# Table of Contents

1.0 **Major Accomplishments** ................................................................. 1  
2.0 **Mission Statement** ........................................................................ 7  
3.0 **Vision Statement** ........................................................................ 7  
4.0 **Core Values** ................................................................................ 7  
5.0 **Campus Program Elements and Objectives** .................................. 8  
6.0 **Injury and Illness Prevention** ........................................................ 9  
   6.1. Industrial Hygiene ........................................................................... 9  
   6.2. Injury Prevention ........................................................................... 10  
   6.3. Indoor Environmental Quality ....................................................... 11  
   6.4. General Safety ............................................................................. 12  
   6.5. Safety Training and Education ....................................................... 13  
   6.6. Ergonomics Programs ................................................................... 14  
   6.7. Safety Technical Services ............................................................. 16  
   6.8. Occupational Health Medicine ...................................................... 17  
   6.9. Emergency Procedures ................................................................. 18  
      6.9.1. Emergency Procedures Program ........................................... 18  
      6.9.2 Training and Orientation ......................................................... 18  
7.0 **Diving Safety** ............................................................................... 19  
8.0 **Disaster and Emergency Preparedness** .......................................... 21  
   8.1. Integrated Contingency Plan .......................................................... 21  
   8.2. Emergency Planning and Community Right-to-Know .................... 23  
   8.3. Spill Prevention Control and Countermeasure (SPCC) Planning ....... 24  
9.0 **Laboratory Safety and Environmental Management** ...................... 25  
   9.1. Air Quality .................................................................................... 25  
      9.1.1. Title V Air Permit .................................................................... 25  
      9.1.2 Air Toxics ................................................................................ 26  
      9.1.3 Refrigerant Management Program (RMP) ............................... 27  
   9.2. Biological Safety ........................................................................... 27  
      9.2.1. The Institutional Biosafety Committee ................................... 28  
      9.2.2. Institutional Animal Care and Use Committee ....................... 30  
      9.2.3. Bloodborne Pathogens Program .......................................... 30  
      9.2.4. Permits ................................................................................... 30  
      9.2.5. Biosecurity ............................................................................ 30  
   9.3. Chemical and Laboratory Safety ................................................... 30  
      9.3.1. Laboratory Safety Inspections ................................................. 30  
      9.3.2. Chemical Safety Committee .................................................. 31  
      9.3.3. Regulatory Compliance Services .......................................... 31  
      9.3.4. Chemical Fume Hood and Laboratory Ventilation Assessments 32  
      9.3.5. Laboratory Design and Renovation ....................................... 34  
      9.3.6. Laboratory Safety Technical Services .................................... 35  
      9.3.7. Laboratory Safety Training ..................................................... 36  

2015 Annual Report for the UNH Office of Environmental Health and Safety
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
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</tr>
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<td>Animal Biosafety Level 1</td>
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<td>Animal Biosafety Level 2</td>
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<td>Aboveground Storage Tank</td>
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<td>NMR</td>
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1.0 Major Accomplishments

- **Implementation of a Laboratory Industrial Hygiene Program for Hazardous Materials**

  The University of New Hampshire (UNH) Office of Environmental Health and Safety (OEHS) developed and implemented an industrial hygiene exposure-monitoring program for hazardous materials used in instructional and research laboratories to evaluate and document faculty, staff and student potential exposures to biological, chemical and physical hazards. The information obtained during these assessments can be used to:

  - Demonstrate compliance with regulatory standards.
  - Provide reassurance that the workplace is safe.
  - Verify effectiveness of engineering controls.
  - Determine the need for ventilation installations.
  - Select appropriate respiratory protection.
  - Establish a program for periodic monitoring and re-monitoring.

- **Adoption of the University of New Hampshire Chemical Environmental Management System (UNHCEMS) Strategic Plan**

  OEHS worked with UNH Research Computing Center and the UNH Innovation Office to develop a CEMS Strategic Plan that would define the CEMS-related goals, action steps and feature requests that are of interest to OEHS and our campus stakeholders. The UNHCEMS working group was established to improve communication and increase collaboration with the Research Computing Center and UNH Innovation in order to align the individual goals of the Research Units into a common objective concerning UNHCEMS.

- **Chemical Inventory Validation Program**

  This year OEHS partnered with the UNH Chemistry Department to perform a comprehensive laboratory chemical inventory verification. OEHS offered four highly qualified Chemistry graduate students summer research stipends in exchange for work on the chemical inventory verification. The project lasted from July 7 to August 28, during which time the team visited 242 rooms in 11 research buildings. The team was successful in verifying 35,007 chemical containers and adding 2,675 chemicals containers to the chemical inventory. The cost to hire the graduate students for this effort was $16,000 in stipends. The program was such a success that we will continue using this model again in 2016.
Shoals Marine Lab Reduces Its Carbon Footprint/Environmental Risk

The Shoals Marine Laboratory (SML) has dramatically decreased its use of fossil fuels and storage of petroleum products on the 95-acre island that provides educational and research facilities for hundreds of visitors each summer. Thanks to the Lab’s commitment to sustainability, the investment in expanded and upgraded green energy infrastructure and innovative conservation programs, total fuel storage at the Island decreased from 12,000 gallons to less than 1,300 gallons per year. This decrease in fuel storage on the island resulted from the removal of two 6,000-gallon bulk storage diesel tanks and replacement with smaller intermediate bulk containers less than 270 gallons each in the summer of 2015. The reduction of fuel storage tank size on island decreases the risk for catastrophic environmental impacts should a tank or container rupture.

Confined Space Assessment and Entry Database

OEHS conducted a comprehensive campus wide assessment for the presence of confined spaces and completed the Confined Space Inventory Database in 2015. Over 700 spaces were individually assessed and the determination was made as to whether or not it met the definition of a confined space or permit-required confined space as defined by the Occupational Safety and Health Administration (OSHA). Of the over 700 spaces in question, 339 were identified as permit-required confined spaces. Entry into any permit-required confined space at UNH is covered by the UNH Confined Space Entry Program which outlines specific procedures to be used for safe entry.
To ensure information regarding identified permit-required confined spaces is available for trained employees, OEHS has developed and implemented the Confined Space Inventory Database. The database lists the 339 identified permit-required confined spaces, their location across campus, and provides a link to the completed OEHS assessment so employees can review potential hazards prior to entry. The database also provides an electronic means to complete the required entry permit, and electronically submits the entry permit to both OEHS and the Durham Fire Department, as required by the UNH written program.

Figure 2 Example of a typical confined space at UNH (Utility Tunnel)

Figure 3 Confined Space Inventory Database

➢ **Hazard Communication Program Update**

In 2012 OSHA amended its Hazard Communication Standard (29 CFR 1910.1200) to incorporate the United Nations Globally Harmonized System for the Classification and Labeling of Hazardous Chemicals. Several compliance dates were set by OSHA to ensure employers complied with the amended standard. The initial compliance directive was to assure all employees were trained by
December 1st, 2013 on the new labeling elements and safety data sheet format. In 2015 OEHS revised its Hazard Communication Program to ensure compliance with the OSHA deadline that by June 1, 2016 all employers update their compliance programs.

➢ **Environmental Health and Safety (EH&S) Mitigation Fund**

There were a total of forty-three (43) mitigation projects managed by OEHS staff in 2015. Projects included air sampling for environmental contaminants in various research laboratory settings, installation of chemical fume hood velocity alarms, evaluation of indoor air quality in several academic and administrative buildings, research laboratory infrastructure upgrades in science facilities, emergency shower and eyewash installations in teaching and research laboratories and certification testing of cranes and hoists in various campus buildings.

➢ **Radiation Protection, X-Ray and Laser Safety Program Enhancements**

Research involving the use of instruments that generate large, static magnetic fields such as Nuclear Magnetic Resonance (NMR) spectrometers or Superconducting Magnet systems is becoming more prevalent at UNH. Superconducting magnets present a number of overt and other less obvious hazards. The magnetic field generated by such a magnet may result in minor inconveniences (e.g. erasure of a credit or bank card) or range to more serious medical conditions (e.g. interruption of an implanted medical device, like a pacemaker). These magnets use cryogenic liquids as coolants and can be associated with high-voltage components representing an electrical hazard. Furthermore, items made of glass such as NMR tubes and storage dewars can present a sharps hazard if cracked or broken. In response to the hazards posed by such instruments, OEHS developed and implemented a Magnet Safety Plan (MSP). The UNH Radiation Safety Committee approved the MSP in September.
National Institutes of Health (NIH) National Biosafety Stewardship Month Assessment

For the second year in a row, the National Institutes of Health and the federal Department of Health and Human Services announced a request for Biosafety Stewardship among institutions performing research in the life sciences. Training, Engagement and Transparency were the themes of 2015’s request and UNH once again evaluated the biosafety and biosecurity programs to tighten up policies and procedures. To that end, Environmental Health and Safety has been working closely with the colleges ensuring biohazardous materials are registered with the Institutional Biosafety Committee, helping Principal Investigators focus on proper safety training for their lab staff, and to ensure that transparency exists in both the Institutional Biosafety Committee process and with reporting of incidents and accidents.

UNH School of Law Adopts Emergency Procedures Program

The UNH School of Law established a formal Emergency Health and Safety Committee (EHSC) in 2015. The charge of the Committee is to assure a safe work environment for faculty, staff, students and visitors through the creation and maintenance of effective health and safety programs. The EHSC reports to the UNH Law School Dean and the Office of the Provost and Vice President for Academic Affairs on matters related to emergency preparedness, industrial hygiene, and workplace safety compliance.
Partnering in Laboratory Moves

Members of OEHS assisted in both the UNH Manchester (UNH-M) laboratory move from 300 Commercial Street to 88 Commercial Street and the New Hampshire Veterinary Diagnostic Laboratory (NHVDL) move from Kendall Hall to Botanical Lane, Durham.

Prior to the move of UNH-M to the new facility at 88 Commercial Street, OEHS Staff reviewed plans for the new Chemical and Biology laboratories, conducted site environmental mitigation sampling, and hazardous materials assessments.

For both the UNH-M move and the NHVDL move, OEHS staff provided guidance on lab and equipment decontamination protocols, removed hazardous waste, moved biological and chemical inventories between sites, and supported lab staff as an extra set of hands for decontamination of equipment and lab surfaces. OEHS partnered with UNH-M and NHVDL staff to meet all move deadlines.
2.0 Mission Statement

The UNH OEHS works to assure safe and healthful environments for all segments of the campus population, through programs of information and education, review and monitoring, technical consultation, and provision of direct services. OEHS is also responsible for developing programs to ensure compliance with applicable state and federal health, safety and environmental regulations, and campus policies on environmental health and safety. Areas of responsibility include hazardous materials, environmental management as well as injury and illness prevention as highlighted in the University System of New Hampshire (USNH) Policy on Environmental Health and Safety. The protection of human health and compliance with applicable regulations are essential conditions for the successful operation of research, conduct of instruction, and provision of public service by the University. OEHS supports the University of New Hampshire’s mission by providing leadership, resources, and services to assure a safe and healthful working environment for all members of the University and its surrounding community.

The OEHS Mission Statement was re-affirmed in 2014 after review and approval of the new five-year OEHS Strategic Plan. The Statement is distributed through the UNH Research Office web site at http://www.unh.edu/research/support-units/environmental-health-safety.

