damage was observed during follow-up medical exams of any of the 68 patients whose conservatively calculated skin dose exceeded the 300 rad adult threshold in the 7,482 fluoroscopic special procedures completed on adult patients at the UIHC. No skin doses exceeded the 100 rad pediatric threshold in the 311 fluoroscopic special procedures completed on pediatric patients at UIHC.
- Reviewed 4 quarterly radiation safety reports and annual audits on the UI Family Care Clinics in Southeast Iowa City, North Liberty, and River Crossing. Three items of non-compliance were identified and corrected.
- Reviewed and approved the credentials of3 new medical physicists in Radiation Oncology.
- Reviewed and approved the use of Yttrium-90 microspheres (TheraSphere®) in clinical practice as a Humanitarian Use Device under Humanitarian Device Exemption.
- Reviewed the 2015 IDPH annual radioactive materials license inspection report.
- Reviewed the 2015 IDPH annual mammography inspection reports for UIHC and IRL.
- Reviewed the 2015 COMPLY radionuclide air emissions report noting that the UI/UIHC emissions (0.003 mrem/yr) were well within regulatory limits (10 mrem/yr).

3. Medical Radiation Protection Committee (MRPC)

The MRPC is responsible for ascertaining that all experimental or research uses of radiation in or on human beings conform to currently accepted radiation protection practices, regulations, and license conditions. The membership of the MRPC is comprised of licensed physicians, individuals with specialized training and knowledge, as necessary, and a representative from EHS. The chair and vice-chairpersons serve as representatives to the Executive Committee.

Activities and Accomplishments for FY16:

The MRPC held 17meetings and approved 51 new research applications and 30 application amendments for radiation and/or radioactive materials use with humans.

4. Radioactive Drug Research Committee (RDRC)

The membership of the MRPC serves as the RDRC and is responsible for the review and approval of certain proposed uses of radioactive drugs for human research intended to obtain basic information regarding metabolism, human physiology, pathophysiology, or biochemistry, but not for diagnostic or therapeutic use or for clinical trials.

Activities and Accomplishments for FY16:

- The RDRC held 1 meeting during FY16.
- The Committee Chair submitted annual membership summary to the FDA on January 4, 2016.
- One new study protocol was submitted to the RDRC on May 18, 2016 and approved on June 27, 2016.

5. Basic Science Radiation Protection Committee (BSRPC)

The BSRPC is responsible for the review of applications for non-human use of radioactive materials to

ensure that they conform to currently accepted radiation protection practices, regulations and license conditions. The Committee is comprised of authorized radioactive material users from within the University's Basic and Health Sciences. A representative from EHS also provides guidance on radiation protection regulations and policies to the Committee. The chair and vice-chairpersons serve as representatives to the Executive Committee.

Activities and Accomplishments for 16:

- The BSRPC reviewed and approved 5 new UI applications for the non-medical use of RAM through its mail ballot process.
- The RSO reviewed and approved 61 non-medical use application amendments.
- Completed 69 non-medical use application renewals.

Radiation Safety Administrative Support Activities

The Radiation Safety Section provides administrative support for the management of both medical and basic science radioactive material use applications and the routine operational activities associated with use of radioactive materials on campus. Administrative support activities also include preparing meeting agendas and documenting minutes for the Radiation Safety Committees.

1. Medical Research Applications Activities and Accomplishments for FY16:

- Processed and approved 51 new applications and 30 application amendments.
- Maintained the application files for 137 principal investigators with 289 active medical research-use applications.
- The table below compares this fiscal year's medical use application activities with that of past years.

Activity	FY13	FY14	FY15	FY16
New Protocols	52	46	50	51
Amendments	19	21	29	30

2. Basic Science Applications

Activities and Accomplishments for FY16

- Processed 6 new applications, 4 cancellations, 4 inactivations, 58 application amendments, and completed 72 application renewals.
- Maintained and managed 82 active authorizations for the RAM use in the basic sciences.
- The following table compares this fiscal year's non-medical use application maintenance activities with that of past years.

Activity	FY14	FY15	FY16
Renewals	84	76	69
Amendments	71	66	61
Cancellations	5	6	9
Inactivation	11	4	6
Reactivations	2	0	1
New Authorizations	6	5	5
Active Authorizations	95	90	82
Total Inactive Authorizations	130	134	139

3. Other Support Activities

Activities and Accomplishments for FY16:

- Managed Radioactive Materials (RAM) Procurement Program.
- Maintained and reviewed medical & basic science applications for completeness.
- Provided administrative support for each of the five committees which make up the University's Radiation Safety Committee structure.

Operational Safety and Compliance Programs

University Audit Program

EHS audits the radiation safety program to assess its performance and provides its findings, evaluations, and actions to the Radiation Protection Executive Committee. The audit schedule for the periodic review of the radiation safety program is designed to provide limited quarterly reviews of the program elements that require the performance of daily, weekly, or monthly tasks, and annual review of the performance of less time critical elements. The current audit schedule is listed below:

1. Medical

- Nuclear Medicine – Quarterly limited scope review of daily, weekly and quarterly requirements 3 times per year plus 1 full annual review.
- PET Imaging Center - Quarterly limited scope review of daily, weekly and quarterly requirements 3 times per year plus 1 full annual review.
- Radiation Oncology - Quarterly limited scope review of daily, weekly and quarterly requirements 3 times per year plus 1 full annual review.
- Patient Fluoroscopy Dose Records – Reviewed quarterly by the Hospital Radiation Safety Review Group for each department performing special fluoroscopy guided procedures as specified by IDPH-BRH Regulations.
- X-Ray Administrative Audit for Mammography- Annually for film-screen, digital and stereotactic mammography operations.
- UIHC Family Care Clinics (Southeast Iowa City, North Liberty, and River Crossing) – Annually audit their x-ray programs.

2. Basic Science

- Radiation Research Gamma Irradiation Facility - Annually during use authorization application renewal.
- Non-medical research labs – Audited monthly, quarterly, or semi-annually according to radioactive materials use.
- After Hours Security Checks – Research labs are checked periodically for RAM security during other than normal business hours.

3. EHS Radiation Safety Programs

- Operational Radiation Safety Programs – Quarterly review of room surveys, bioassay, RAM receipt and delivery, instrument calibration, and sealed source programs.
- Radioactive Waste – Four quarterly limited scope audits which review all operations at least once per year.

Activities and Accomplishments for FY16:

- Thirty-one program audits were completed.

- Audits identified a total of 13 items (3 UIHC, 3 UIHC Outreach Clinics & 7 UI) of regulatory or University safety policy non-compliance.
  - The UIHC non-compliances included 1 ambient survey records deficiency in the PET Imaging Center, 1 annual training violation and 1 IORT QC procedural violation in Radiation Oncology. Each of the 3 items have been corrected.
  - The UIHC Outreach Clinic violations identified at the North Liberty Clinic included: failure to complete annual inspection of protective lead aprons in accordance with Joint Commission standards, and a newly hire x-ray tech who was not wearing her dosimeter and did not have a copy of her permit to practice available at the facility. Each of the 3 items have been corrected.
  - The 7 UI violations which occurred in posted basic science research labs include 6 first offense RAM security violations and 1 first offense violation for eating & drinking in a posted area. Follow-up checks have verified that each of the violations have been corrected.

4. Increased Controls Audits for RAM Quantities of Concern

- Audits of security and approved access to each of the areas affected by the increased controls order are conducted at least quarterly. No items of non-compliance were observed.

Bioassay Program

EHS monitors occupational dose commitment of radiation workers at the University with the greatest potential for internal radionuclide intake based on receipts and/or usage of radioactive material by the end users. Bioassays are also offered to monitor potential exposure to the embryo/fetus throughout gestation of female personnel declaring a pregnancy who work in areas where radioactive materials are actively used.

Activities and Accomplishments for FY16:

- Performed 111 bioassays for UI/UIHC personnel. No internal exposures exceeded 10% of our operational ALARA limit of 125 mrem effective dose equivalent. The table below provides a comparison of the total number of bioassays performed in previous years.

Bioassay Type	FY14	FY15	FY16
Thyroid	76	68	71
Urine	24	20	40
Total	**100**	**88**	**111**

Dosimetry Program

EHS manages and maintains the Dosimetry Program that provides external exposure monitoring for radiation workers and the embryo/fetus of declared pregnant radiation workers, as required by regulation.

