

2019

Environmental Health and Safety Annual Report

WORK SAFE. BE SAFE. STAY SAFE.



The Environmental Health and Safety Office mission is to promote a safe and environmentally conscious campus by providing expert guidance and effective leadership in support of Carleton University's strategic goals.

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MESSAGE FROM THE DIRECTOR

The Environmental Health and Safety Office is pleased to provide you with the 2019 Carleton EHS Annual report.

Our team offers solution-based programs including Fire and Life Safety, Industrial Hygiene, Laboratory Safety, Workplace Violence and Harassment Prevention, Ergonomics, and Accident/Incident Prevention. We identify, evaluate and mitigate operational risk across the spectrum of our research, teaching and operational activities. Through collaboration and partnership with stakeholders across the CU community, we continue to build a safe and productive environment for all to learn and work.

As we end one decade and begin another, and in alignment with our commitment to continuous improvement in building a strong and robust safety culture, we thought it timely to highlight some of the significant strides we have achieved over the past decade. In 2011 Carleton invested to develop a team of highly skilled professionals, that I am privileged to lead. In addition to dedicated safety leaders, we invested in solutions to improve safety, efficiently. Some milestone moments include:

- Implementation of an integrated health and safety management system
- Introduction of a chemical inventory and waste tracking system
- First to offer online training to all members of the CU community
- Decreasing WSIB costs, positioning the university for the next decade.

Each year has shown year over year successes. I am pleased to highlight some of the performance based metrics we achieved, together, in 2019.

CU 2019 SAFETY METRICS:

- # of Good Catches reported exceeded **100** for the 3rd straight year
- **94%** of corrective actions linked with very high / high risk concerns resolved
- **68%** increase in chemical entries into the inventory over last year, highlighting tremendous research growth, enhancing hazards management and waste tracking
- **~21** CU members no longer requiring paramedical benefits following an ergonomic assessment.

The strength, resiliency and commitment by our community in fulfillment of our University's mission has never been more apparent than this past year, and this past month, as navigate our new circumstances.

Through the lens of reflection we can confidently state that we have accomplished much, but there remains work to be done. We are eager to continue to move the yardstick for the next decade and beyond.

WORK SAFE. BE SAFE. STAY SAFE.



Nancy Delcellier, MBA, BSc, CRSP
Director
Environmental Health and Safety

A DECADE OF PROGRESS



Implementation of asbestos, laboratory and biosafety programs. Began performing in house risk/exposure assessments



Online Worker/Supervisor Health and Safety Awareness, and WHIMIS training. Roll out of campus chemical inventory software and chemical barcoding



2011

We start building our team

2012

Good Catch program started. Ergonomic prevention program implemented. Phase 1 of asbestos abatement based on campus survey completed in previous year



2013

2014

Installed campus wide lab. Completed 3 year asbestos. Human Pathogens and Toxins license obtained.



2015



Consolidated testing approach for all engineering controls on campus. Installed fume hood monitors. 2 fold increase in reported Good Catches from previous year



CU WorkSafe launched. Decommissioned and rendered safe 6 labs for renewal. Began consolidated management of campus life safety alarms testing



Laboratory signage. Asbestos abatement project. Compliance with Hazardous Waste Regulations (HPTR)



Developed CUWorkSafe. Decommissioned LSRB and two labs in Steacie. Completed campus noise survey & signage. Implemented Lock out / Tagout Program across divisions





Environmental Health & Safety Accomplishments

PUTTING OUR PLAN INTO ACTION

In an effort to continuously improve health and safety at Carleton University, a multi year action plan to further enhance safety culture was developed in 2016. We are now entering the final year of the current plan, and will be identifying new key priorities over the course of the year, as we start our journey with the WSIB Health and Safety Excellence program. We will be seeking engagement opportunities with key stakeholders, including the Joint Health and Safety Committee, as well as the broader community. Together, these will drive the development of key programs and continue to entrench the safety culture at Carleton University.