3.0 Vision Statement

OEHS will be a valued partner in the creation and maintenance of a safe and healthy University environment and will achieve excellence through its provision of leadership, oversight, stewardship and services.

4.0 Core Values

OEHS has adopted a Code of Professional Conduct. These core values describe the standards to which we aspire. They guide our actions and help to assure accountability, responsibility and trust as we interact with one another and our campus clients.

**Excellence:** We dedicate ourselves to the highest standards of quality in our professional work, outreach, public service, mentoring, and advising.

**Integrity:** We commit ourselves to an open, honest, and trustworthy approach to all endeavors we are working on. We value fairness, straightforward conduct, adherence to the facts, sincerity and transparency. We will make a reasonable effort to provide appropriate professional referrals when unable to provide competent professional assistance.

**Responsiveness:** We respond to and address the needs and expectations of our students, faculty, staff, partners, and external constituents.
**Respect:** We foster an environment of mutual respect. We listen to each other, encourage each other and care about each other.

**Diversity:** We commit to an inclusive community for diverse students, faculty and staff. We reject bigotry, oppression, degradation and harassment, and we challenge injustice toward any member of our community.

**Accountability:** We are personally and organizationally accountable for all that we do and commit to providing timely and comprehensive evaluation of our programs and efforts.

**Innovation:** We want to be at the forefront of change and believe that the best way to lead is to learn from our successes and mistakes and continue to grow. We are forward-looking and break new ground in addressing important community and societal needs.

**Openness:** We encourage the open exchange of information and ideas from all quarters of the university community. We believe that through collaboration and participation, each of us has an important role in determining the direction and well-being of our community.

### 5.0 Campus Program Elements and Objectives

UNH has adopted an Environmental Health and Safety Mission Statement that works to assure safe and healthful environments for all segments of the campus population, through programs of information and education, review and monitoring, technical consultation, and provision of direct services. OEHS has developed and implemented programs to ensure compliance with applicable state and federal health, safety and environmental regulations, and USNH policies on environmental health and safety.
6.0 Injury and Illness Prevention

6.1. Industrial Hygiene

Industrial hygiene is the art and science of the recognition, evaluation, and control of those environmental factors or stresses, arising in or from the work place, which may cause sickness, impaired health and well-being, or significant discomfort and inefficiency among workers or citizens of the community. OEHS performs worksite assessments to determine potential health hazards throughout the many locations associated with UNH. Technical assistance is provided on issues involving chemical hazards that can contribute to exposure risks (including laboratory exposures), exposures as the result of chemical release incidents, noise, heat, and hazardous building materials. Advice is then provided on protective measures that include the development and implementation of corrective controls or the use of personal protective equipment. OEHS calibrates and maintains an inventory of nineteen (19) direct reading/sampling instruments that include:

- Simpson 884 Sound Level Meter;
- Jerome 431X Mercury Vapor Analyzer;
- Gillian Personal Sampling Pumps(5);
- Rae Systems MiniRae 2000 portable volatile organic compound (VOC) monitor; and
- Gast Systems High Volume Sampling Pumps(2).

Contaminants that can be sampled include lead, asbestos, mold, dust, and chemical contaminants. OEHS responded to twenty nine (29) requests from the campus community for industrial hygiene technical services. Inquiries were related to hazardous building materials, potential exposures to hazardous chemicals, and noise.

During the summer months OEHS monitors the weather to support the UNH Excessive Heat Advisory program (see UNH On-Line Policy Manual, UNH VD 3.5). A Quest wet-bulb globe thermometer is placed outside to measure the outdoor heat. When the outdoor temperature exceeds the established consensus threshold for heat as established by the American Conference of Governmental Industrial Hygienists, OEHS notifies the campus community via e-mail. Through the Directed Communication, a Heat Advisory contains a prescription of work and rest for those employees, athletes, visitors, and/or guests that may be working outside, and, as necessary, for those working inside. In 2015 OEHS issued a total of fourteen (14) heat advisories.
6.2. Injury Prevention

The effectiveness of a safety program can be assessed in many ways. However it is typically reviewed from a financial perspective. UNH losses are reviewed by OEHS to evaluate the frequency (number of incidents) and the severity (cost associated with an injury). OEHS, in conjunction with Human Resources and our Workers Compensation Insurance Carrier, Maine Employee Mutual Insurance Company (MEMIC), monitors monthly trends and costs and works to focus efforts on addressing those areas where a higher frequency and/or severity of accidents are occurring. During 2015 UNH experienced 311 incidents that resulted in approximately $437,000 in financial losses. While this number of incidents is slightly down (approximately 7%) from the 334 incidents in 2014 the financial losses were higher than the $326,000 recorded for 2014. The following Figure 7 summarizes UNH claims and monetary losses for the previous ten years. Overall, the general trend in financial losses continues to remain lower than previous years. However, during 2015 a single accident resulted in approximately $115,000 in financial losses and has contributed to the 25% increase as compared to 2014.

Figure 7 Total workers compensation claims versus losses paid over last 10 years at UNH.
In an effort to address reported incidents OEHS conducts routine accident investigations. Many involve a simple telephone call or e-mail requesting information for recommended corrective actions while more significant accidents involve formal site visits, interviews, and assistance from various operating groups that include Human Resources and MEMIC. These are followed up with a more formal investigation report. In 2015 OEHS conducted 32 accident investigations.

In an effort to further promote a safe and healthful working environment for the UNH community, OEHS participated in the Human Resources Benefits Fair, which included providing information on ergonomics to UNH Faculty and Staff. The promotion of the Ergonomics Program included providing examples of various ergonomic related computer accessories, chairs, and sit to stand workstations. In addition OEHS representatives along with ergonomic vendors, and students from the UNH Occupational Therapy Program were available to discuss ergonomic-related concerns with employees.

6.3. Indoor Environmental Quality

OEHS investigates indoor environmental quality (IEQ) complaints and concerns by campus community members. While most complaints involve thermal comfort, odors, or non-specific symptoms; some are associated with reports of microbiological contamination/growth, specific health-related symptoms related to indoor air, or response to a water intrusion. Indoor air quality (IAQ) surveys and due diligence assessments are conducted following routinely practiced industry standards for the investigation of IAQ complaints. To assist in the evaluation, OEHS maintains two direct reading instruments to monitor basic IAQ parameters, two moisture survey meters to evaluate for damp conditions that can be conducive for microbiological growth, a borescope that allows the user to view inaccessible areas such as heating, ventilation and air conditioning (HVAC) ducts and wall cavities, and an ultrafine particle analyzer that can be used to assess for dusts/particles and determine their source.

In 2015 OEHS responded to thirty nine (39) requests for IEQ services. This is up from thirty-seven (37) requests in 2014. OEHS requested assistance from IAQ consultants on four occasions with eight investigations requiring remediation or corrective actions by qualified
personnel. Remedial efforts were funded primarily by the affected departments. However, OEHS was able to support some external sampling efforts through the EH&S Mitigation Fund established in 2009.

![Figure 9 Indoor Environmental Quality Requests Received by OEHS from 2011 through 2015](image)

### 6.4. General Safety

The safety programs at UNH focus efforts on injury prevention through the development and implementation of policies and procedures for the recognition and identification of hazards and the development of corrective actions. During 2015 OEHS conducted an annual review of each of its ten Occupational Safety Programs to ensure any regulatory changes were reflected in the programs and address any operational questions or concerns from impacted campus representatives. The programs are listed below:

- Confined Space Entry;
- Fall Protection;
- Hazard Communication;
- Hot Work Permit Program;
- Control of Hazardous Energy (Lockout/Tagout);
- Personal Protective Equipment;
- Respiratory Protection;
- Emergency Action and Fire Prevention;
- Contractor Safety; and
- Hearing Conservation.
The UNH Occupational Safety Committee assists with setting forth health and safety policies and programs which are then adopted and implemented within the affected departments. The Occupational Safety Committee is a joint labor-management committee, and is a vehicle through which the campus community can discuss safety concerns, disseminate information about programs and services from OEHS, and develop initiatives for future health and safety efforts. The Occupational Safety Committee incorporates representation from Facilities, Research Integrity Services, Facilities Construction Team, Housing, Campus Recreation, Memorial Union Building, Athletics, Information Technology, Hospitality Services, Health Services, Energy and Utilities, Housekeeping, Contracts Management, and University Libraries. OEHS coordinates and schedules the quarterly meetings, develops meeting agendas, and records and generates meeting minutes.

6.5. Safety Training and Education

Safety training is routinely performed and/or coordinated for those affected faculty, staff, and students on a variety of topics that include Hazard Communication, Personal Protective Equipment, Respiratory Protection, Hearing Conservation, Control of Hazardous Energy (Lockout/Tagout), Confined Space Entry, Fall Protection, Asbestos Awareness, Powered Industrial Trucks, Material Handling, and Ergonomics. The responsibility for ensuring that affected staff receive the appropriate training falls under each individual department. OEHS offers training services that are pre-arranged with the affected departments.

Throughout 2015 OEHS continued its efforts to promote training to targeted areas where increased losses were occurring, in order to ensure compliance with regulatory training requirements. OEHS continued its partnership with UNH Housekeeping (Custodial Services) to address areas of increased losses. This included redeveloping multiple training programs to address hazards and their controls to minimize exposure risks. These areas covered training on slips, trips, and falls, ergonomics and back/lifting safety, hazard communication/right to know, asbestos awareness, and bloodborne pathogens. OEHS continued to provide training for UNH Facilities Operations and the Facilities Construction Team to target specific areas that impact their operations to promote safety.

Instructor-led training on a variety of occupation safety programs was conducted in 2015 with 445 employees attending training including: Fall Protection; Confined Space Entry; Respiratory Protection; and Asbestos Awareness. In addition, 167 employees participated in the on-line Hazardous Communication/Globally Harmonized System Training available through UNHCEMS.

During 2015 OEHS discontinued its use of the Blackboard platform to deliver e-learning alternatives in several OEHS topics. E-learning has been integrated into the recently developed UNH Chemical Environmental Management System (UNHCEMS) Training/Management module. This module not only allows employees the ability to participate in e-learning from their desktop,
but allows employees to track their training compliance. OEHS anticipates the expansion of the UNHCEMS Training/Management System to multiple operating groups on campus in 2016.

OEHS continued its partnership with Human Resources on Accident Prevention and Safety by conducting an OEHS Orientation as part of UNH Getting Started and with the Animal Resource Office to provide an Occupational Health and Safety component as part of the mandatory Animal Handler Training conducted prior to the start of each academic semester.

6.6. Ergonomics Programs

OEHS promotes its proactive approach to ergonomics by providing guidance to the campus community on ergonomic-related risks in an effort to reduce the number of claims involving musculoskeletal disorders associated with poor workstation design and manual material handling.

OEHS conducted 99 workstation evaluations in 2015. Each evaluation consists of the following:

- Reviewing the employee’s workstation;
- Discussing with them their work processes and any symptoms they may be experiencing;
- Making adjustments and modifications to the workstation; and
- Discussing with them proper body positioning.