Activities and Accomplishments for FY16

- Issued a total of 18,554 dosimeters to a monthly average of 901 individual participants.
- Only a total of 58 (6.4%) individuals participating in the dosimeter program received an annual occupational whole body radiation dose greater than the 100 mrem regulatory limit prescribed for members of the general public not working with radiation. Of the dosimeters issued, 5.1% were either returned late for processing or not returned. Comparisons to the

past two fiscal years are given below:

Activity	FY14	FY15	FY16
Dosimeters Issued (annual total)	17,682	17,347	18,554
Individual Participants (monthly average)	847	834	901
Lost/Late Dosimeters (annual average %)	5.4%	4.4%	5.1%
Percentage Issued to UI Personnel	7.6%	5.0%	5.0%
Percentage Issued to UIHC Personnel	92.4	95.0	95.0%

- The number of individual dosimeter program participants increased 8.0% from FY15, while the total number of dosimeters issued increased by 7.0%.
- The number of late/lost dosimeters increased from 4.4% to 5.1%. The recent increase of new dosimeter participants is responsible for much of the increase in late dosimeter returns. The Radiation Section will continue to focus effort on further reduction of late/lost dosimeters.
- Dosimeter prices were increased 3.8% for body badges and 7.3% for ring badges due to the vendor's price increase.

ALARA Program

Dosimetry and bioassay results are reviewed by EHS to ensure exposures are maintained **A**s **L**ow **A**s **R**easonably **A**chievable (ALARA). Personnel exposures in excess of established ALARA limits are investigated by EHS. Quarterly ALARA reports, compiled by EHS, are distributed to the Radiation Executive Committee and the Hospital Radiation Safety Review Group for their review.

Activities and Accomplishments for FY16:

1. External Radiation Exposures

A. UIHC Dosimeter Participants

- Twelve UIHC participants recorded exposures (1.4% of the total UIHC dosimeter participants) that exceeded the monthly ALARA Level I limits (4% of the annual regulatory limits). Of these, 6 were whole body deep dose exposures (4 of which were determined to be falsely elevated due to improper dosimeter use), 4 lens of the eye, and 8 extremity exposures.
- Two UIHC participants recorded exposures that exceeded ALARA Level II dose limits (8% of the annual regulatory limits). Of these, 1 was a whole body deep dose exposure, 1 shallow dose equivalent exposure, and 1 lens of eye exposures.
- An investigation determined that the Level II whole body deep dose exposure was falsely elevated due to improper dosimeter use.
- Each quarter EHS performs a review of the dosimetry wear practices and dose records of up to three user groups which is included in the quarterly ALARA Reports that are reviewed by the HRSRG and Executive Committee.

B. UI Dosimeter Participants

No UI participants exceeded the institutional ALARA limits.

C. ALARA Totals

- The following table reflects the UI and UIHC department demographics of exposures in excess of the University ALARA levels.

 # Reports Exceeding ALARA Level I Action Levels

Whole Body Deep Dose Equivalent	Diagnostic Radiology(improper use)	2
	Radiology Residents (improper use)	1
	Adult Cardiac Cath Lab (improper use)	1
	Surgery	1
	PET Imaging Center	1
Lens of Eye Dose Equivalent	Interventional Radiology	4
Extremities Dose Equivalent	PET Imaging Center	8
Total FY16 Level I ALARA Exposures (4 falsely elevated due to improper use)		**18**

 # Reports Exceeding ALARA Level II

Whole Body Deep Dose Equivalent	Adult Cardiac Cath Lab (improper use)	1
Shallow Dose Equivalent	PET Imaging Center	1
Lens of Eye Dose Equivalent	PET Imaging Center	1
Total FY16 Level II ALARA Exposures (1 falsely elevated due to improper use)		**3**

2. Internal Radiation Exposures

Thyroid Bioassays

- During FY16 EHS performed 71 thyroid bioassays. None of the thyroid bioassay results exceeded 10% of our 125 mrem committed effective dose equivalent ALARA limit.

Urine Bioassays

- During FY16, EHS performed 40 urine bioassays. None of the urine bioassay results exceeded 10% of our 125 mrem committed effective dose equivalent ALARA limit.

Airborne Radioactive Material Emissions

Regulations require the University to demonstrate that the atmospheric emissions from its licensed radioactive materials operations will not result in a total annual exposure in excess of 10 mrem to members of the general public. To demonstrate compliance with this requirement EHS uses the Environmental Protection Agency's (EPA) Clean Air Assessment Package – 1988 (CAP88). The CAP88 program is a dosimetrically conservative computer model that uses the University's total annual inventory of radioactive materials to calculate the potential airborne dose to the general public.

Activities and Accomplishments for FY16:

- Based on the University's total annual radioactive material inventory from January 1 through December 31st, 2015, the CAP88 Program calculated an effective dose equivalent (EDE) of 0.003 mrem to the nearest potentially exposed individual residing outside the University's facilities. This result demonstrated that airborne emissions from the University's radioactive material usage did not exceed 0.03% of the 10 mrem/year regulatory limit.

Emergency Response and Preparedness

EHS serves as a resource unit for the UI, UIHC (including the Emergency Trauma Center (ETC)) and the Johnson County HazMat Team for emergencies involving sources of ionizing radiation.

Activities and Accomplishments for FY16:

- Members of EHS' Spill Group engaged in an 8-hour training course and meeting to review the procedures.
- Members of the EHS' Radiation Safety staff provided radiation monitoring for the UHIC during their biennial drill with the Duane Arnold Energy Center (DAEC) to demonstrate to FEMA evaluators that the UIHC Emergency Room is capable of receiving, decontaminating, and treating a victim from the DAEC that has been contaminated with a radiologic substance. The FEMA evaluator rated the drill as exemplary.

Health Physics Monitoring Support

EHS provides radiation monitoring of facilities in areas where radioactive materials are used or stored: (1) to evaluate user control of exposure and contamination; (2) monitor compliance with regulations and license conditions; and (3) prior to facility maintenance or equipment disposal.

Activities and Accomplishments for FY16:

1. Room Survey Program

- Performed a total of 1,181 area and equipment monitoring surveys for academic labs and the UIHC. Surveys include routine laboratory audits, after hours security checks, facility decommissioning, posting/de-posting, pre-maintenance, spill response and post-iodination activities. A comparison of the last three fiscal years is provided below:

Activity	FY14	FY15	FY16
UI Surveys	452	572	496
UI After Hours Security Checks	528	709	679
UIHC Surveys	9	6	6
Total Surveys	**989**	**1,287**	**1,181**

2. Compliance Assessment Program

- Currently there are 170 UI labs posted for non-medical use of radioactive material, representing a decrease of 1 lab research lab from FY15. A total of 7 regulatory compliance violations were observed by EHS during 496 routine surveys and 679 afterhours security checks of non-medical use research labs conducted in FY16. The compliance violations occurred in 7 different labs under the use authorization of 6 out of the 82 active principal investigators (7.3%). The non-compliance violations consisted of 6 first time violations for radioactive materials security and 1 first time violation for eating & drinking in a posted area. Violation notices were sent to the principal investigators and each of the violations were corrected. No second or third violation/suspension notices were issued.

- A follow-up security check for each lab in which a security violation was identified has been performed and in each case, EHS is satisfied that the problem has been corrected.

3. Decommissioning Activities

- Extensive radiation monitoring and wipe tests are completed whenever a posted radioactive material use area is decommissioned to ensure all radioactive materials have been removed and no contamination remains before deposting and releasing the area for unrestricted use.
- EHS has initiated a new laboratory closeout procedure on our web site to assist the research community in decommissioning their laboratory prior to leaving the University or relocating to another lab. The procedure is designed to ensure that all laboratory rooms, chemical storage areas, or areas where hazardous equipment or materials are used or stored need to be cleared by EHS staff before being assigned to new occupants or scheduled for renovation activities.
- During FY16, six principal investigators used the laboratory closeout procedure to decommission their labs.

Sealed Source Leak Testing Program

The sealed source leak testing program includes wipe testing to ensure sealed source structural integrity; ambient radiation level surveys in areas where the sources are used and/or stored; and physical inventories to assure sealed source accountability and security.