Year 1 (2017)	Year 2 (2018)	Year 3 (2019)	Year 4 (2020)
Engineering controls – Enhance testing protocols	Implement CUWorkSafe (Phase 1—IIGC)	WHMIS 2015 program and training updates	Implement CUWorkSafe (Phase 2—Inspections)
Campus wide Noise Assessment	Developed strategy for occupation based training	Develop CUWorkSafe (Phase 2—Inspections)	Campus workshop equipment audit
Install AEDs across campus	Hot Work and Smudging Procedures	Update of Health and Safety Management System	Engineering controls – Enhance testing protocols with personal monitoring
Develop CUWorkSafe (Phase 1—IIGC)	Designated Substances Program update	Update Workplace Violence and Harassment Prevention training	—

DID YOU KNOW?

In 2019 EHS completed:

75⁺ Laboratory Inspections

85⁺ Ergonomic Assessments

200⁺ Fume hood and local exhaust ventilation performance tests



45⁺ Biohazards applications approved and renewed

30 Biological Safety Cabinet performance tests



25⁺ Environmental assessments (asbestos, mould, IAQ, noise etc.)

385⁺ Fire System deficiencies were identified and fixed

90⁺ Life Safety Alarm (Cl₂, NH₃, CO, H₂S, O₂, etc.) tests and calibrations

375 Hot Work Permits Reviewed

Research and Operational Safety

In 2019, the Nesbitt Biology Building underwent extensive renovations. These included six laboratories and 2 tissue culture rooms upgraded to comply with the containment standards required under the Human Pathogens and Toxins Regulations. Over 9 months, existing spaces were decommissioned and floor to ceiling upgrades (i.e. building-wide systems, casework, emergency eyewashes and showers) were completed. In addition, greenhouses and labs that house plant pest research and certified under the Plant Protection Regulations were also renovated. EHS worked as part of the team of CU stakeholders (researchers, department, FMP) to make this project a success!

DID YOU KNOW?

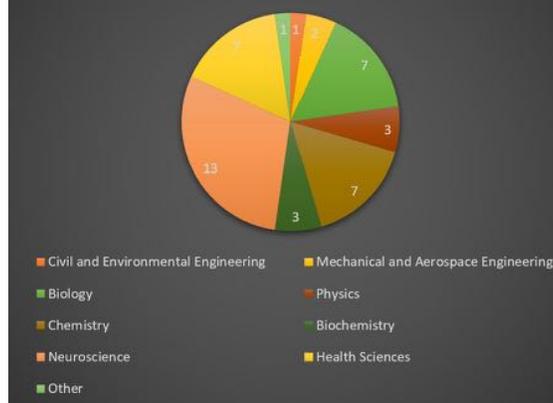
1. On average, Carleton receives over **330** hazardous products each month
2. **\$38k** spent on safe and compliant disposal of hazardous chemicals and biological waste
3. **995** roof anchors are inspected annually
4. Over **200** fall arrest and lift equipment devices are inspected annually

Collaborations and interdisciplinary research are on the rise! In 2019, nine different departments across the University engaged in research involving biohazardous materials compared to only four departments just 5 years ago.

450 SEARCHES IN CHEMWATCH

By hiring summer student workers, the Environmental Health and Safety office was able to successfully implement Canada's WHMIS 2015 regulations. Along with the objective of updating 100% of existing, non-compliant chemical labelling in our laboratories, we took the opportunity to reconcile Carleton's chemical inventory system. We determined a **70%** accuracy rate in chemical storage across campus. Laboratories were reminded to remove barcodes from empty chemical bottles and dispose as per the chemical inventory procedures. Completing this crucial project over summer 2019 laid the foundation to allow EHS to update the laboratory signage in 2020 to correspond to chemical hazard risk.

Departmental Biohazard Research



EMERGENCY RESPONSE AND FOLLOW UP

Keeping the CU community safe is critical in a hazmat situation. EHS team members were called to respond to an unknown origin mercury spill in a laboratory within the Steacie building. The extent of the spill, the hazards associated with mercury and the requirements under the Ontario Designated Substances Regulations (*O. Reg. 490*) necessitated careful and meticulous spill clean-up over a 2 day period.

Direct reading air measurements were taken in multiple locations throughout the laboratory during an initial site survey, continuously during the clean up, immediately after clean-up and during final verification in combination with a mercury indicator powder. Final air sample results indicated mercury levels below the CDC Agency Toxic Substances and Disease Registry (ATSDR) acceptable level for occupancy within a work setting of 3 ug/m3.