The assessment is followed up by a formal report that not only summarizes our observations and modifications, but includes additional recommendations to further reduce ergonomic risk factors. Simple modifications may include modifying the employee’s chair height, repositioning the keyboard to an existing adjustable tray, or raising the monitor utilizing materials readily at hand such as books or reams of paper. More complex recommendations may include replacement of existing keyboards and mouse options, re-design of work processes to reduce repetitive motions or replacement of desks and chairs. New employees are informed of the ergonomics program during their orientation and are encouraged to take advantage of the assessment services provided by OEHS. The following table (Table 1) summarizes the ergonomic losses dating back to 2007.
Table 1  Ergonomic Losses (Claims) and Incurred Costs as a result of Ergonomic-Related Injuries at UNH

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1. Values provided by Human Resources based on loss runs as provided by MEMIC. Claims and values may vary slightly based on cause description as documented by MEMIC. Costs will fluctuate up and down based on continuing/additional treatment, indemnity costs, and/or injuries reported in 2015 that occurred in 2014.
2. Prior to 2009 ergonomic assessments were performed on a reactionary basis following the report of an occupational injury.

During 2015 OEHS observed a significant increase in employee requests for information on sit-to-stand workstations, and for their purchase and installation at the work station. This ergonomic trend has been shown to increase employee productivity and overall wellness.

Figure 10 Example of a sit-to-stand workstation

OEHS maintained its partnership with UNH Occupational Therapy, the Office of Human Resources, and other campus departments with ongoing student projects as part of the department’s Ergonomics course. OEHS participated in the course by presenting material on ergonomics as it relates to the UNH campus. During 2015 students conducted evaluations for selected employees on campus. OEHS participated in the classroom presentations on the student assessments to ensure they were conducted in line with the current assessment process. In addition the student projects continue to be utilized in support of the OEHS ergonomics program.
6.7. Safety Technical Services

OEHS provides assistance to our campus stakeholders on issues of safety program development, implementation, compliance, regulatory interpretation, and technical assistance. In 2015, OEHS responded to 33 requests for technical assistance on a broad range of safety topics including walking and working surfaces, respiratory protection, personal protective equipment, rigging, contractor safety, fire safety and prevention, emergency action planning, scaffolding, confined space entry, fall protection, the control of hazardous energy (lockout/tagout), welding and cutting, fuel handling, electrical safety, powered industrial trucks, and lift safety.

OEHS and UNH continue to partner with the Durham and Manchester Fire Departments to provide for confined space entry rescue services. OEHS receives and maintains all permits for activities involving entry into UNH confined spaces. During 2015 OEHS received one hundred eighteen (118) confined space entry permits. These permits are reviewed, and if necessary, followed up on site to ensure employees entering confined spaces are following current UNH program requirements. In addition, permits are reviewed with the applicable campus operating group as part of the annual Permit-Required Confined Space Entry Program review.

OEHS continues its advisory and administrative role for the current Hot Work Permit Program. This program is designed to require those personnel who are required to perform welding, torch cutting, or any other heat and spark producing activities outside a designated hot work area to complete a Hot Work Permit. The program offers two options for hot work:

Option 1 - Those conducting hot work can opt to complete a single shift permit, which authorizes hot work for the single date specified on the permit. These permits are completed by the UNH Facilities Project Manager and/or the Competent Hot Work Supervisor and forwarded to OEHS prior to the commencement of activities. The second option available is to request a blanket permit.

Figure 11 Sample Confined Space and Hot Work Permit Request Forms
Option 2 - A blanket permit can be submitted to OEHS and will be reviewed on site with the appropriate UNH and/or contractor personnel. Once reviewed, the blanket permit is signed and approved. The blanket permit can be used for a time period not to exceed 14 calendar days.

During 2015 OEHS received one hundred forty six (146) single shift hot work permits and one hundred twenty five (125) blanket permit requests that were subsequently approved.

OEHS provides technical guidance to UNH project managers on environmental health and safety concerns during construction, demolition, and renovation projects. Services include minor technical inquiries, pre-construction plan review, and pre-demolition hazardous building materials abatement planning. In 2015 staff from all disciplines in OEHS participated in projects associated with McConnell Hall, Hewitt Annex, Conant Hall, Spaulding Hall, Horton Hall, Memorial Union Building, Huddleston Hall, Hamilton Smith Hall, the Field House, Hammel Recreation Center, Stillings Hall, Dimond Library, Kendall Hall, Parsons Hall, Paul Creative Arts Center, Greenhouses, Morse Hall, UNH Manchester, and exterior locations including the Conant Hall Courtyard and Cowell Stadium.

6.8. Occupational Health Medicine

OEHS provides guidance to affected departments on medical surveillance requirements for faculty, staff, and students as required by state or federal requirements or as indicated by best management practices. Medical surveillance programs are established for respiratory protection, hearing conservation, lead, asbestos, bloodborne pathogens and animal handlers. OEHS continues to receive and maintain records for those participating in the Animal Handlers Medical Surveillance Program. However the day-to-day management and participant follow up is now under the responsibility of Research Integrity Services.

There are currently 452 faculty, staff, students and visitors participating in medical surveillance programs at UNH. As displayed in Figure 12, below, the number of staff enrolled in medical surveillance programs at is lower when compared to 2014. However, a 31% decrease in individuals enrolled in the respiratory protection medical surveillance program was the result of two primary changes: OEHS along with Facilities Operations assessed their tasks and determined that not all employees required the need for respiratory protection; and the actual number of UNH personnel performing the tasks requiring respiratory protection are being replaced with an outsourced vendor.
6.9. Emergency Procedures

6.9.1. Emergency Procedures Program

It is the policy of the UNH to maintain a safe environment for its students, academic appointees, staff, and visitors in an atmosphere that encourages those individuals to communicate on occupational and environmental health and safety matters without fear of reprisal. The UNH Emergency Procedures Program (EPP) is a written document required by OSHA. The purpose of the EPP is to facilitate and organize employer and employee actions during workplace emergencies. A well-developed emergency plan and proper employee training (such that employees understand their roles and responsibilities within the plan) should result in fewer and less severe employee injuries and less structural damage to campus facilities during emergencies. The EPP outlines procedures to be followed by the campus community for responding to, and recovering from, a variety of emergency and disaster situations. These events may include fires, hazardous spills, earthquakes, bomb threats, or major accidents.

In September 2015, OEHS conducted the annual review of the EPP. Revisions were made to the Incident Response Instructions sections covering Considerations for Persons with Disabilities and Shelter-In-Place procedures.

6.9.2 Training and Orientation

Live fire extinguisher training was again provided in 2015 with 55 employees participating.
7.0 Diving Safety

Scientific diving is defined by OSHA regulations as diving performed solely as a necessary part of a scientific, research, or educational activity by employees whose sole purpose for diving is to perform scientific research tasks. UNH is exempt from the regulations that govern commercial diving activities provided its program is defined as scientific diving and which is under the direction and control of a diving safety program containing at least the following elements:

A diving safety manual which includes at a minimum: Procedures covering all diving operations specific to the program; procedures for emergency care, re-compression and evacuation; the criteria for diver training and certification; and a diving safety officer.

Diving Control Safety Board, with the majority of its members being active scientific divers, which shall at a minimum have the authority to: approve and monitor diving projects, review and revise the diving safety manual, assure compliance with the manual, certify the depths to which a diver has been trained, take disciplinary action for unsafe practices, and assure adherence to the buddy system (a diver is accompanied by and is in continuous contact with another diver in the water) for SCUBA diving. UNH has implemented both of these elements and is in compliance with this exemption.

The following are statistics with regard to the Diving Program at UNH:

- Total Number of Divers logging dives during 2015: 34
- Total Number of Dives logged during 2015: 717
- Total minutes of diving logged during 2015: 25,474

Tables 2 through Table 6 summarizes various dive statistics, including purpose for dives, modes of diving, breathing gas types used, and equipment.

<table>
<thead>
<tr>
<th>Table 2  Summary of Dives by Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
</tr>
<tr>
<td>Scientific</td>
</tr>
<tr>
<td>Training and Proficiency</td>
</tr>
</tbody>
</table>
### Table 3  Summary of Dives by Diving Mode in 2015

<table>
<thead>
<tr>
<th>Diving Mode</th>
<th>Dive Time In Minutes</th>
<th>Dives Logged</th>
<th>Number of Divers Logging Dives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Circuit SCUBA</td>
<td>23,176</td>
<td>680</td>
<td>34</td>
</tr>
<tr>
<td>Hookah</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Surface Supplied</td>
<td>939</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>Rebreather</td>
<td>1,359</td>
<td>18</td>
<td>2</td>
</tr>
</tbody>
</table>

### Table 4  Number of Dives by Breathing Gas Type in 2015

<table>
<thead>
<tr>
<th>Gas Type</th>
<th>Dive Time In Minutes</th>
<th>Dives Logged</th>
<th>Number of Divers Logging Dives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air</td>
<td>24,177</td>
<td>701</td>
<td>34</td>
</tr>
<tr>
<td>Nitrox</td>
<td>109</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mixed Gas</td>
<td>1,188</td>
<td>15</td>
<td>2</td>
</tr>
</tbody>
</table>

### Table 5  Number of Dives by Decompression Profiling Method in 2015

<table>
<thead>
<tr>
<th>Profiling Method</th>
<th>Dive Time In Minutes</th>
<th>Dives Logged</th>
<th>Number of Divers Logging Dives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dive Tables</td>
<td>3,121</td>
<td>81</td>
<td>14</td>
</tr>
<tr>
<td>Dive Computer</td>
<td>22,353</td>
<td>636</td>
<td>26</td>
</tr>
<tr>
<td>PC-based Deco Software</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Table 6  Number of Dives distributed by Specialized Diving Equipment in 2015

<table>
<thead>
<tr>
<th>Specialized Environment</th>
<th>Dive Time in Minutes</th>
<th>Dives Logged</th>
<th>Number of Divers Logging Dives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Decompression</td>
<td>1,297</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>Overhead Environment</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Blue Water</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ice/Polar</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Saturation Diving</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Aquarium Diving</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
In addition to the scientific diving listed in Table 7, below, we run three Academic open water scuba classes per semester. The diving for that is as follows:

- Basic Open Water Scuba Classes - 54 Students;
- Approximately 20 hours of training in the pool for each student leading to 5 open ocean dives each; and
- 270 Student dives in the ocean.

<table>
<thead>
<tr>
<th>Depth Range</th>
<th>Dive Time In Minutes</th>
<th>Dives Logged</th>
<th>Number of Divers Logging Dives</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 30 feet</td>
<td>11,263</td>
<td>345</td>
<td>32</td>
</tr>
<tr>
<td>31 - 60 feet</td>
<td>11,124</td>
<td>299</td>
<td>28</td>
</tr>
<tr>
<td>61 - 100 feet</td>
<td>1,974</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>101 - 130 feet</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>131 - 150 feet</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>151 - 190 feet</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>190 - &gt; feet</td>
<td>1,113</td>
<td>13</td>
<td>2</td>
</tr>
</tbody>
</table>

There were no diving incidents reported during the 2015 training cycle.

8.0 Disaster and Emergency Preparedness

OEHS is constantly reviewing and updating Disaster and Emergency Response plans required by the United States Environmental Protection Agency (US EPA) for the Campus. OEHS is responsible for maintaining the Integrated Contingency Plan, Spill Prevention Control and Countermeasures Plans (40CFR Part 112) and reporting to EPA for Emergency Planning and Community Right to Know Act (SARA Title III)

8.1. Integrated Contingency Plan

The US EPA National Response Team (NRT) passed guidance in 1996 allowing facilities to prepare an emergency response plan (the ‘one plan’) that consolidates the multitude of response plans required by several federal agencies including: US EPA, Occupational Safety and Health Administration, the Department of Transportation, The Mineral Management Service, the United States Coast Guard and the Research and Special Programs Administration.