Activities and Accomplishments for FY16:

- A summary of activity is given below.

Sealed Source Leak Tests	FY14	FY15	FY16
UI	112	111	104
UIHC	241	249	183
Totals	**353**	**360**	**287**

- Performed 132 ambient radiation level surveys and 415 physical inventories.
- A total of 15 new sources were added to the inventory (1UI & 14UIHC) during FY16, while 131sources were disposed of or returned to the original manufacturer (1 UI & 130 UIHC).
- All sources were accounted for and all leak tests were negative (< 0.005 uCi of removable radioactive material).

Instrument Calibration Program

Annual calibration is required for survey instruments used for quantitative radiation measurement. EHS continues to provide this service for the UI and UIHC.

Activities and Accomplishments for FY16:

- A total of 149 instruments were calibrated and 32 instruments were tagged out of service. A comparison of the last three fiscal years is given below.

UI Activity	FY14	FY15	FY16
Compliance Calibrations	103	99	98
Tagged Out of Service	13	10	11
UIHC Activity	**FY14**	**FY15**	**FY16**
Compliance Calibrations	61	61	51
Tagged Out of Service	1	1	21

Machine-Produced Ionizing Radiation Safety Program

EHS maintains the registration with IDPH of all sources of machine-produced ionizing radiation at the University. In addition, EHS also performs radiation monitoring and machine compliance testing of each of these x-ray producing units to ensure operational safety and compliance with regulatory requirements. There are currently 318 registered x-ray units in the UIHC/UI's inventory. The current inventory of x-ray units by type is shown below:

107 Diagnostic or Therapy Units 169
Dental Units
15 X-Ray Diffraction Units 6
Electron Microscopes
6 Bone Densitometer Units 12
Cabinet X-Ray Units
3 Veterinary Units
318 Total Units

Activities and Accomplishments for FY16:

- Conducted X-ray compliance inspection surveys of all medical and dental diagnostic X-ray units in service as well as 30 research related X-ray units and 6 bone densitometer units in the University's X-ray inventory. Details for the past three fiscal years are as follows:

X-Ray Unit Inspections	FY14	FY15	FY16
Dental	149	157	162
UI	17	18	21
UIHC	97	98	100
Iowa River Landing	4	6	8
Totals	**267**	**279**	**291**

- Identified 2 minor items of equipment non-compliance within the UIHC and 2 minor items with the units at the College of Dentistry. Radiology Engineering and Patterson X-ray promptly investigated and corrected all UIHC and College of Dentistry items of non-compliance respectively.
- Worked to successfully implement Joint Commission's Revised Requirements for Diagnostic Imaging Services related to CT physicist surveys and shielding evaluations. Performed compliance testing for all clinical and research CT units at UIHC.
- Provided mammography physicist services to the UIHC and IRL to include MQSA equipment compliance checks for each of the five tomographic mammography units and the stereotactic breast biopsy add-on. ACR re-accreditation surveys were performed for two units.

- The EHS mammography physicist performed quality control checks on all the physician review workstations in mammography, as well as on the Kodak Carestream monitors that are being integrated into PACS for use with mammographic images.
- The EHS mammography physicist participated in the IDPH-BRH's Mammography Quality Standards Act (MQSA) and Stereotactic Breast Biopsy inspections of the Department of Radiology's Breast Imaging Center and Iowa River Landing on November 23 - 24, 2015. No violations or concerns were identified with the UIHC's or IRL's mammography and stereotactic breast biopsy programs.
- Provided health physics monitoring support for Radiation Oncology during Intrabeam™ Intraoperative Radiation Therapy (IORT or electronic brachytherapy) x-ray unit patient treatments.

Radiation Shielding Design and Construction Analysis

EHS provides radiation shielding evaluations for new construction planning and existing facilities to assist in assuring that all facilities designed for radiation producing machines and radioactive material use and storage meet applicable standards and regulations.

Activities and Accomplishments for FY16:

- Provided construction shielding plans for the College of Dentistry, and UIHC's departments of Radiology, Orthopedics, Nuclear Cardiology, Pediatric Cardiology, Children's Hospital, and Iowa River Landing (IRL). The evaluations covered a wide range of equipment, including CT, cone- beam CT, mobile c-arm, as well as stationary radiographic and fluoroscopic equipment.
- Provided post construction shielding verification measurements for new x-ray rooms at UIHC's Department of Radiology, the new Pediatric Cath Lab, IRL's Nuclear Cardiology, and the Dental Science Building (DSB).
- Consulted and provided shielding evaluations for remodeling projects for the UIHC's Departments of Radiology, Pediatric Cardiac Cath Lab, Iowa River Landing, and the UI College of Dentistry.
- Provided radiation surveys for Radiation Oncology to verify adequacy of Vault B shielding following installation of their new Elekta Versa Linear Accelerator external beam therapy unit.
- Scanned older shielding evaluations and created an electronic archive of shielding specifications and testing results.
- Adopted the use of radioactive material, rather than portable x-ray machines for performing post-construction shielding verification, increasing efficiency for this function.

Radioactive Materials Procurement and Shipping Program

This program oversees the receipt, distribution and documentation for all radioactive materials delivered to the University. The shipment of radioactive material is controlled and regulated by the IDPH-BRH, the DOT and the International Air Transportation Agency (IATA). These regulations specify that documented training is required for any persons involved in the shipping of radioactive material. As such, EHS provides shipping services for UI and UIHC to minimize the burden on users of radioactive materials. Shipping services involve: completing required documentation; obtaining copies of recipient's radioactive materials licenses; preparing and packaging radioactive materials for shipment; providing training to individuals when required; and maintaining records.

Activities and Accomplishments for FY16:

- Radioactive Materials Receipt and Delivery: a total of 374 items of radioactive material were processed and delivered to UI or UIHC facilities. Receipt totals from previous fiscal years are provided below for comparison.

# Receipts	FY14	FY15	FY16
UI	229	249	263
UIHC	125	133	111
Total	**354**	**382**	**374**

- Radioactive material inventories were maintained within the University's license limits.
- Radioactive Materials Shipments: 14 packages were shipped for UI (0) and UIHC (14) personnel. RAM shipment totals from previous fiscal years are provided below for comparison.

# Shipments	FY14	FY15	FY16
UI	2	7	0
UIHC	15	20	14
Total	**17**	**27**	**14**

Radiation Safety Education Program

The EHS Radiation Safety Section provides a wide variety of radiation safety courses tailored to specific types of use and exposure. Required radiation safety training is provided both initially and annually to individuals listed on an active radioactive materials use authorization in the basic sciences and to health care workers who receive an annual radiation dose equivalent greater than 100 mrem. Completion of initial radiation safety training is also required as a prerequisite to receiving a radiation dosimeter. Health care workers providing care to brachytherapy and/or radiopharmaceutical therapy patients at the UIHC are trained annually as required by regulation. Radiation safety training for ancillary personnel is provided annually, or on an as needed basis. In addition, the EHS Radiation Section also provides laser safety training courses for both the UI researchers and UIHC medical users.

Activities and Accomplishments for FY16:

- A total of 1,858 radiation safety courses were completed during FY15, representing a 21.9% increase over FY15 totals. The numbers reflect courses taken by faculty, staff and students. A breakdown in course participation is given below:

Radiation Safety Course	Total Participants
Analytical X-Ray Equipment	20
Electron Capture Detector	17
Laser Safety - Research	116
Laser Safety - UIHC	28
Nuclear Medicine Staff	24
P.E.T. Imaging Staff	40
Radioactive Materials Shipping	2
Radiation Oncology Staff	91
Radiation Awareness for Labs	301
Radiation Safety, Basic	172

Radiation Safety, Refresher	311
Radiation Safety CRU Staff	5
Radiation Safety CS Staff	2
Radiation Safety for FM Staff	238
Radiation Safety 3JPP Staff	48
Radiation Safety 3RCP Staff	116
Radioactive Waste Management	19
SAIC Radiation Safety	1
Sealed Sources Radiation Safety	12
UIHC Radiation Awareness	3
UIHC Radiation Safety, Security	8
X-Ray Safety for Fluoroscopy Staff	76
X-Ray Safety for Fluoroscopy Practitioners	4
X-Ray Safety, General	75
X-Ray Safety, Limited	5
Y-90 Microspheres Radiation Safety	82
Radiation Awareness for UI Public Safety	42
Radiation Safety Training Total	**1,858**

UIHC Therapy Patient Monitoring Program

EHS provides health physics support and radiation safety monitoring service for UIHC departments administering therapeutic amounts of radioactive materials to patients. Support services include post-administration radiation surveys; staff and family/visitor education and training; after hours on-call; facility decontamination; and radioactive waste collection.