CONTINUED RISK MITIGATION ON CAMPUS

We continue to apply site specific air monitoring to confirm safe practices and engineering controls across the Carleton community.

In 2019, an exposure assessment to an anti-corrosion chemical additive (NA-104C) in building-wide steam systems was conducted in the CU Microfabrication Facility. The deposition of crystallized NA-104C indicated potential elevated airborne contaminants that may result in adverse health effects. Based on Time-Weighted Average Threshold Limits set out by the American Conference of Governmental Industrial Hygienists, results collected during sampling determined no concern of exposure.

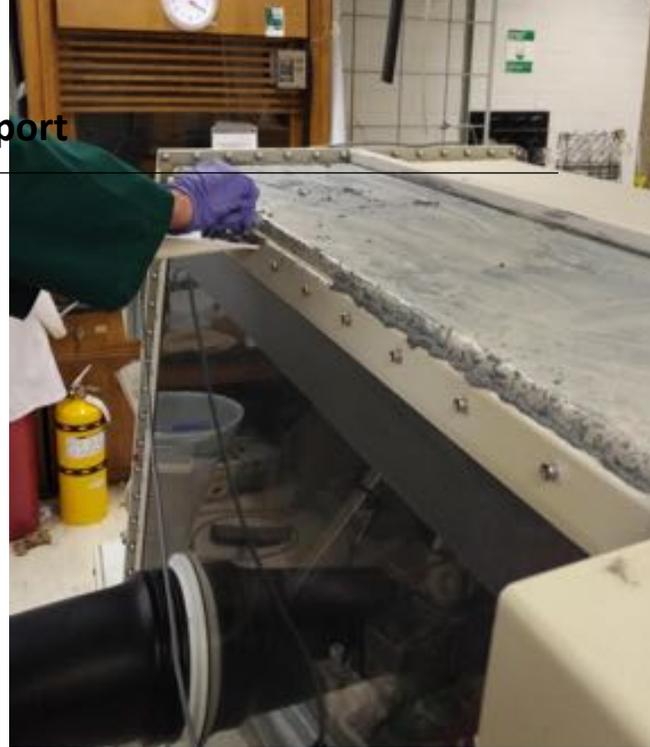
In addition, a personal air monitoring campaign was completed in the Faculty in Science solvent waste bulking facility to validate the effectiveness of the local exhaust canopy. Samples were collected in the breathing zone of the worker while performing the bulking. Air sampling indicated exposure to various solvents were at an acceptable level. That said, given the limited sample size collected, baffles were installed on the canopy to increase airflow and raise the canopy performance to appropriate engineered design guidelines.

Office Ergonomics continues to be a high demand program for our team with **85+** assessments completed in 2019. Over 80% of the requests come from staff who report pain while working at their desk. More than 30 of those staff members used their paramedical benefits to help address their symptoms.

21

Number of staff no longer using paramedical services after an ergonomic intervention this year*

* estimated



Steacie Fire

A fire erupted Saturday January 26th, just before 7 pm, in a laboratory in Earth Sciences within the Steacie Building. Over a year later we are almost ready to reopen the laboratory.

Significant concerns were raised during the City response, as over 18,000 of Carleton's 26,000 chemicals are housed in Steacie, primarily in Chemistry.

The Carleton Chemical inventory system was critical in providing first responders with accurate contents of the laboratory, and associated laboratory spaces. Initially thought to be a hazardous materials fire, the cause was identified several days later as electrical in nature, caused by deteriorated armoured electrical cable and electrical junction box under the lab fume hood. Deterioration was caused by many years of exposure to corrosive vapours from acids stored underneath.

As the fire spread, the fume hood collapsed, breaking the containers stored below, which then ignited. Once ignited, the chemicals likely contributed to the growth of the fire, as well as its spread.

The presence of "chases" within walls contributed to the extremely rapid spread of smoke throughout the building, resulting in lost time ensuring the fire had not spread to multi level walls and significantly increasing water, throughout the building.

Our accurate ACM inventory avoided fears of asbestos exposure.