UNH originally drafted the Integrated Contingency Plan in 2009 and continues necessary revisions to the campus Integrated Contingency Plan (ICP) as needed or at a minimum on an annual basis.
The intent of the UNH ICP is to establish the necessary procedures and equipment required to prevent and to minimize hazards to public health, safety or welfare, or to the environment, from fires, explosions, spills or any other unplanned sudden or non-sudden release of hazardous materials to air, soil, surface water, or groundwater. The plan is also designed to prevent spills or releases of hazardous substances that violate applicable water quality standards, cause a sheen upon or discoloration of the surface waters, or cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shorelines.


• Section I - Introduction describes UNH’s facilities and the administration of this Plan, including procedures for the distribution, periodic review, and amendment of the Plan.

• Section II - Fire, Explosion, or Spill/Release Emergency Response Procedures identifies and establishes the response and notification procedures to be used in the event of a spill/release, including: steps to be taken when a spill/release is discovered; how to report a spill/release; guidance on mitigation and cleanup of a spill/release and disposal of related waste; and a description of spill/release response equipment maintained by UNH.

• Section III - Fire, Explosion, or Spill/Release Prevention identifies and establishes policies and procedures to be implemented with the goal of reducing the potential of a spill/release, including: a detailed description of areas of the facility where oil, petroleum products and hazardous materials and wastes are used, stored and generated; the associated containment systems; a description of the potential environmental receptors that may be affected; procedures for inspecting storage areas or equipment containing oil or hazardous waste; delivery/storage procedures; and a discussion and assessment of the potential spill/release scenarios.
The areas of the University of New Hampshire property that are covered by the ICP include:

- Durham campus;
- UNH Central Hazardous Waste Accumulation Area;
- Satellite Accumulation Areas (SAAs) in laboratories and research facilities throughout campus;
- UNH Facilities including the Heating Plant and shops;
- Transportation Garage;
- All other perimeter farms in Durham associated with the UNH Durham campus;
- Jackson Estuarine Laboratory in Durham;
- Ft. Constitution Coastal Marine Laboratory Facility in New Castle;
- Ft. Constitution Pier Support Facility in New Castle;
- Burley DeMeritt facility in Lee;
- Kingman Farm / Main Lab in Madbury;
- Residential housing for college students and employees (single-family residences are exempt when oil is used exclusively for on premise heating); commercial properties owned or partially owned by the University of New Hampshire, and situated within the general Durham campus area; and
- Other miscellaneous properties owned by the University of New Hampshire.

8.2. Emergency Planning and Community Right-to-Know

The Emergency Planning and Community Right-to-Know Act (EPCRA), also known as the Superfund Amendments and Reauthorization Act (SARA) Title III, is a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by State of New Hampshire and local government (the Town of Durham). EPCRA requires the establishment of State Emergency Response Commissions (SERCs) responsible for coordinating certain emergency response activities and for appointing Local Emergency Planning Committees (LEPCs). The emergency planning requirements of EPCRA are designed to develop state and local government emergency response and preparedness capabilities through better coordination and planning, especially within the local community. For reporting year 2014 (submitted in 2015), OEHS notified the SERC and the LEPC that UNH stores 18 chemicals that fall above the threshold planning quantity that are required reporting to local and state government. Table 8 below summarizes the Tier II Reporting for the campus from 2012 through 2015.
Table 8  EPCRA Chemicals reported in 2015 by UNH Durham Campus for RY2014

<table>
<thead>
<tr>
<th>Chemical</th>
<th>RY 2012 (lbs)</th>
<th>RY 2013 (lbs)</th>
<th>RY 2014 (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonia</td>
<td>1,000</td>
<td>1,000</td>
<td>1,197</td>
</tr>
<tr>
<td>Chloroform</td>
<td>NR</td>
<td>1,064</td>
<td>1,106</td>
</tr>
<tr>
<td>Diesel</td>
<td>32,170</td>
<td>32,170</td>
<td>32,170</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>534</td>
<td>545</td>
<td>559</td>
</tr>
<tr>
<td>FR3 (transformer fluid)</td>
<td>43,098</td>
<td>43,098</td>
<td>43,098</td>
</tr>
<tr>
<td>Fuel Oil #2</td>
<td>592,339</td>
<td>592,339</td>
<td>592,339</td>
</tr>
<tr>
<td>Fuel Oil #6</td>
<td>554,610</td>
<td>554,610</td>
<td>554,610</td>
</tr>
<tr>
<td>Hydraulic Oil (elevators)</td>
<td>77,782</td>
<td>77,782</td>
<td>77,782</td>
</tr>
<tr>
<td>Hydrofluoric Acid</td>
<td>NR</td>
<td>NR</td>
<td>111</td>
</tr>
<tr>
<td>Mineral Oil (transformers)</td>
<td>145,406</td>
<td>145,406</td>
<td>145,406</td>
</tr>
<tr>
<td>PCH-180 (Inorganic Aluminum Salt)</td>
<td>NR</td>
<td>60,048</td>
<td>60,048</td>
</tr>
<tr>
<td>Propane</td>
<td>185,363</td>
<td>185,363</td>
<td>185,363</td>
</tr>
<tr>
<td>R-TEMP (transformer fluid)</td>
<td>13,636</td>
<td>13,636</td>
<td>13,636</td>
</tr>
<tr>
<td>Sand</td>
<td>NR</td>
<td>150,000</td>
<td>150,000</td>
</tr>
<tr>
<td>Salt</td>
<td>1,000,000</td>
<td>857,350</td>
<td>857,350</td>
</tr>
<tr>
<td>Sodium Hydroxide</td>
<td>64,779</td>
<td>42,827</td>
<td>140,854</td>
</tr>
<tr>
<td>Sodium Hypochlorite</td>
<td>33,642</td>
<td>26,093</td>
<td>36,060</td>
</tr>
<tr>
<td>Sulfuric Acid</td>
<td>2,448</td>
<td>2,476</td>
<td>2,769</td>
</tr>
<tr>
<td>Sulfuric Acid Batteries</td>
<td>261</td>
<td>17,860¹</td>
<td>17,860¹</td>
</tr>
<tr>
<td>Lead (batteries)</td>
<td>NR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NR  Not Reported, did not meet threshold planning criteria
1.  Total Battery weight as a mixture

8.3. Spill Prevention Control and Countermeasure (SPCC) Planning

The priority of the US EPA Emergency Management Program is to prevent, prepare for, and respond to oil spills that occur in and around inland waters of the United States. US EPA is the lead federal response agency for oil spills occurring in inland waters, and the United States Coast Guard is the lead response agency for spills in coastal waters and deep-water ports. The SPCC rule provides requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule (40 CFR Part 112) requires facilities that meet specific petroleum storage quantities to prepare, amend, and implement SPCC Plans.

UNH maintains certified SPCC Plans for the Durham campus, the Combined Heat and Power Plant, and the UNH Landfill Gas Processing Facility in Rochester. The Plans were revised and updated for 2015.
UNH Facilities staff conducts regular inspections of the 55 aboveground storage tanks (ASTs) on campus. For 2015, staff conducted 366 tank inspections.

Per US EPA SPCC Regulations, OEHS conducted in-person training for 47 UNH staff and contractors identified as oil handling personnel, for the operation and maintenance of equipment to prevent oil discharges; discharge procedure protocols; applicable pollution control laws, rules and regulations; general facility operations; and the contents of the various facility SPCC Plans.

Staff at the Shoals Marine Laboratory decreased total oil storage on the Island in 2015 to reduce the overall burden and environmental risks. This decrease in oil storage and use on the Island means an SPCC plan is no longer required for the Shoals Marine lab as it does not meet the de minimis threshold planning quantity of 1,320-gallons of above ground petroleum storage, in aggregate containers of greater than 55-gallons each. Current petroleum storage on the Island is now 1,256-gallons. To maintain best practices, OEHS will maintain an Oil Spill Mitigation Plan for Shoals Marine Lab and provide annual training to the Shoals Marine Lab staff for oil spill prevention and response.

9.0 Laboratory Safety and Environmental Management

9.1. Air Quality

9.1.1. Title V Air Permit

The New Hampshire Department of Environmental Services (NHDES) issued UNH a Title V Air Permit (TV-OP-010) for the campus Central Heating Plant and Co-generation Facility on April 11, 2007. A significant permit modification was issued by NHDES in November 2009 removing the permit condition requiring a fuel flow meter on the black start emergency generator (BSEG) at UNH’s Co-generation facility. In addition, UNH was issued a Temporary Permit and Prevention of Significant Deterioration (PSD) and Non-Attainment New Source Review (NSR) permit (TP-B-0531) in July 2007 for the construction and operation of combustion devices associated with a Landfill Gas to Energy facility at Rochester and on the Durham campus. UNH was also issued a Temporary Permit (TP-0161) in July 2015 for the replacement of one of the Central Heating Plant boilers, to allow the firing of processed landfill gas in the new boiler and one of the existing boilers, as well as to remove burdensome continuous emissions monitoring requirements from UNH’s previous Temporary Permit.

UNH’s current Title V and Temporary permits contain specific conditions that the campus must adhere to including an annual compliance certification report. UNH filed a renewal application for its Title V permit that was determined to be timely and complete by NHDES in December 2011. UNH’s Title V renewal application included all devices currently covered by the existing Title V
and Temporary Permits. It is anticipated that a draft Title V permit will be issued by NHDES in late 2016.

9.1.2 Air Toxics

In 2015, OEHS updated the University of New Hampshire’s air toxics compliance demonstration required under New Hampshire Air Regulation, Chapter Env-A 1400 that was initially prepared in December 2000 and subsequently updated in September 2003, March 2007, February 2009, October 2010, March 2011, April 2013 and July 2013. The majority of the report was completed in the fall of 2014 prior to having a complete data set for 2014. As part of this updated compliance demonstration, the following activities were carried out:

- Reviewed current version of Env-A 1400 (revised in April 2014) for any rule changes (i.e. changes to ambient air limits, methodologies, etc.) since the most recent compliance demonstration for potential impacts to UNH’s compliance demonstration;

- Collected information on types and amounts of water treatment chemicals added to the cooling towers as algaecides, fungicides, biocides, and anti-foaming agents. Documented compliance demonstration for cooling tower regulated toxic air pollutant (RTAP) emissions;

- Updated UNH Printing Services’ products and actual usage rates for calendar year 2013, to identify any new RTAPs not covered by the most recent update, and to assess changes in usage rates;

- Reviewed and updated emissions from the combustion of Processed Landfill Gas (PLFG) at the Landfill Gas to Energy Facility located in Rochester;

- Reviewed Safety Data Sheets (SDS) and determined compliance for degreasing materials used at the Combined Heating Plant and vehicle maintenance shop;

- Reviewed activities at the Paul Creative Arts Center paint booth; and

- Reviewed existing activities identified in UNH’s most recent compliance demonstration to identify any significant changes to methods and/or equipment.
9.1.3 Refrigerant Management Program (RMP)

The purpose of the University of New Hampshire’s (UNH) Refrigerant Management Program (RMP) is to:

- Maximize the recycling of ozone depleting substances (ODS) and to minimize the release of ODS to the ambient air from the servicing, repairing, maintaining, and disposing of refrigeration appliances on its Durham, Manchester, and Concord campuses;
- Utilize certified technicians for the servicing, repairing, maintaining, and disposing of refrigeration appliances on its Durham, Manchester, and Concord campuses;
- Maintain proper records of refrigerant consumption, technician training, and recycling and recovery equipment certification;
- Ensure proper repairs are made for units with significant leak rates; and
- To ensure UNH is in full compliance with Section 608 of the Clean Air Act Amendments and the requirements of 40 CFR Part 82, Subpart F.