Activities and Accomplishments for FY16:

- Therapy patient activities and historical comparison are provided below:

Therapy Procedure	FY13	FY14	FY15	FY16
I-125 Eye Plaque Brachytherapy	43	34	42	40
I-125 Prostate Brachytherapy	6	3	1	2
Ir-192 Brachytherapy	0	1	2	0
I-131 Radiopharmaceutical Therapy	32	40	52	41
Y-90 Radiopharmaceutical Spheres	12	15	5	17
Lu-177 Radiopharmaceutical Therapy	1	16	3	0
Intraoperative Radiation Therapy (IORT)	28	31	15	17
Y-90 Radiopharmaceutical Therapy (DOTATOC)	NA	NA	3	16
TOTAL Therapy Procedures	**122**	**140**	**123**	**133**

- All therapies were delivered as prescribed. No reportable medical events occurred during FY16.

Laser Safety Program

EHS provides laser safety support to UI and UIHC laser users. The program includes training, consultation, unit registration, and safety audits. Currently there are 75 research lasers registered

with 26 investigators at the UI and 37 medical lasers registered to 9 departments at UIHC.

Activities and Accomplishments for FY16:

- The Assistant Radiation Safety Officer serves as University's & UIHC's Laser Safety Officer.
- The Assistant Radiation Safety Officer serves as a member of the UIHC Laser Safety Panel.
- Approved the purchase of new medical use lasers for the UIHC's Departments of Ophthalmology, Surgery, and Dermatology in conjunction with the UIHC's Laser Safety Panel.
- Approved purchase of new research lasers in Biochemistry and Biology.
- A new laser treatment room was evaluated in the Department of Ophthalmology. Due to its infrequent usage and secure location, access to this room will be controlled via administrative controls.
- Performed laser safety audits of 15 UI research groups utilizing 46 lasers and 9 UIHC departments utilizing 37 lasers. EHS met with two new research laser users to register equipment and provide guidance for establishing a safe laser use environment.
- Assisted the UIHC's Ambulatory Surgery Center in correcting area entry control deficiencies in one of their laser use rooms.
- Investigated and implemented corrective action for two reported laser incidents, one in the Ambulatory Surgery Center involving a stray laser beam, and the other in the Main Operating Room involving non-use of PPE.
- Provided equipment and area audits for new and trial use lasers.
- Working on implementation of a physician's laser usage competency program to require documented laser safety training and experience in use of each specific laser and procedure.

Radioactive Waste Management Program

The EHS manages the Radioactive Waste Management Program for the UI and UIHC. The program includes: (1) collection, transportation, processing, storage and disposal of radioactive waste materials; (2) the management of required program records; (3) facility and environmental monitoring of its operation; and (4) educational support services regarding hazardous materials waste handling.

Activities and Accomplishments for FY16:

EHS dedicated 0.68 FTE to the management of radioactive waste during FY16. This effort is broken down as follows:

UI	0.23 FTE
UIHC-Pathology	0.02 FTE
UIHC-Radiology	0.41 FTE
VAMC	0.02 FTE

A summary of the radioactive waste management program is provided below with data from the previous 2 fiscal years included for comparison.

Summary (UI & UIHC)	FY14	FY15	FY16
# Pick-Ups	177	195	205
# Items Radioactive Collected	616	768	849
# Pieces Lead Shield Collected	994	480	1,878
Activity Collected – Curies	0.271	0.349	0.666

Summary (UI & UIHC)	FY14	FY15	FY16
# Containers Shipped Off-Site	22	35	47
# Liquid Barrels Discharged	7	4	1
Activity Discharged to Sewer (Curies)	0.102	0.005	0.004
# Shipping Containers Generated*	**FY14**	**FY15**	**FY16**
Animal Carcass	0	1	4
Dry Waste	19	28	38
Liquid Waste, Aqueous	5	4	5
Liquid Waste, Mixed	0	1	2
LSC Vials (Hazardous)	1	1	1
LSC Vials (Non-hazardous)	22	23	28
Other	0	2	1
Sharps	1	1	2
Total Containers	**48**	**61**	**81**

* Shipping containers may be 55-gallon drums, 30-gallon drums, pails, or yard boxes.

Any reductions in numbers are attributable to several factors, including:

- Intensive in-house processing of various waste streams;
- A reduction in the use of long-lived radioactive materials;
- Users ordering less activity for the same experimental protocols due to vendor improvements in radionuclide purity and methodologies;
- EHS involvement with researchers during audits, training and renewals which encourage ordering only the amount of activity needed and correct identification of radioactive waste;
- A shift towards research using biochemical alternatives rather than radioactive materials.

EHS processes some radioactive waste via in-house methods to reduce disposal costs charged back to the University due to disposal at a low-level radioactive waste burial site. A summary of the number of containers processed by in-house methods and the number of drums eliminated from radioactive burial is shown below. Cost saving resulting from in-house processing and/or material segregation of radioactive materials is listed below:

# Processed	FY14	FY15	FY16
Patient Linens Decay-In-Storage (containers)	0	0	13
Sharps Decay-In-Storage (containers)	47	0	35
Dry Waste Decay-In-Storage (drums)	5	0	16
Dry Waste Incineration (containers)	70	78	91
TOTAL	**82**	**78**	**155**

# of Drums Eliminated from Radioactive Waste Burial	FY14	FY15	FY16
Dry Waste Decay-In-Storage	5	0	16
Sharps	3	0	2
Dry Waste Incineration	5	5.5	6
Total	**13**	**5.5**	**24**

Waste Processing Cost Savings	FY14	FY15	FY16
Dry Waste Decay-In-Storage	$8200	$ 0	$26,200
Sharps Decay-In-Storage	$ 17,500	$0	$12,000

Radiation Safety Program Goals for FY17

- Continue work with the DOE's National Nuclear Security Administration (NNSA) Office of Radiological Security-Radiological Security Partnership (ORS RSP) to enhance the security of the University's Category I & II radioactive material.
- Continue the transfer of paper radiation safety records and files to an electronic, searchable format.
- Continue to work with the UIHC Hospital Advisory Committee towards the implementation of fluoroscopy user credentialing program.
- Ensure that all the revised Joint Commission Requirements for Diagnostic Imaging Services are being met.
- Continue to work with the UIHC's Interventional Radiology staff to help reduce lens of eye dose.
- Continue to work with the UIHC's Departments of Anesthesia and Surgery to ensure proper dosimetry wear and radiation safety practices.
- Complete integration of laser safety audits into EHS Assistant.
- Complete implementation of laser safety competency program for UIHC physicians.
- Develop means to credit physicians for completing radiation safety and laser safety training at either VAMC or UIHC so they don't have to duplicate this training at both locations.
- Provide radiation safety support to forthcoming research projects involving substantial radioactive materials in-patient time.

Administrative Services Section

The Administrative Services Section provides information management and administrative support for all EHS program areas.

General Administrative Activities

Scope: The purpose of the General Administrative Activities Program is to provide budgetary, human resource, and administrative support to all EHS programs and staff. These activities are performed by the Unit HR Unit Rep, Administrative Services Coordinator and Clerk IV with oversight provided by the OVPR&ED Compliance Unit Business Manager.

Activities for FY16:

- Biosafety Cabinet Program Support
- Financial Accounting
- Administrative Support
- Human Resources:
  - Participated in the recruitment and onboarding of seven positions. (Three new employees and four transfers)
  - Assisted other Research Compliance units with monthly leave reconciliation.
  - Served as Wellness Ambassador for EHS.
- Special Projects:
  - Event Planning
  - Building Maintenance
  - Collecting statistical data
- Lab News Production and Distribution through Campaign Monitor
- Staff Training Records Program
- Website Maintenance and ICON Training administration

Training and Education Program

Scope: EHS' training and education program addresses the University community's need for regulatory compliance and professional development in the areas of hazardous materials, emergency preparedness, health and safety and use of personal protective equipment, enabling staff to perform their respective jobs safely. See the tables below for statistical information. These data reflect staff usage of courses only and do not include students.