To achieve the stated objectives above, UNH requires all employees and contractors whose job duties require the handling, ordering, repairing, servicing, maintaining, or disposing of refrigerant or refrigeration appliances to review and comply with this written program.

In June 2015, the UNH RMP was revised to update the refrigerant-containing appliance inventory for UNH Durham and to include the UNH School of Law and the new home of UNH-M. Additional certified service providers for appliance repairs were also included in the RMP.

9.2. Biological Safety

National Biosafety Stewardship Month was announced in October of 2015 and OEHS got to work on the three focus elements: Training, Engagement and Transparency. With the roll out of the UNHCEMS training platform, it was easy to engage the UNH population with simple training options for biological safety offered through the UNHCEMS system. Compliance with training requirements and completion rates increased significantly with the UNHCEMS training platform. In addition to traditional biosafety training, new training modules were developed and rolled out for Institutional Biosafety Committee members and Principal Investigators; these modules clearly define and communicate responsibilities for oversight of the biological safety program. OEHS engaged Principal Investigators in risk assessments for their biological work, as well as encouraged senior management to communicate the importance of biosafety at all institutional levels. Oversight of biohazardous work by the Institutional Biosafety Committee remains transparent by engaging the community through our three community representatives on the Committee, as well as publishing meeting dates and locations for attendance by any person.
wanting to join a meeting. OEHS, through its partnership with the colleges, continues to reinforce good safety practices and policy development as it applies to biological safety.

### 9.2.1. The Institutional Biosafety Committee

The Institutional Biosafety Committee continues to be effective in its role of campus oversight for recombinant and synthetic nucleic acid research, as well as all Biosafety Level 2 containment labs. The Committee membership remained mostly stable in 2015, with the biggest change occurring in quarter 4 when Chair Frank Rodgers’ term came to an end and Vice-Chair Robert Gibson assumed the vacated Chair position. In addition, the representative from the College of Health and Human Services resigned from the Committee in quarter 4 due to time restraints and the Committee decided not to replace a full voting member from the college. Instead, the Committee will tap separate resources in specific departments within the College of Health and Human Services to serve as ad-hoc members when policy is being discussed, or when laboratories need to be registered. The Committee reviewed and approved 23 protocols in 2015. Other notable points for the Institutional Biosafety Committee in 2015 are as follows:

- The Institutional Biosafety Committee annual report was submitted to National Institutes of Health in December and was accepted;
- There are 63 active protocols registered with the Committee. The protocols represent research, teaching and commercial projects (Figure 13); and
- Of the 63 active protocols, 24 are recombinant deoxyribonucleic acid (r-DNA) protocols and 38 are protocols registered for their biohazardous work requiring Biosafety Level 2 containment (Figure 14).

![Figure 13 Active IBC Protocols by Type](image-url)
Figure 14 Total r-DNA Protocols versus non-Recombinant DNA Protocols Registered at UNH in 2015

- The total number of Biosafety Level 2 labs is 65; which is up from 52 registered in 2014
- There are 34 Biosafety Level 1 labs; a 10% increase from 2014
- For the first time, UNH now has two Animal Biosafety Level 2 laboratories and the Animal Biosafety Level 1 laboratory number has remained the same at 13

Figure 15 Biosafety Containment Labs at UNH

The success of the UNHCEMS training platform roll-out and the biosafety program training initiatives are apparent in the number of completed training requirements logged for 2015.
Biosafety training compliance is at an all-time high; with a 25% increase since 2014 and a 54% increase since 2013.

9.2.2. Institutional Animal Care and Use Committee

OEHS provided two non-voting members to the Institutional Animal Care and Use Committee for safety oversight for personnel working with animals. OEHS has worked with the Research Integrity Office to get all Animal Handler Occupational Health forms into the UNHCEMS system for easier compliance tracking. The system for administering the Animal Handler forms has been significantly streamlined through the efforts and collaboration of both offices.

9.2.3. Bloodborne Pathogens Program

OEHS oversees the campus-wide Bloodborne Pathogens program for compliance to OSHA’s standard (29 CFR 1910.1030). As required by the standard, the UNH Exposure Control Plan is reviewed and updated annually (every December) and training is provided to each participant in the program annually. Training is offered either via live training sessions through OEHS or other qualified trainers, or by electronic training content accessible through the UNHCEMS platform. In 2015, 381 staff and students were trained and 17 new staff members completed Hepatitis B vaccine declination forms.

9.2.4. Permits

There were multiple requests in 2015 for technical help in acquiring United States Department of Agriculture (USDA) permits. OEHS worked as liaison between the Principal Investigator and USDA- Animal and Plant Health Inspection Service (APHIS) to obtain approval for international shipments.

9.2.5. Biosecurity

In 2015, OEHS and COLSA approved 62 requests for access to the restricted areas in Rudman Hall. The requests included those from new faculty and staff members, graduate and undergraduate students and facilities personnel. The biological inventory remained the same and only 2 new infectious agents were added in 2015.

9.3. Chemical and Laboratory Safety

9.3.1. Laboratory Safety Inspections

The Laboratory Safety Inspection Initiative (LSII) continued in 2015 under the direction of the Laboratory Safety Officer. The LSII includes the inspection of rooms where hazardous chemicals
are used or stored. In 2015, OEHS performed safety inspections in rooms possessing or using hazardous materials in the following buildings:

- Demeritt Hall
- Gregg Hall
- James Hall
- Kendall Hall
- Kingsbury Hall
- Morse Hall
- Parsons Hall
- Rudman Hall
- Spaulding Hall

OEHS evaluates laboratory engineering controls during safety inspections and identifies issues requiring repair. OEHS also collaborates with Facilities Operations and Maintenance and the Energy Office on repair and maintenance projects as a technical advisor.

9.3.2. Chemical Safety Committee

OEHS continues to administer and support the UNH Chemical Safety Committee (CSC). Representatives from OEHS organize and attend quarterly meetings, compile minutes, draft appointment letters, and fulfill other administrative requirements for the committee. This year, two new members were appointed to the CSC representing UNH-M and the Chemistry Department. Also, the CSC contributed many hours of work on updating the UNH Laboratory Safety Plan. The final document, renamed the UNH Chemical Hygiene Plan (Figure 16), was approved by the committee in June, 2015. The new document is completely reorganized to better meet UNH researcher needs, and will help UNH meet important regulatory requirements.

Figure 16 Chemical Hygiene Plan for UNH Durham Drafted in 2015

9.3.3. Regulatory Compliance Services

OEHS continued to monitor and ensure institutional compliance with the US Department of Homeland Security (DHS) Chemical Facility Anti-Terrorism Standards (CFATS). This regulation requires facilities which possess or transfer certain “Chemicals of Interest,” to file an in-depth
screening report with DHS and comply with certain security requirements. The list of Chemicals of Interest includes over 300 chemicals that could potentially be used for sabotage or the creation of a weapon of mass effect. OEHS uses UNHCEMS to search the campus inventory for Chemicals of Interest, and works with owners to ensure the inventories are accurate.

OEHS administration of the UNHCEMS Parsons Hall Flammable Liquid Report in 2015 resulted in successful maintenance of compliance obligations. UNHCEMS automatically sends an alert to OEHS, Principal Investigators, and the Durham Fire Department when volumes of flammable liquids in laboratories in Parsons Hall exceed fire code storage limits. Also, UNHCEMS sends a warning to OEHS and PIs when inventories approach the storage limit, allowing us to evaluate inventories internally before reporting to the fire department is required. OEHS continues to work with Principal Investigators (PIs) to facilitate accurate reporting of flammable liquid inventories and accurate reporting to our emergency responders.

9.3.4. Chemical Fume Hood and Laboratory Ventilation Assessments

OEHS continued to perform detailed evaluations of laboratory chemical fume hood operation and performance in 2015. These checks are performed for each UNH’s 436 fume hoods on an annual basis and whenever hoods are reported to have operational deficiencies. OEHS conducted 478 fume hood airflow tests in 2015. As a result of this work, OEHS submitted 76 service requests for fume hoods. The chemical fume hood is the primary engineering control protecting workers in research laboratories from hazardous chemical exposures; as a result, OEHS dedicates significant resources to properly evaluate fume hoods for safe operation.

In 2015, OEHS identified significant performance deficiencies of chemical fume hoods in Rudman Hall and instituted a short-term strategy to mitigate the risk of chemical exposures to occupants. OEHS worked alongside the Facilities Project Management Group, outside contractors, and UNH Facilities Maintenance staff to determine appropriate long-term solutions to the problem. Work to resolve this challenging issue will continue in 2016.

In addition to evaluation of chemical fume hoods, OEHS also assesses operation of other laboratory ventilation components that may impact worker health and safety. These components include gas cabinets, snorkel exhausts, canopy exhausts, other point source ventilation, valve and actuator operations, dampers, and alarms and control devices including face velocity monitors and flow controllers.

In 2015, OEHS acquired two new tools which increased our capability to assess laboratory ventilation systems: a handheld micromanometer (Figure 17) and a high quality miniature smoke generator (Figure 18). These tools have been used to provide more complete information about performance of laboratory ventilation systems.
Figure 17 Micromanometer used by OEHS to evaluate laboratory ventilation systems.

Figure 18 Miniature Smoke Generator used by OEHS to assess laboratory ventilation
9.3.5. Laboratory Design and Renovation

OEHS provides technical input and support for laboratory design and renovation projects including during planning phase, construction, and commissioning. OEHS tested fume hood performance as well as other laboratory exhausts, evaluated face velocity monitor function, reviewed eyewash and deluge showers, flammable cabinets, chemical storage cabinets, safety equipment availability, egress, lab HVAC function, and chemical storage. This year, OEHS provided input and support for the following projects:

- Morse Hall room 345 major renovation to house a new Mass Spectrometer;
- Kingsbury S325 minor renovation for new researcher and support services for new carbon monoxide sensor;
- Review of major laboratory construction project at Pandora Mill Building in Manchester;
- Construction of chemistry research laboratory in Parsons Hall Room S222;
- Review of construction of new laboratory building to house NHVDL;
- Provided input on proposed laboratory design for Spaulding Hall renovation;
- Reviewed plans and provided onsite review and technical support for Spaulding Hall teaching lab renovations; and
- Provided plan review and on-site inspection of Conant Hall second floor research laboratory renovations.

OEHS uses internal funding to mitigate health and safety issues in laboratories and other research facilities. When OEHS identifies health and safety concerns that can be mitigated by installation of equipment or modification of the laboratory, it coordinates the work through the Facilities Project Management group. Projects that OEHS took the lead on in 2015 include:

- Installation of emergency eyewashes and showers in Conant Hall second floor cage-washing area, Rudman Hall basement cage-washing area, and Morse Hall Room A132 research lab.
- Fume hood face velocity monitor installations in three labs in Spaulding Hall and one in the Research Greenhouse.
- Installation of 12 vaneometers on fume hoods to assist users in evaluating face velocity.
- Installation of new fume hood controls system and face velocity monitor for chemical fume hood in Demeritt Hall room 201.
- Installation of an oxygen deficiency monitor in the Parsons Hall cylinder storage room.
9.3.6. Laboratory Safety Technical Services

OEHS staff provides technical safety services to teaching and research laboratories at UNH and UNH-M. These services include providing chemical safety information, incident investigation, laboratory exhaust evaluation, chemical storage and segregation, assessment of personal protective equipment, reproductive health assessments, and regulatory compliance services. Selected projects this year include:

- Utilized an event data logger to evaluate laboratory exhaust system failures in a Parsons Hall research laboratory.
- Administered management plan for chemical inventory of Morse Hall room 104 to comply with State Fire Marshal mandates. After receiving official approval, updated the management plan to add new chemicals to the approved chemical list.
- Prepared nine (9) draft chemical Standard Operating Procedures for researchers in Chemistry, Psychology, Materials Science, and Chemical Engineering.
- Provided safety review and assessments for nanomaterials research lab including review of ventilated enclosures, guidance on particle containment strategies, vapor control, and compressed gas use and storage.
- Worked with researchers on targeted reductions of hazardous chemicals in laboratories including reactive cyanides, chloroprene, and 1,3,5-trinitrobenzene.
- Modified chemical storage cabinets in Spaulding Hall to enhance vapor and odor containment.
- Provided edits to the General Chemistry course safety documentation to maintain consistency with the UNH Chemical Hygiene Plan.
- Created a new version of the Laboratory Check-In Guide to help new laboratory occupants identify and utilize health and safety program services.
- Provided technical input on research project planning to investigate oil droplet acoustical characteristics in a large pool.
- Provided smoke test demonstrations of laboratory exhaust systems in organic teaching lab area in Parsons Hall to help train staff in safe use of the ventilation system.
- Led project to acquire data on performance of the building chilled water loop in Parsons Hall and collaborated with stakeholders on plans to repair the system.
- Assisted Degree Controls, a NH company, in the testing of a prototype fume hood airflow monitor. When production models became available, we installed four on UNH fume hoods that lacked electronic monitors.
9.3.7. Laboratory Safety Training

OEHS provides laboratory safety training for the campus community including cryogenic liquid safety training, Laboratory Safety Awareness for Contractors, and Laboratory and Chemical Safety training. In 2015, 502 people took Laboratory and Chemical Safety training and 37 people took Cryogenic Liquid Safety training.

10.0 Hazardous Materials

10.1. Chemical Transfer Station

OEHS continued to operate the Chemical Transfer Station in 2015. Chemical orders for all research chemicals, except those for the Chemistry Department, are received at the Chemical Transfer Station.

Here, OEHS staff receive chemical deliveries, barcode the chemical containers, and collect information required for the chemical inventory. Packages are then closed up and delivered directly to research labs on the same day the package is received. Monthly trends in chemical deliveries roughly follow academic and fiscal years schedules where there is usually an increase in chemical deliveries in early fall, a decline during winter break. 2015 trends did not follow this trend very well as seen in Figure 19; this may be due to the fact that there were several new faculty hires in COLSA who ordered chemicals on a less regular cycle than other established research labs. 2015 saw another slight decline in the total number of chemical containers that were received at the Chemical Transfer Station, as seen in Figure 20.

![Chemicals Received by OEHS (by year)](image)

*Figure 19 Comparison of Number of Chemical Containers Received by OEHS from 2012 through 2015*
10.2. Chemical Inventory Validation Program

OEHS conducts periodic campus-wide chemical inventory verification with the goal of verifying the accuracy of the UNHCEMS chemical inventory. Maintaining an accurate chemical inventory is important for many reasons:

- Emergency responders rely on accurate reporting of hazards in campus buildings and rooms;
- OEHS relies on accurate inventories for regulatory reporting requirements such as EPCRA and DHS CFATS;
- Agreements with the State Fire Marshal’s office require UNH to actively monitor chemical inventories in Parsons Hall and a select laboratory in Morse Hall; and
- UNH researchers rely on information in UNHCEMS to help conduct their research; they regularly use UNHCEMS to search the campus inventory for chemicals they can use in their research.

Historically, verifications have been done at various intervals from one to three years and with differing combinations of OEHS staff, student interns, and contractors. This year OEHS partnered with the UNH Chemistry Department to perform a comprehensive laboratory chemical inventory verification. OEHS offered four highly qualified Chemistry graduate students summer research stipends in exchange for work on the chemical inventory verification. The project lasted from July 7 to August 28, during which time the team visited 242 rooms in 11 research buildings. The team...
was successful in verifying 35,007 chemical containers and adding 2,675 chemicals containers to the chemical inventory.

Figure 21 below, shows the distribution of chemical inventory in the major science buildings on campus, with Parsons Hall having the highest number of total containers.

![Chemical Containers Scanned 2015](image_url)

*Figure 21 Total Chemical Containers Scanned, by Building, During Validation Program in 2015*
The scanning team added a significant number of chemicals to the inventory during their field work, 2,675, which were distributed amongst the buildings they visited according to Figure 22.

![Chemical Containers Added During Scanning 2015](image)

*Figure 22 Total number of chemical containers scanned during the inventory evaluation project of 2015, by building.*

10.3. Chemical Inventory - UNHCEMS

Data collection and compliance reporting for OEHS relies heavily on the UNH Chemical Environmental Management System (UNHCEMS®). Indeed, the entire university community uses UNHCEMS®. There are approximately 6,784 active users accounting for active faculty, staff and students, along with several other classifications such as contractors and visiting researchers.
Additional UNHCEMS® statistics for the calendar year include:

- 40,026 chemicals containers on campus
- 14,549 unique chemicals in the inventory
- 5,070 containers added
- 8,420 containers marked empty
- 33,254 MSDS/SDS stored
- 559 active door signs
  - 9 at UNH-M
  - 65 Biosafety Level 2 signs posted
    - 1 BSL-2 at UNH-M
  - 366 AST inspection reports
  - 96 transformer inspection reports
  - 7 SAA inspection reports
  - 36 Small Quantity Generator inspection reports

Figure 23 below, shows the number of containers added to the UNHCEMS system per month. This includes items added by faculty and staff outside of OEHS. It is noted that a large number of chemicals were added between July 2015 and August 2015. The capture of these chemical containers is directly attributable to the inventory validation effort of 2015.

![Figure 23 Chemical Containers added to UNHCEMS by Month in 2015](image)

OEHS compared the number of containers found in buildings across campus to the amount of hazardous waste disposed of, in kilograms. As shown in Figure 24 below, the highest chemical...
use buildings are Parsons Hall (Chemistry) and Rudman Hall (Biological Sciences) with Spaulding Hall (Biology) following closely. It is interesting to note that James Hall disposed of more waste than Chemical Containers identified in 2015. This is likely attributable to the fact that much of their waste stream is a mixed aqueous acid solution. The addition of water to their acid waste streams increases the overall amount of waste produced and disposed. The amount of waste disposed of in Spaulding Hall can be attributed to Faculty Lab Cleanouts occurring over the course of 2015. Rudman Hall houses a large amount of ‘legacy’ chemicals. OEHS continues to work with Researchers and Staff to reduce the amount of Legacy chemicals in Rudman Hall. Hopefully we will see that happen in 2016.

![Figure 24 Total number containers compared to kilograms hazardous waste disposed](image)

**Figure 24 Total number containers compared to kilograms hazardous waste disposed**

A distribution of total chemical containers by Department at UNH is displayed in Figure 25, below. As one might suspect, Chemistry, Biological Sciences and Department of Molecular, Biological and Cellular Sciences are the areas with the greatest number of chemical containers on campus.
OEHS continued efforts to maintain compliance with hazardous material shipping regulations by offering guidance, training, on-site review, and reference material to the UNH community. OEHS provided professional guidance and training for 23 UNH research projects in 2015. This included providing guidance for domestic and international research material shipments including those to Sweden, Alaska, and Austria.

OEHS continued a partnership with the Thompson School Veterinary Technician Program to offer shipping certification training to students. As students enter their profession, they will very likely have responsibilities to ship infectious and potentially infectious samples. Providing the necessary training to perform these tasks will help students market themselves to prospective employers. Nineteen (19) students in the Veterinary Technician program attended this training which was offered as part of their coursework.

Resources created by UNH OEHS for hazardous material shipping are used extensively nationwide. Several UNH hazardous material shipping documents are widely recognized as standard reference material and are used by many other institutions. OEHS continued to create and update hazardous material shipping reference documents for the UNH research community in 2015.

10.5. Hazardous Waste Management

OEHS provides hazardous waste management support to faculty, staff and students at the Durham campus as well as the Manchester campus, UNH School of Law, Jackson Estuarine Laboratory, Coastal Marine Laboratory, Shoals Marine Laboratory, UNH Transportation Garage and USNH Facilities. We manage EPA, State of New Hampshire and State of Maine (Shoals Marine Laboratory) regulated hazardous waste materials generated throughout the year as a byproduct of research, teaching and operations and maintenance activities. In addition, the staff have been involved in a number of projects and initiatives to limit the University’s environmental liability by assuring proper transportation and disposal of hazardous materials and wastes and by reducing the quantity and toxicity of the hazardous waste streams generated.

This year OEHS Hazardous Waste Coordinators conducted the following special projects:

- Collaborated with Chemistry Professor Sterling Tomellini on the development of “green” mobile phase solvent mixtures for high performance liquid chromatography;
- Instituted the 2015 NHDES hazardous waste management rules for solvent and oil contaminated wipers. This resulted in the deregulation of 50% of our satellite storage areas that accumulate greater than ten gallons of hazardous waste; and
- Replaced the OEHS hazardous waste transportation truck with a new, less than 10,000 pound GVWR, non-US Department of Transportation (USDOT) regulated vehicle. This eliminates the staff time and expense otherwise associated with compliance with USDOT hazardous material transportation regulations.

10.5.1. Inventory Reductions

In 2015, OEHS performed hazardous material inventory reductions throughout the University to increase safety and reduce liability, including but not limited to:

- Disposal of legacy and surplus chemical reagents from Rudman Hall, Spaulding Hall, Kendall Hall, Kingsbury Hall, Morse Hall and UNH Manchester. 1,400 chemical reagent containers were removed from Rudman Hall and disposed of. This represents a reduction of approximately 12.5% of the Rudman Hall chemical inventory.
- Identification and disposal of shock sensitive, pyrophoric, reactive lithium and reactive cyanide compounds from Parsons Hall.
• Disposal of five cubic yards of paints, coatings, adhesives and other commercial chemical products from Facilities Services and Housing.

10.5.2 Hazardous Material Moves

As mentioned previously, OEHS managed the hazardous material moves for two significant University laboratory facilities, UNH-M and NHVDL:

• UNH Manchester teaching laboratory suite from the former 400 Commercial Street campus to the current 88 Commercial Street campus; and

• The New Hampshire Veterinary Diagnostic Laboratory, from its former location in Kendall Hall to its newly constructed building on Botanical Lane.