Type	FY16	FY15	FY14	FY13	FY12	FY11	FY10	FY09	FY08
ClarityNet	--	--	2445	3019	3609	3963	3141	4979	4518
Classroom	91								
VA	118	152	4	26	125	244	118		
ICON	26333	16178	14951	12965	9988	9337	10519	9714	7599
Total	**26542**	**16330**	**17400**	**16010**	**13722**	**13544**	**13778**	**14693**	**12117**

The table on the following page summarizes the training statistics courses taken. Note: **Total = ICON & Classroom

FY16 classroom and e-learning course completion totals

W005BO	Advanced Biological Safety	503
W516OS	Aerial Lifts	54
W025RD	Analytical X-Ray Equipment	20
W522CM	Antineoplastic Agents Safety	23
W508OS	Asbestos Awareness	683
W004BO	Basic Biological Safety	888
W518BO	BBP for FM, Housing and Dining	718
W524HZ	Bio-hazardous Waste Management	1174
W520BO	Biological Safety Cabinets	64
W132BO	Bloodborne Pathogen Refresher	1196
W130BO	Bloodborne Pathogens CPH	60
W003BO	Bloodborne Pathogens Lab	637
W131BO	Bloodborne Pathogens Non-Lab	510
W034RD	Bone Densitometer	0
W485CM	Chemical Fume Hoods	1163
W126CM	Chemical Storage Safety	127
W018CM	Compressed Gas Safety	418
W497OS	Confine Space Reclas Alt Entry	267
W498OS	Confined Space Prohibited	267
W506HZ	Contingency Plan Training	0
W501CM	Controlled Substances Research	17
W527BO	Dual Use Research of Concern	24
W517OS	Electrical Safety	330
W024RD	Electron Capture Detector	17
W455OS	Ergonomics Back Safety	477
W006OS	Ergonomics Computer Use	229
W188OS	Fall Protection	304
W160OS	Fire Extinguishers	365
W057OS	Forklifts	67
W470CM	Formaldehyde Safety	572
W514OS	Hand Safety	99
W07HAZ	Hazardous Waste for Labs	1108
W32HAZ	Hazardous Waste for Non-Labs	35
W115OS	HazCom with GHS	3564
W190OS	Hearing Conservation	265
W526OS	Incident Investigation Training	163
W515OS	Indoor Cranes	45
W507HZ	Introduction to RCRA Training	2
W008CM	Lab Chemical Safety	1241
W040OS	Ladders	808
W028RD	Laser Safety Research	116
W036RD	Laser Safety UIHC	28
W020OS	Lead Safety Awareness	240
W064OS	Lockout Tagout Safety	342
W051OS	Machine Guarding	205
W491CM	Nanomaterials Research Safety	29
		19464

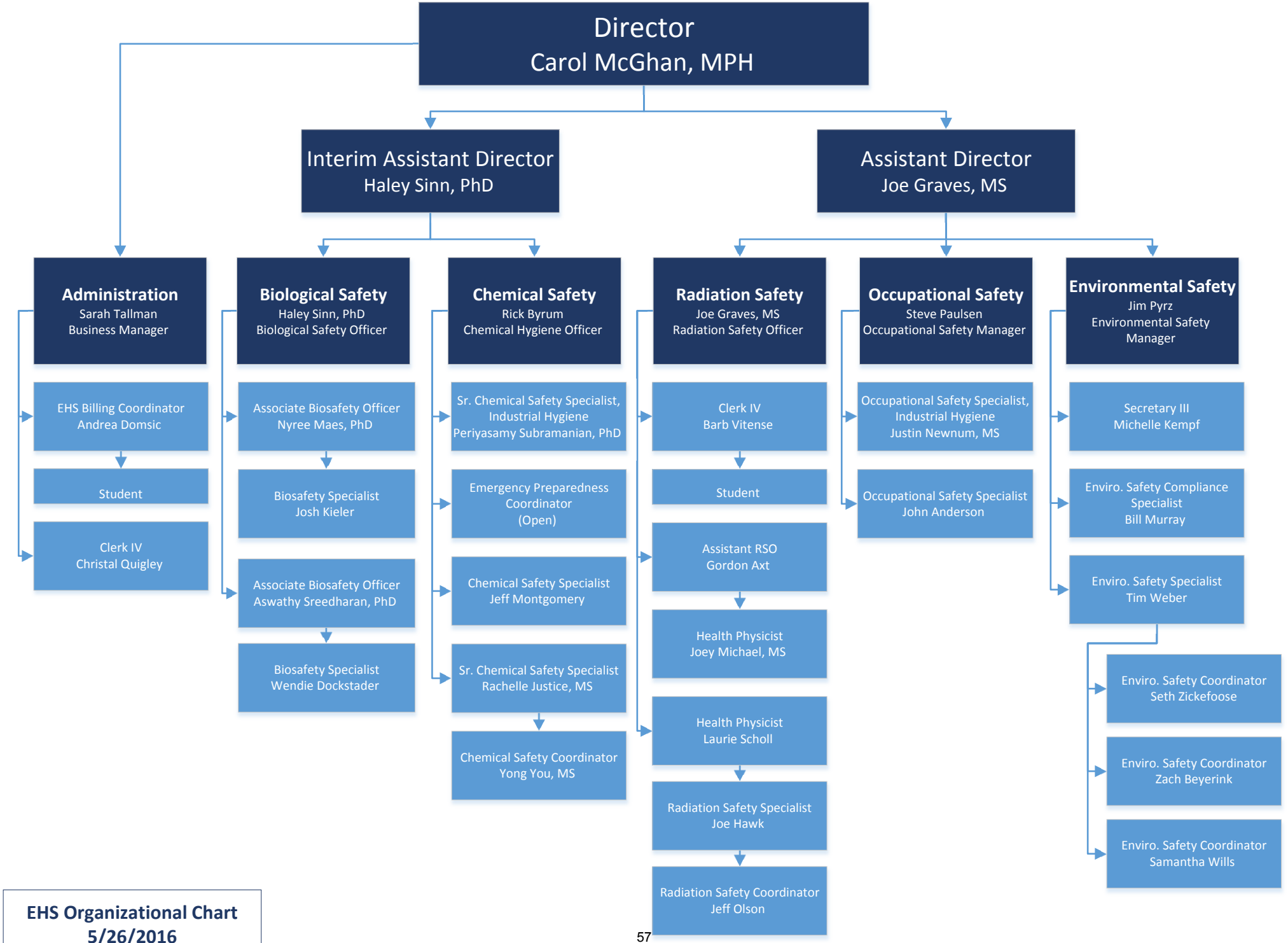
W038RD	Nuclear Medicine Staff	24
W143OS	Office Safety	101
W022RD	P.E.T. Imaging Staff	40
W451OS	Pandemic Influenza Dust Mask	1
W157CM	PPE Awareness for Labs	973
W156OS	PPE Awareness for Non-Labs	848
W012RD	Rad Safety 3JPP Staff	48
W046RD	Rad Safety CRU Staff	5
W444RD	Rad Safety for 3RCP Staff	116
W014RD	Rad Safety for FM Staff	238
W533RD	Rad Safety for Public Safety	40
W528RD	Radiation Awareness for Labs	301
W013RD	Radiation Oncology Staff	91
W002RD	Radiation Safety Basic	172
W125RD	Radiation Safety CS Staff	2
W001RD	Radiation Safety Refresher	311
W035RD	Radioactive Materials Shipping	2
W086RD	Radioactive Waste Management	19
W137BO	RDNA Research NIH Guidelines	385
W141OS	Respirator Dust Mask	74
W139OS	Respirator PAPR Hood or Helmet	31
W140OS	Respirator PAPR Tight Fit Face	93
W138OS	Respirator Tight Fit Face piece	127
W050OS	Respirator Voluntary Use	1027
W519OS	Safety Leadership	93
W434RD	SAIC Radiation Safety	1
W023RD	Sealed Sources Radiation Safety	12
W009BO	Shipping Infectious Substances	218
W052BO	Shipping with Dry Ice	223
W67HAZ	SPCC: Oil Spill Prevention	12
W142CM	Spill Preparedness Response	89
W481BO	Stem Cell Research	19
W525HZ	SWPP Plan (Storm Water Pollution Prevention Plan)	0
W154OS	Tool Safety	110
W006BO	Toxins Select Agent Quantity	30
W198RD	UIHC Radiation Awareness	3
W016RD	UIHC Radiation Safety, Security	8
W500HZ	Universal Waste Management	352
W192OS	Walking and Working Surfaces	360
W193OS	Welding and Cutting	119
W543RD	X-Ray Safety, Anesthesia Staff	0
W523RD	X-Ray Safety Fluoroscopy Practitioners	4
W495RD	X-Ray Safety for Fluoroscopy Staff	76
W011RD	X-Ray Safety General	75
W111RD	X-Ray Safety Limited	5
W496RD	Y-90 Microspheres Radiation Safety	82
		6936

Grand total 26400

EHS Committee Activities

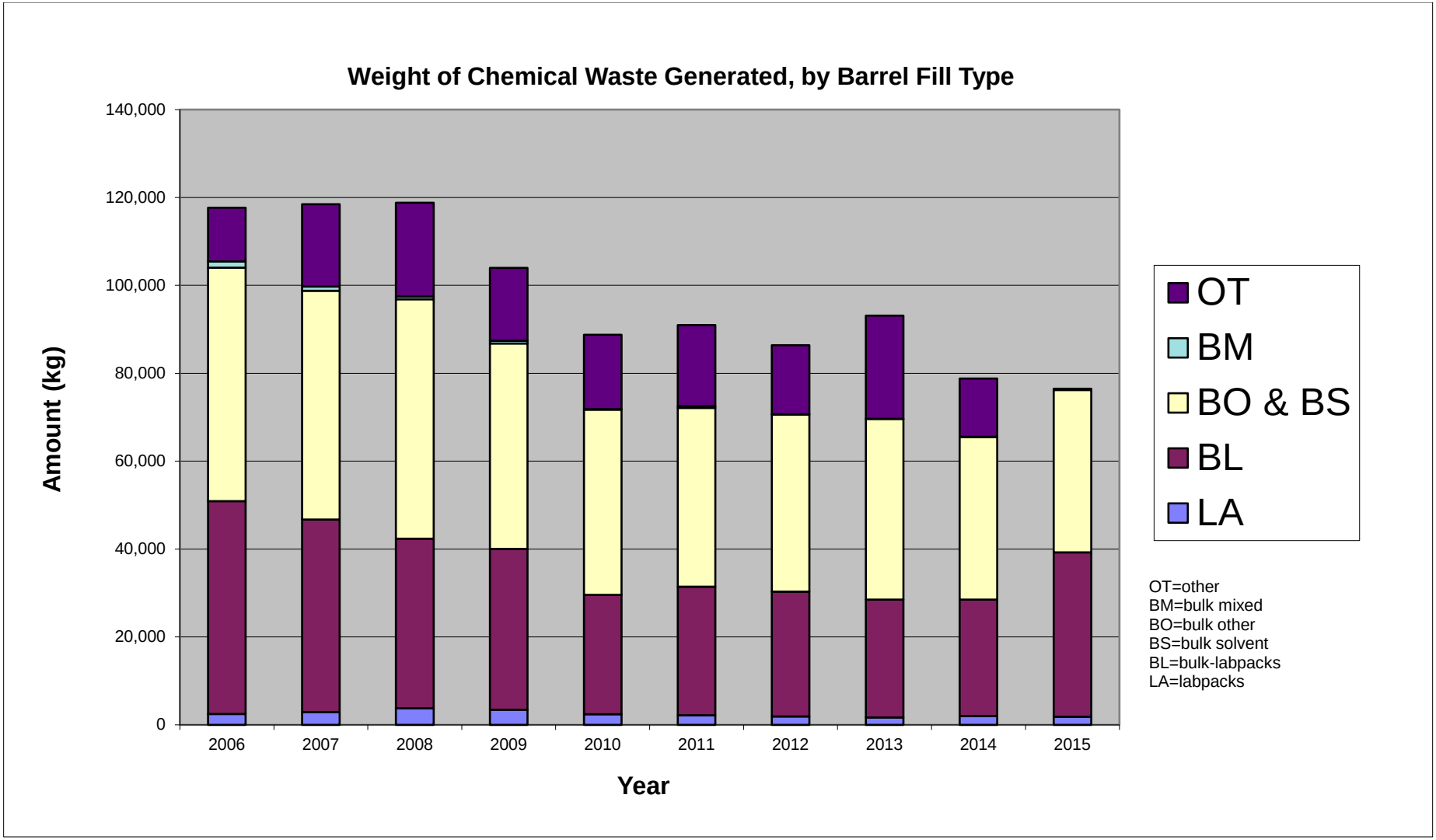
EHS staff members are involved in the following campus committees, subcommittees, and workgroups:

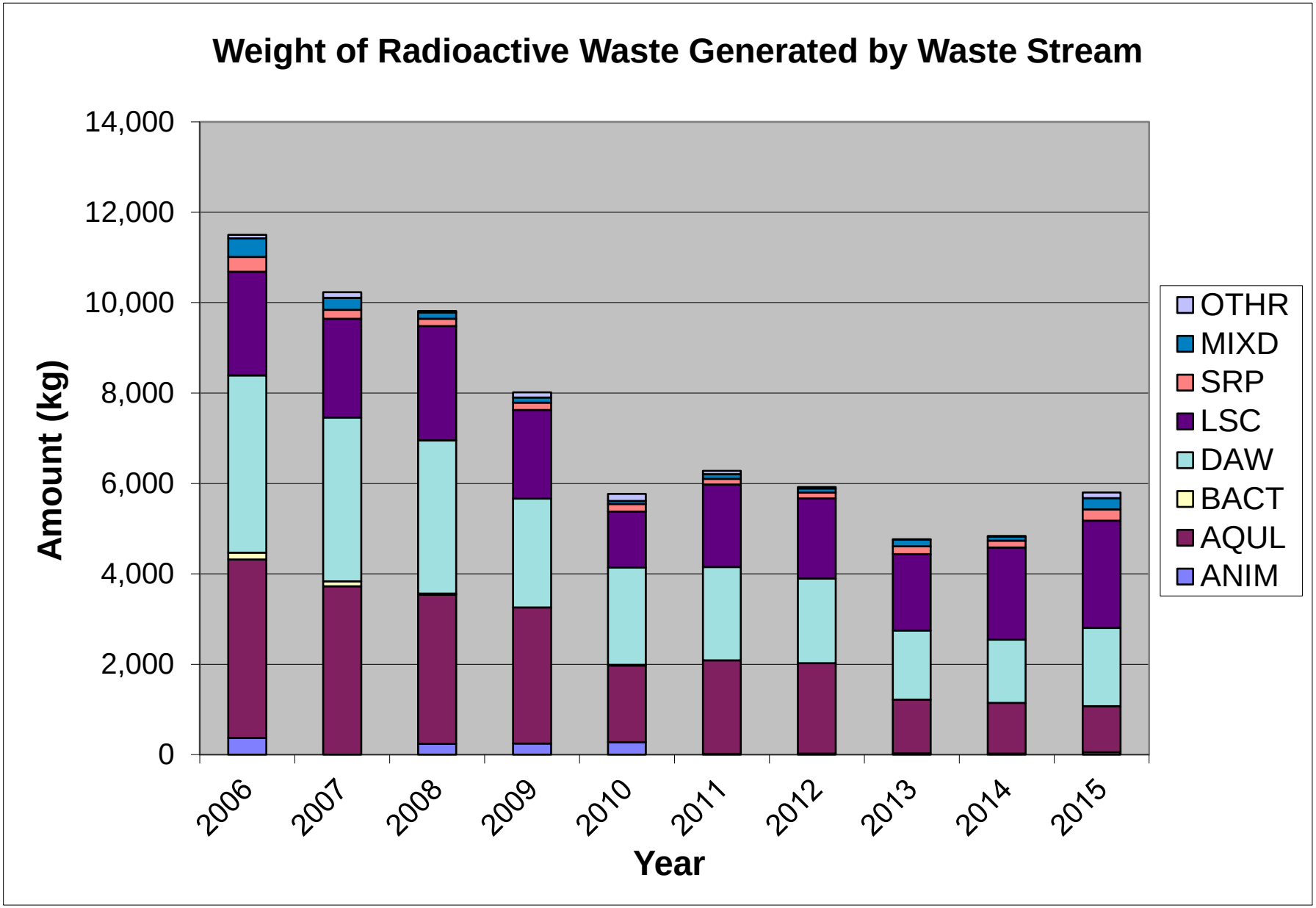
Institutional Animal Care and Use Committee
Basic Science Radiation Protection Committee
College of Dentistry Nitrous Oxide Oversight Committee
Emergency Preparedness Planning Committee
Employee Health and Safety Work Group
Facilities Design Center Committee
Fire Safety Advisory Group
Flood Emergency Response Team
FM Safety Steering Committee
Hospital Radiation Safety Review Group
Institutional Biosafety Committee
Integrated Health Management Advisory Group
Medical Radiation Protection Committee
Minors on Campus Committee
Pharmaceutical Safety Committee
Radiation Protection Executive Committee
Radioactive Drug Research Committee
UI Medical Surveillance Workgroup
UI Pre-Disaster Mitigation Plan Steering Committee
UIHC Environment of Care Committee
UIHC Hazardous Materials Workgroup
UIHC Indoor Air Quality Workgroup
UIHC Laser Safety Panel
UIHC Safety Education Workgroup
UIHC Staff Safety & Health Council
Workplace Occupational Safety and Health Working Group