10.5.3 Management of EPA Regulated Wastes

Managed the collection, transportation and disposal of EPA regulated wastes generated from building renovation projects including:

• Lead contaminated waste materials from the UNH Housing Forest Park apartment complex lead paint abatement project;

• Ammonia contaminated brine solution at the Whittemore Center Arena;

• Universal wastes and polychlorinated biphenyl (PCB) contaminated materials from the Horton Hall and Dimond Library renovations; and

• Ninety seven tons of asbestos containing material and 450 tons of PCB contaminated wastes generated from the Hamilton Smith Hall renovation project. All hazardous waste handlers continue to receive mandatory “Hazardous Waste Handler Training” through our CEMS training platform. This program has allowed us to remain in compliance with state and federal regulations while also being an easy-to-use tool for our university members to access. Since we implemented the CEMS training platform in 2014, 313 hazardous waste handlers have received training.

10.5.4 Summary of Hazardous and Universal Wastes Generated

As a result of various campus activities, the following statistics represent biological and hazardous waste generation and disposal for the University in 2015.

Total Chemical and Biohazardous Waste generated:

• Chemical Waste: 53,561 pounds

• Biohazardous Waste: 773 cubic feet
Table 9 below represents a summary of lab pack and bulk shipments.

<table>
<thead>
<tr>
<th>Date</th>
<th>Building</th>
<th>Department</th>
<th>Generators</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 8, 2015</td>
<td>UNH-M</td>
<td>Biology</td>
<td>K. Legro</td>
<td>189 lbs./86 kg</td>
</tr>
<tr>
<td>June 9, 2015</td>
<td>UNH-M</td>
<td>Biology</td>
<td>K. Legro</td>
<td>211 lbs./96 kg</td>
</tr>
<tr>
<td>July 29, 2015</td>
<td>Rudman Hall</td>
<td>MCBS</td>
<td>Multiple generators¹</td>
<td>749 lbs./340 kg</td>
</tr>
<tr>
<td>August 20 and September 10, 2015</td>
<td>Whittemore Center</td>
<td>Facilities</td>
<td>T. Smith</td>
<td>5,638 gallons²</td>
</tr>
<tr>
<td>August 25 through October 1, 2015</td>
<td>Hamilton Smith</td>
<td>Facilities/Skanska Construction</td>
<td>R. Rouleau</td>
<td>~497,316 kg/548 tons</td>
</tr>
</tbody>
</table>

Inventory reduction for multiple generators

Total amount of Non Regulated Calcium Chloride mixture shipped from site.

Estimated total amount of demolition material containing ACM (asbestos), PCB solids, and bulk product shipped from site.

The kilograms of Hazardous Chemical Waste distributed by building are summarized in Figure 26, below. In 2015, we continue the trend of Parsons Hall being our largest waste generating building on campus. Teaching labs and ongoing research make up the bulk of waste being produced at Parsons Hall. On the other end of the spectrum, Gregg Hall has seen a decrease in overall waste production due to many factors including a decline in research activities and better hazardous waste management practices.
Figure 26 Kilograms of Hazardous Chemical Waste recorded by Building for UNH Durham Campus 2015

Total Kilograms of Hazardous Waste generated across nine campus departments is displayed in Figure 27 below. In 2015, the Chemistry department continues to be UNH's largest producer of hazardous waste. Through research and teaching activities, Chemistry will likely continue this trend indefinitely.

Figure 27 Kilograms of Hazardous Waste generated and disposed of by department in 2015
10.5.5 Universal Waste

In 2015, OEHS worked closely with Facilities to implement new procedures regarding access, storage, and regulatory compliance within our Universal Waste Storage building at 11 Leavitt Lane. Instead of allowing access to every member of Facilities who handles universal waste, we were able to streamline the process. Each zone named one person as their “key-holder” who in turn was able to access our Facility at any time throughout the day and drop off their zones accumulated waste. This has helped both departments bridge the communication gap and assure that the facility was meeting its regulatory requirements.

Universal waste production experienced a few disruptions during the year due to storage issues that were then addressed by implementing our new key system. However, waste production remained steady throughout the course of 2015 due to renovation and construction projects. These projects produced a great amount of used lamps and ballasts and depending on the scope and size of the project, in some instances outside contractors were used to dispose of materials generated. The contractors shipped the universal waste directly from the site instead of processing the waste through our Universal Waste Facility. The waste shipped by contractors does not count against our waste generators permits. OEHS does not include totals for universal waste shipped out by contractors in Figure 28 through 33 below.

![Fluorescent Lamps Removed](chart.png)

**Figure 28 Total feet of fluorescent lamps removed from the campus from 2002 through 2015**
Figure 29 Disposal of Compact Fluorescent Lamps across UNH Durham Campus from 2002 through 2015

Figure 30 Circular Lamps disposed of by OEHS from 2002 through 2015
Figure 31 U-Tubes removed from UNH Durham Campus from 2002 through 2015

Figure 32 HID Lamps removed from Campus in 2015 as Universal Waste
Figure 33 Ballasts removed from Campus and disposed of as Universal Waste in 2015

Figure 34, below, summarizes the pounds of lead-acid batteries disposed of since 2002. Since 2011 the total pounds of lead-acid battery waste has decreased from the amount disposed in previous years, but has since remained fairly consistent (2012 through 2015).

The trend in types and sizes of batteries being disposed of has evolved over the years to smaller battery housings. In addition, instead of groups accumulating large amounts of batteries for bulk disposal (as shown by the numbers in 2009 through 2011), staff are disposing of these items on a more regular basis throughout the year.
The amount of infectious biological waste being disposed of through contracted waste vendors at UNH has continued to decrease through the years, as shown in Figure 35. This is directly attributable to the implementation of autoclave treatment of biological waste as outlined in the Biohazardous Waste Disposal Plan. Implementation of the Plan has saved the University a large amount of money on regulated infectious waste disposal.

Figure 34 Lead Acid Batteries disposed of from 2002 through 2015

Figure 35 Total number boxes of Infectious Waste disposed on from 2001 through 2015
11.0 Radiation, Laser and Magnet Safety

11.1 Radiation Safety

UNH possesses a Type-A Broad Scope License from the State of New Hampshire Department of Health and Human Services, Radiological Health Section, to use radioactive material. OEHS manages the Radiation Protection Program and ensures compliance with license conditions, applicable governmental and state rules and regulations. OEHS reviews and updates the Radiation Protection Program and the Radiation Safety Users Guide. OEHS distributes and reviews new and renewal applications for the use of radioactive material and issues permits granted by the UNH Radiation Safety Committee (RSC) to Authorized Users on campus.

There were 15 radioactive permit holders and 3 terminations of permits processed in Calendar Year 2015. Seventeen students, staff, and faculty received instructor-led Radiation Worker training and 72 students, staff, and faculty completed Radiation Worker Refresher training online. One hundred and three students and staff completed Radiation Awareness Training. There are 134 sealed sources of radioactive material, which OEHS inventories several times a year. OEHS completed 45 leak test evaluations in Calendar Year 2015. Five radioactive packages were surveyed and delivered. One hundred thirty-six surveys were performed in 2015, amounting to 34 surveys on a quarterly basis.

The receipt of unsealed radioactive packages has decreased, and the receipt of sealed radioactive sources has increased over the years (Figure 36). Unsealed source use has diminished due to chemiluminescent techniques replacing radioactive tagging. Sealed sources are used by Physics and Space Science, and these research activities have increased over the past five years.
OEHS exchanged 78 dosimeters via a bimonthly exchange. Dosimeters are used to measure the doses of external radiation to personnel. OEHS will issue 78 annual occupational dose history exposure reports, which state dose histories for the previous twelve months. OEHS also sent 8 termination dose history reports for those who had ceased using radioactive materials at UNH.

OEHS collected eleven (11) 1-gallon containers of liquid scintillation vial waste and 88 gallons of dry active waste. OEHS maintained 115 gallons of decay-in-storage waste, which is held in a secure location until decayed to background levels and disposed as ordinary trash. This greatly reduces the amount of radioactive waste the University has to ship to a low-level radioactive waste facility. Ten drums of dry active waste went out for burial in 2015.

An annual compliance audit for 2015 was completed by Clym Environmental Services, LLC in October 2015. There were no findings or items of non-compliance and no recommendations for improvement. This is the best report we have ever received from Clym Environmental. As shown in Figure 37, below, overall compliance has increased over time.
11.2. Magnet Safety

A new safety program was added for superconducting magnets on campus. Two magnet laboratories were surveyed and 64 students, staff, and faculty were trained on-line. A new magnet safety manual was created by Clym Environmental with input from the laboratories and Environmental Health and Safety. A web page was created and an inventory in CEMS. There are currently four superconducting magnets on campus.

11.3. X-Ray Safety

Nine x-ray diffraction laboratories are surveyed twice per year, once by the Radiation Safety Officer (RSO) and once by Clym Environmental. As usual no items of non-compliance were reported by Clym Environmental. Thirty four people completed x-ray training online in 2015.

11.4. Laser Safety

OEHS also has an inventory of 29 class 3B and class 4 lasers, of which 8 are actively in use. OEHS offered Laser Safety training on-line and evaluation to 96 students, staff and faculty. Training includes hazard identification, proper signage, use of protective eyewear, and laser registration requirements. Sixty-three staff and students passed Laser Operator training. Twenty-three people passed online Laser Awareness training and ten others completed live, instructor-led, training in 2015. In 2016 OEHS will expand the training programs to approximately 75 additional contractors and other personnel for Laser Awareness and other Safety trainings.
Figure 38 below, demonstrates the number of lasers in each building on campus. These numbers are roughly the same as last year.

![Figure 38 Total Lasers on Campus by Building (Includes Active Lasers and Lasers in Storage)](image)

The number of trained laser operators increased and then slightly decreased due to a change in the number of active lasers over the past five years. The total number of class 3B and class 4 lasers in our inventory has been roughly the same since 2011. Figure 39, below displays this comparison.
12.0 UNH at Manchester

12.1 Safety Committee

The charge of the EHSC is to assure a safe work environment for faculty, staff and students and visitors through the creation and maintenance of effective health and safety programs. It is the responsibility of the Committee to establish appropriate health and safety policies, programs and procedures in accordance with federal regulations and guidelines that cover workplace safety and emergency preparedness. The UNH Manchester Emergency Health and Safety Committee met on a regular basis in 2015 to address pertinent health, safety, and emergency matters for the UNH Manchester campus. A few of the accomplishments of the group are listed below:

- Universal Waste training was made available on Blackboard – all facilities staff completed the training
- At the beginning of each semester UNH-M holds safety information sessions for students and staff.
- Security Camera purchase and installation has been put out to bid with an anticipated installation in early 2016
In 2015, the move from 400 Commercial Street to 88 Commercial Street was completed. This necessitated many changes, including but not limited to:

- Relocation of Automated External Defibrillators;
- Relocation of chemical inventory;
- Purchase and installation of approved chemical storage units;
- New fume hood testing and certification;
- Relocation of Hazmat document cabinet;
- Identifying new storage space for universal waste;
- Working with the University Office of Emergency Management to update building evacuation plans;
- Defining new role as tenant in regards to life safety; and
- Updating the fire extinguisher inspection schedule and contract.
Data maintained in UNHCEMS regarding the chemical inventory at UNH at Manchester from 2000 through 2015 is summarized in Table 10, below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Removed Containers</th>
<th>Added Containers</th>
<th>Active Containers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>0</td>
<td>41</td>
<td>559</td>
</tr>
<tr>
<td>2001</td>
<td>0</td>
<td>48</td>
<td>607</td>
</tr>
<tr>
<td>2002</td>
<td>0</td>
<td>15</td>
<td>622</td>
</tr>
<tr>
<td>2003</td>
<td>32</td>
<td>29</td>
<td>619</td>
</tr>
<tr>
<td>2004</td>
<td>18</td>
<td>19</td>
<td>620</td>
</tr>
<tr>
<td>2005</td>
<td>139</td>
<td>113</td>
<td>594</td>
</tr>
<tr>
<td>2006</td>
<td>14</td>
<td>23</td>
<td>603</td>
</tr>
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<td>2008</td>
<td>18</td>
<td>11</td>
<td>594</td>
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<td>2013</td>
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<td>589</td>
</tr>
<tr>
<td>2014</td>
<td>62</td>
<td>32</td>
<td>559</td>
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<td>2015</td>
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<td>59</td>
<td>560</td>
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During the move of the laboratory spaces from 400 to 88 Commercial Street, OEHS Hazardous Waste Coordinators assisted with the removal of approximately 58 containers (Figure 40).