EHS Organizational Chart
5/26/2016

ATTACHMENTS


Weight of Chemical Waste Generated, by Barrel Fill Type
Amount (kg)
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year
OT
BM
BO & BS
BL
LA
OT=other
BM=bulk mixed
BO=bulk other
BS=bulk solvent
BL=bulk-labpacks
LA=labpacks


Weight of Radioactive Waste Generated by Waste Stream
Amount (kg)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Year
OTHR
MIXD
SRP
LSC
DAW
BACT
AQUL
ANIM

University of Iowa Environmental Health & Safety Historical Waste Collection Statistics Summary

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Chemical Waste										
Stops	2,786	2,819	3,026	3,277	3,454	3,511	3,633	3,464	3,735	3,593
Containers	18,853	21,054	21,198	22,077	25,519	25,275	29,211	22,108	26,047	26,872
Weight (kg)	77,162	66,444	86,113	103,611	121,134	119,960	127,095	118,038	119,888	130,177
Radiation Waste										
Stops	1,581	1,358	1,177	1,117	942	934	798	659	644	556
Containers (excludes lead)*	4,738	4,153	3,703	3,373	2,745	2,786	2,523	2,092	1,904	1,812
Lead shielding (pieces)	3,651	4,283	2,843	3,333	2,629	3,198	3,270	2,356	2,818	3,532
Total containers	8,389	8,436	6,546	6,706	5,374	5,984	5,793	4,448	4,722	5,344
Weight (kg) (excludes lead)	28,787	26,526	22,102	21,648	20,802	19,811	17,163	17,560	15,830	14,194

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Chemical Waste										
Stops	3,324	3,702	3,517	3,783	3,903	4,039	3,824	3,951	3,807	3,408
Containers	24,216	27,543	28,950	26,847	21,739	27,166	22,514	24,865	29,103	26,524
Weight (kg)	117,494	118,446	118,192	103,980	88,744	90,974	88,479	93,122	80,210	76,562
Radiation Waste										
Stops	451	412	365	336	292	249	238	189	205	196
Containers (excludes lead)*	1,468	1,366	1,225	1,129	925	865	776	664	731	822
Lead shielding (pieces)	2,386	2,097	2,444	2,192	2,061	2,532	1,773	984	901	1,549
Total containers	3,854	3,463	3,669	3,321	2,986	3,397	2,549	1,684	1,631	2,371
Weight (kg) (excludes lead)	11,502	10,178	9,886	8,017	5,766	6,174	5,918	4,764	4,836	5,581
Biohazardous Waste"										
Total Containers			28,846	27,873	27,671	26,417	26,001	26,142	25,171	25,205
Total Weight (lb)			1,018,432	930,921	842,858	783,722	804,263	780,305	744,022	745,885

*Collection and accounting method changed in 1995. Lead shields are accounted for separately.
"EHS assumed responsibility for the biohazardous waste program in mid-year 2007

Radioactive Waste Generation Statistics

Waste Type	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Animal	325	322	210	183	161	210	153	87	68	45	3	11	1	9	2
Ash				43	78	4	3	7	5	5	5	2	0	2	0
Bactec Vials															
Dry (Box) - 0.1 Yard Box										115	105	131	90	123	129
Dry (Box) - Yard Box															
Dry (Drum)-Long	160	192	184	121	78	66	49	38	30	18	11	12	7	9	7
Dry (Drum)-Short	35	5	6	90	148	153	139	122	105	97	88	87	61	63	48
Dry (Drum)-Total	195	197	190	211	226	219	188	160	135	115	99	99	68	72	55
Liquids-Aqueous		133	163	191	188	81[a]	48	53	45	36	42	34	29	37	28
Liquids-Mixed		26	11	9	17	14	18	20	17	12	15	10	9	10	8
Liquids-Total		158	174	200	205	95	66	73	62	48	57	44	38	47	36
LSC (Vials)				117	114	122	107	92	74	58	51	37	28	20	18
Sharps-Long				26	25	18	10	3	3	2	1	3	2	2	3
Sharps-Short				0	0	8	0	5	3	3	2	2	1	6	1
Sharps-Total				26	25	26	10	8	6	5	3	5	3	8	4
Sealed Source							1	0	2	3	3	2	1	1	2
Total				778	808	676	528	428	353	394	326	331	229	282	246
Waste Containers (excludes lead)								5,265	4,738	4,153	3,703	3,373	2,745	2,186	2,523
Lead shielding (pieces)							61	2,120	3,651	4,283	2,843	3,333	2,629	3,198	3,270
Incoming Packages					4,238	3,776	3,932	3,693	3,329	3,417	3,424	3,284	3,008	2,308	2,137

Waste Type	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Animal	4	0	17	7	0	5	7	5	5	12	0	1	0
Bactec Vials				2	1	0	1	0	1	0	0	0	1
Dry (Box) - 0.1 Yard Box	103										0	0	0
Dry (Box) - Yard Box	2	15	8	7	5	6	5	4	5	4	5	5	5
Dry (Drum)-Long	3	3	5	3	5	5	4	3	3	3	2	1	1
Dry (Drum)-Short	45	42	36	29	30	20	20	13	13	10	6	20	25
Dry (Drum)-Total	48	45	41	32	35	25	24	16	16	13	8	21	26
Liquids-Aqueous	26	35	25	21	18	17	16	11	8	6	5	5	4
Liquids-Mixed	5	6	6	4	1	1	0	1	0	1	1	0	1
Liquids-Total	31	41	31	25	19	18	16	12	8	7	6	5	5
LSC Vials (Mixed)	15	13	13	14	13	8	8	3	9	0	0	1	1
LSC Vials (Nonhaz)							19	15	19	19	18	21	33
Sharps-Long	1	2	3	3	2	1	1	1	0	0	1	1	2
Sharps-Short	2	1	1	0[b]	0	0	0	0	0	0	0	0	0
Sharps-Total	3	3	4	3	2	1	1	1	0	0	1	1	2
Sealed Source	1	1	2	1	1	0	1	0	0	0	0	0	1
Total	207	11	116	91	76	63	82	57	63	55	38	55	74
Waste Containers	2,092	1,904	1,812	1,468	1,366	1,255	1,129	925	865	776	664	731	822
(excludes lead)													
Lead shielding (pieces)	2,356	2,818	3,532	2,386	2,097	2,444	2,192	2,061	2,532	1,773	984	901	1,549
Incoming Packages	1,843	1,442	1,207	1,254	1,147	1,001	817	766	385	501	264	390	366

a = Converted from 30 gallon to 55 gallon drums in 1993.

b = short-lived sharps are now being held for decay, and subsequently shipped to Stericycle

Annual Statistical Summary of Radiation Safety Program

	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Investigators														
Non-Human Use	175	162	167	147	134	139	138	125	114	102	104	95	90	82
Human	95	101	120	111	116	119	125	122	90	96	110	118	114	137
Applications														
Non-Human Use	175	162	167	147	134	139	138	131	114	102	104	95	90	82
Human Use	164	181	197	205	207	202	222	228	101	122	139	55	239	289
# of PIs Ordering Packages	136	120	130	127	104	100	90	82	79	70	54	57	48	42
Package Delivery (*item count)														
UI	1822*	1458*	1226*	1172*	1025	953	750	719	580	456	311	229	249	263
UIHC	210	173	157	173	139	136	161	143	65	114	136	125	133	111
Total	2032	1631	1383	1345	1164	1089	911	862	645	570	447	354	382	374
Routine Surveys	1762	1415	1241	1296	1587	902	1277	1108	739	617	1093	989	1,287	1,181
UI	1645	1252	1184	902	784	695	690	602	522	545	481	452	572	496
UIHC	62	55	47	51	44	38	40	42	36	10	8	9	6	6
Non-routine Security Checks	55	108	10	343	759	169	547	464	181	62	604	528	709	679
Total Radiation Labs	338	326	299	285	264	264	236	198	177	183	204	171	171	170
Badges														
Per Year	26463	24,273	23640	22,621	18,430	18,420	18,117	17,075	16873	17,678	17,853	17,682	17,347	18,554
Per Month (UIHC)	2122 (1131)	2023 (1246)	1970 (1284)	1885 (1287)	1536 (1280)	1535 (1284)	1510 (1298)	1423 (1249)	1406 (1264)	1,473 (1,347)	1,488 (1,379)	1,474 (1,362)	1,445 (1,373)	1,546 (1,469)
Badge Participants														
Per Year	15120	13824	13752	12588	10320	10044	9840	9564	9864	10,152	10,212	10,164	10,008	10,812
Per Month (monthly average)	1260	1152	1146	1131	860	837	820	797	822	846	851	847	834	901
Staff Trained													1,524	1,858
UIHC	1255	1302	841	983	964		160	414	404	378	464	442	NA	NA
UI	1243	1161	1101	1318	1319		506	712	790	811	641	722	NA	NA
VAMC	63	53	46	29	12		253	180	244	125	130	80	NA	NA
Instrument Calibrations	279	255	248	222	189	188	180	176	187	177	164	164	160	149
UI	209	171	165	147	133	129	125	124	128	118	106	103	99	98
UIHC	49	55	55	57	56	59	55	52	59	59	58	61	61	51
Repairs	8	4	2	0	0	0	1	0	0	0	0	0	0	0
ALARA Evaluations														
Operational Level	121	138	130	119	138	132	---*	---*	---*	deleted	NA	NA	NA*	NA*
Level 1	15	21	26	17	22	11	18	14	14	19	12	19[#]	10[#]	18[x]
Level 2	4	9	21	4	3	7	5	7	9	6	2	4[##]	1[#3]	3[##]

ALARA Levels changed beginning FY09 – Operational levels discontinued. --- Information no longer available.

[#]2 Were falsely elevated due to improper use [##]1Was falsely elevated due to improper use

[x]4 Were falsely elevated due to improper use

	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Sealed Source Leak Tests Total	247	236	238	235	248	317	382	601	413	369	377	353	360	287
UI	107	103	111	122	118	129	116	158	126	101	108	112	111	104
UIHC	140	133	127	113	130	188	266	443	287	268	269	241	249	183
VAMC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
X-ray unit compliance tests Total	183	183	183	181	187	183	181	198	193	193	218	267	279	291
UI	82	84	86	80	82	80	80	100	105	106	122	166	175	205
UIHC	101	99	97	101	105	103	101	98	88	87	92	97	98	113
IRL	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	4	4	6	6
Laser Safety Audits														
UI/UIHC		35/56	27/28	32/30	45/32	38/28	43/24	35/21	35/22	26/22	20/23	17/24	52/36	46/37
Bioassays Total	277	239	248	174	186	170	159	92	151	176	132	100	88	111
Urine/Thyroid	73/198	44/195	65/183	26/154	28/158	21/149	11/148	15/77	18/133	22/154	23/109	24/76	20/68	40/71
UIHC Activities														
Total Patient Surveys	152	153	145	125	138	136	142	122	114	103	122	140	123	133
Cesium –137	36	39	23	3	0	0	0	0	0	0	0	0	0	0
Cs-137/Ir-192	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Iodine-125 (total)	54	51	42	51	73	51	57	52	47	33	49	37	43	42
Iodine-125 (prostrate)							28	22	15	10	6	3	1	2
Iodine-125 (eye plaque)							29	30	32	23	43	34	42	40
Iodine-131	49	50	59	57	60	70	73	55	54	44	32	40	52	41
Iridium-192	5	0	0	0	3	2	0	0	1	0	0	1	2	0
Gold-198	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phosphorous-32	2	0	0	0	0	0	1	0	0	0	0	0	0	0
Palladium-103	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sm-153	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Strontium-89	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Tc99m	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Y-90		13	18	14	1	13	11	15	12	12	12	15	8	33
Re-188		NA	1	0	0	0	0	0	0	0	0	0	0	0
Lu-177	Not Previously Available									3	1	16	3	0
Intraoperative Radiation Therapy (IORT)	Not Previously Available									11	28	31	15	17

	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Biological Safety Program Summary									
Biosafety Cabinet (BSC) Certifications				442	506	561	594	598	467
Horizontal Flow Cabinets Tested				20	22	17	21	19	16
BSC Decontaminations				55	62	50	47	97	49
BSL3 Room Decontaminations				2	1	0	0	0	0
Bio exposure/needle stick injury evaluations	4	8	22	27	12	11	4	10	4
New rDNA/IBC Non-exempt Protocols	186	206	179	158	170	177	164	170	114
rDNA/IBC Non-exempt Protocols Reviewed	216	236	199	241	297	304	351	na	na
rDNA Annual protocols reviewed (years 1&2)	364	323	321	311	292	279	295	272	353
rDNA/IBC Exempt Protocols Reviewed	170	196	150	109	86	77	27	na	na
Reports to NIH/CDC – potential exposures	2	2	2	3	3	19	5	1	0
USDA permit application inspections				2	2	2	1	0	0
BSL3 Protocols reviewed	16	15	14	12	14	16	16	11	8
hPluripotent Stem Cell protocols				1	2	1	1	4	2
Occupational Safety & Health Program Summary									
Departmental OS Reviews Conducted	45	45	45	72	89	63	60	87	99
Departmental Reviews – Student Use of Machines (Machine Shops) **					17	7	7	10	10
Departmental Reviews – Required Respirator Programs				13	13	13	13	14	13
Departmental Reviews – Confined Space		3		7	0	10	18	18	0
Incident Reports Reviewed	1785	1821	1534	1426	1499	1,571	1,576	1545	1523
Formal Incident Investigations	6	5	11	134	82	85	58	66	96
Indoor Environmental Quality (IEQ)	18	25	17	17	25	21	13	7	5
IEQ samples collected			20	20	42	84	58	17	142

	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16
Fit tests completed			52	41	47	51	47	48	35
Quantitative			38	33	32	34	34	37	32
Qualitative			14	8	15	17	13	11	3
Asbestos Programs reviewed			3	6	6	6	7	7	5
IH evaluations performed			18	56	61	67	31	3	24
Samples collected/interpreted			61	61	79	214	189	22	165
Noise Monitoring Exposure/level	17	14	20	53	66	17	5	34	34
Chemical Safety Program Summary									
Hazard Assessments Conducted	40	29	29	40	46	52	100	101	126
Personal and Area Chemical Monitoring (samples/measurements taken)	5	21	16	22	7	21	9	7	12
Chemical Inventory System (# of PIs/users)	400			590/1030	530/1400	554/1363	547/1331	549/1607	568/1605
No. of inventory items				83,000	103,000	111,700	165,958	163,782	112,726
Fume Hood Evaluations	773	764	664	892	863	876	870	881	905
# of hoods referred to FM	112	65	45	163	126	138	72	189	214
Bio/Chemical Lab Reviews Conducted	388	384	364	379	358	394	390	363	366
Spill Response Consultations			11	18	11	18	14	17	12
# PIs sponsored by USAMRMC/DOD	16	17	17	17	18	15	16	11	14
Respirator Program lab use reviews	124			100	75/140	32/164	21/175	13/194	32/187
***New program - 2011; ** new program - 2012**									