The move from 400 Commercial Street to 88 Commercial Street saw an increase in square footage of lab space. The number of labs more than doubled; increasing from three teaching laboratories in the old space to seven teaching laboratories in the new space. The number of students accommodated in the new lab space also increased. The new laboratories can accommodate up to 24 students each; excluding the new microbiology and organic laboratories, which accommodate 16 students each. This is a 50% increase in overall classroom capacity. Of the seven new laboratories, five of them are biological laboratories supporting the additional class offerings in the life sciences area. UNH-M was able to acquire two new biological safety cabinets for the expanded molecular and microbial work at the campus.

13.0 UNH School of Law

13.1 Emergency Health and Safety Committee

The UNH School of Law established a formal EHSC in 2015. The charge of the Committee is to assure a safe work environment for faculty, staff, students and visitors through the creation and maintenance of effective health and safety programs. The EHSC reports to the UNH Law School Dean and the Office of the Provost and Vice President for Academic Affairs on matters related to emergency preparedness, industrial hygiene, and workplace safety compliance. Specific tasks include:
• Develop, review, and update written programs and procedures to ensure compliance with OSHA, New Hampshire Department of Labor and other applicable regulations, and recognized consensus safety standards;

• Serve as an advisory body to the UNH Environmental Health and Safety Committee on policies and procedures to ensure the health and safety of all faculty, staff, students, and visitors at UNH-M; and

• Obtain and analyze available data on past injuries and illnesses, identify trends, and suggest appropriate corrective actions.

The EHSC is a deliberative body that is representative of the School of Law community, and includes members from academic and administrative divisions on campus. It is the committee's responsibility to advise the Dean, and to administratively coordinate the various safety-related efforts of the university community. Full voting membership of the EHSC includes the Facilities Manager, the Security Supervisor, the Reference and Public Services Librarian, the SR Human Resource Assistant, the UNH Director of Environmental Health and Safety and the UNH Homeland Security Specialist. Chair and Vice-Chair are elected for 3-year terms with a majority vote. The EHSC Chair is a member of the UNH Environmental Health and Safety Committee.

13.2. Other Accomplishments

Other accomplishments completed by the UNH School of Law EHSC in 2015 include, but are not limited to:

• Established a UNH School of Law Safety Committee webpage, which can be found here (http://www.unh.edu/research/unh-school-law-safety-committee) and is shown in Figure 41, below;
• Provided universal waste management training to UNHL Facilities staff for hazardous wastes that can be handled as universal waste, including batteries, pesticides, mercury-containing devices, lamps, cathode ray tubes, and antifreeze;

• Updated the UNH Refrigerant Management Plan (RMP) to include all UNHL refrigeration appliances, which contain ozone-depleting substances; and

• Provided asbestos awareness training to UNHL Facilities staff. Asbestos awareness training is required for those employees whose daily work activities require the possible contact with asbestos containing material (ACM) or related responsibilities. The training includes a discussion on asbestos and asbestos related products, locations of ACM, health hazards associated with exposures, regulatory requirements, and UNH practices and procedures associated with the presence of ACM.

14.0 Emerging Issues

14.1. Hazardous Waste Management

The United States Environmental Protection Agency (EPA) is proposing the Hazardous Waste Generator Improvements Rule to update the hazardous waste generator regulations. According
to the EPA, this rule would make the regulations easier to understand and comply with, and provide needed clarification on gaps in the current regulations.

The proposed rule would allow greater flexibility for episodic generation of hazardous waste. Currently, facilities are allowed a one-time exemption for exceeding their generator status thresholds. Sporadic increased waste generation can occur due to events such as lab clean outs, which can happened more than once. Other areas that are considered in the proposed rule are emergency planning and preparedness, determination of hazardous waste, labeling, reporting, closure, and other clarifications.

There is great concern among institutions of higher education, however, that some provisions will have a significant negative effect and will not lead to improved safety and compliance. For example, the proposed requirement for a hazardous waste determination to be made at the point of waste generation before any dilution, mixing, or other alteration would create undue hardship on higher education sector institutions, particularly in research and teaching laboratories. Laboratories, art studios, and other research and teaching operations generate constantly changing waste streams at infrequent or erratic intervals. The population of students, faculty, and staff is constantly changing.

We know from experience that we can achieve greater safety and compliance when an institution issues guidance to laboratory workers and other generators so they are informed about aspects of chemical waste such as the characteristics, the regulatory listing, safe collection and storage, what can be mixed together safely, and labeling. This is followed up with procedures for final waste determination, performed by highly trained personnel such as environmental health and safety staff either at the time the waste is removed from the laboratory or in a central accumulation area.

Our experience is that generators are much more likely to take a cautious approach and collect and offer chemical waste that is not regulated by hazardous waste rules than to dispose of the waste in a manner that poses a risk to human health or the environment (e.g., via the sanitary sewer or municipal solid waste). Thus, the proposed changes that clearly state that waste determination must be conducted at the point of generation may make it more likely rather than less likely that a laboratory worker would dispose of a chemical waste improperly, due to the complexity and added burden this change would place on the generator.

### 14.2 Unmanned Aircraft (Drone and Model Aircraft) Use on Institutional Property

The Federal Aviation Administration (FAA) and relevant state law regulate the operation of unmanned aircraft systems including drones and model aircraft. USNH must comply with FAA requirements, state law, and any other locally applicable laws or regulations regarding unmanned aircraft systems. Inherent risks in the operation of such equipment may require additional
insurance provisions and policy considerations. USNH component institutions will need to consider establishing procedures to ensure compliance with those legal obligations and to reduce risks to safety, security and privacy.

15.0 Communication and Outreach

The Office of Environmental Health and Safety uses many ways to communicate our mission to the campus. The department also provides invaluable information to the general public. This is accomplished in the form of a departmental website (Figure 41) and blog, face-to-face and group meetings, electronic communications, telephone consultations, on-site investigations, group trainings, and other effective communication methods.

![Figure 42 OEHS Home Page](image)

The minutes of the Chemical, Occupational, Radiation Safety, and University Environmental Health and Safety Committee meetings are posted on the website for full public disclosure of our activities. OEHS staff members serve as representatives on these regulatory committee meetings, and attend other meetings of interest to the campus, such as building construction and renovation meetings, the Energy Task Force, the Ecosystems Task Force, the University Emergency Group, as well as ad-hoc meetings when new issues arise.

OEHS produces and distributes many pamphlets and educational materials that cover a wide variety of health and safety topics. As a general practice, the technical experts in OEHS share their programs as much as possible.
16.0  Mechanisms to Measure Compliance

UNH utilizes a number of mechanisms to assure the campus is meeting the elements and objectives of the campus EH&S programs discussed in this report. These include outside audits, regulatory inspections, technical committee oversight, OEHS program review and USNH EH&S Council review. Examples are highlighted below.

16.1.  Industrial Hygiene

Indoor air quality and toxic material exposure assessments are conducted by OEHS, outside consultants or by the campus Worker's Compensation Insurer depending on the complexity of the issue. The New Hampshire Department of Labor reviews the asbestos abatement program and the overall safety and health management program on a periodic basis.

16.2.  General Safety

OEHS and the campus Worker’s Compensation Insurer conduct bi-monthly independent safety audits of targeted areas. In 2015 these included the Jackson Estuarine Lab, the Organic Dairy Farm, the UNH Sawmill, and Shoals Marine Lab. OEHS utilizes injury and illness trending data compiled by UNH’s Workers Compensation insurer to focus safety initiatives. OEHS works with colleges and departments to maintain an electronic environmental health and safety training database for affected faculty, staff, and students. This centralized record keeping process enables OEHS and/or managers to generate queries of individual staff or area departments that are due for safety training. These reports aid in the scheduling of safety training and ensure that all necessary training is completed. Procedures for particularly hazardous work such as hot work, confined space entry, and asbestos and/or lead abatement require a reporting procedure that involves regular communication and oversight from OEHS with additional assistance from the Durham Fire Department and State agencies, as necessary.

16.3.  Fire Protection

Both the Durham Fire Department and the State Fire Marshal's Office conduct fire and life safety inspections of campus buildings. Fire suppression and fire alarm systems are tested and certified by outside consultants.

16.4.  Occupational Health and Medicine

Medical screening and surveillance programs are implemented by departments utilizing the services of either UNH Health Services or outside occupational health services organizations. Faculty, staff, and student compliance with the animal handler medical surveillance program is reviewed jointly by OEHS and the Office of Research Integrity Services on a monthly basis.
16.5. Disaster Preparedness

UNH has implemented an Emergency Action and Procedures Plan that outlines procedures to be followed by the campus community for responding to and recovering from fires, hazardous materials spills, and major accidents. Specific procedures to follow for fire evacuation are listed in the plan. Nobis Engineering, Inc. was hired to conduct a thorough review of the UNH Integrated Contingency Plan to ensure compliance with federal and state regulations.

OEHS liaises with UNH Police for annual reviews of Emergency Procedures an Action Plans.

16.6. Diving Safety

All aspects of the UNH research diving program are reviewed annually by the UNH Diving Safety Control Board.

16.7. Biological Safety

The UNH Institutional Biosafety Committee reviews and approves all biohazardous material protocols, including use of recombinant DNA molecules, for compliance with the National Institutes of Health Guidelines. OEHS conducts laboratory audits to assure proper biosafety procedures are being followed in the lab. Labs using human source materials are kept in compliance with the OSHA Bloodborne Pathogens Standard through training and strict use of Universal Precautions.

16.8. Hazardous Materials Inventory and Reporting

The U.S. Department of Transportation and the Federal Aviation Administration perform unannounced inspections and audits of the shipping program as part of a regional initiative to enforce hazardous materials shipping regulations at colleges and universities.

16.9. Hazardous Waste Management

OEHS provides regular oversight and review of laboratories and shops that generate and store hazardous waste. The New Hampshire Department of Environmental Services and the U.S. Environmental Protection Agency conduct unannounced inspections of the hazardous waste management program at colleges and universities. OEHS staff conducted a review of the Central Hazardous Waste Accumulation Area Preparedness, Prevention and Contingency Plan, the Hazardous Waste Transporter Contingency Plan, and the Central Accumulation Area Security Plan.
16.10. Radiation Safety

OEHS inspects all laboratories that contain radioactive material quarterly, performing contamination surveys, radiation surveys and compliance audits, ensuring all laboratories continue to meet all license conditions. The Radiation Safety Program is audited annually by an outside consultant. Results of the audit are shared with the Radiation Safety Committee and the Committee approves any changes to the Radiation Protection Program recommended by the audit consultant.