IMPACT OF THE FIRE:

2M⁺	Remediation Costs
3	Hours required to extinguish fire. Another 3 hours before returned to CU
14	Months required to complete repairs
1	Day of lost class time



KEY SAFETY FINDINGS:

Of the **33** additional fume hoods on campus of similar vintage and construction

25

Of the fume hoods had similar deteriorated conditions and many with BX cable pitting visible

As a result, all fume hoods of concern were immediately signed on the sash, and locked and tagged out at the panel with alternate power being provided to researchers when needed.

Additional safety findings from the fire are noted below:

1. Improper WHMIS labelling which caused first responder confusion.
2. Gaps in completed training from the users of the space (Laboratory Safety, WHMIS, Supervisor H&S Awareness).
3. General H&S deficiencies identified in the lab space that should have been identified and mitigated.
4. On-site custodial staff and supervisors unaware of water shut off locations.

STAYING SAFE, POST FIRE:

Immediately began remediation using 3rd party specialists (within 12 hours), avoiding risk of mould growth, and minimizing damage to sensitive scientific equipment throughout the building. In addition, the training and lab space specific gaps were addressed.

\$5M

Funding obtained
(\$2.5M/year)

Most significantly, funding was obtained to address base building systems concerns within the Steacie building.

1. Vintage fume hoods replaced (16 fume hoods in year 1, remainder in year 2).
2. Funding to include sprinkler system installation building wide, and replacement of chemical suppression system.

Given the significance of the event, findings were shared across all Ontario Universities and then Canada wide.



Fire and Life Safety

In accordance with Ontario Fire Code requirements, all buildings completed an evacuation drill in 2019. The target for a successful evacuation is substantial building evacuation by 8 minutes. All buildings met this target with the Residence buildings averaging **6** minutes and academic and administrative buildings averaging just over **4.5** minutes.

In 2019, EHS managed the Fire Alarm and Suppression Systems on an interim basis while maintaining existing EHS fire and life safety responsibilities. This included oversight for inspections, testing, and maintenance of key fire safety systems on campus. With a comprehensive vision, of systems and prevention, we achieved key improvements aligning with the Ontario Fire Code and NFPA 25.

2019 ACCOMPLISHMENTS

425+

Fire systems inspections were reviewed and deficiencies identified were actioned for repair

375

Hot Work Permits reviewed

30 +

Calls for investigation of odours/burning smells on campus

20 +

Fire Safety Plans revised, updated and submitted to OFS

\$270k

Spent to complete repairs to the fire detection and suppression system

1400

Sprinkler heads replaced in Lennox-Addington due to recall

1300

Independent smoke alarms in Residence building are now annually inspected

560

Additional annual inspections completed of fire suppression system (fire pumps)

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TRAINING HIGHLIGHTS

Safety training is a key component to ensuring staff and students are aware, competent and able to work safely at Carleton University. The EHS team works diligently to provide training opportunities across a variety of platforms to meet the needs of our community. Currently, we offer the CU community **20+** general and occupation specific training courses. We have created and implemented 12 courses in the last 5 years and have identified gaps where an additional 15+ courses are required. We are working with stakeholders to address this community need. Given the nature of university staffing, there is a need to move from participant completion counts to completion percentage relative to those required to take the course. This will be a key training metric moving forward.

8,874

Total # of course completions by staff and students in 2019

33%

Of CU staff completed the mandatory Respect and Safety Course

Online Training Courses	# of Participants
Respect and Safety	2408
Worker Health and Safety	1414
Supervisor Health and Safety	256
WHMIS	2650
Asbestos Awareness	242
Fire Safety Awareness	272
Ladder Safety	127
Total	7369

In Class Training Courses	# of Participants
Bio-Safety Awareness	169
Workplace Health and Safety Inspections	6
Emergency First Aid and CPR	60
Laboratory Safety	292
Laser Safety	25
Radiation Safety	20
Transportation of Dangerous Goods	9
Young Worker Orientation	42
Working at Heights	43
Fire Safety	801
Mech & Aero LOTO for CUSP	20
Grounds Students Safety	18
Total	1,505

AIMING FOR EXCELLENCE



The Workplace Safety and Insurance Board (WSIB) of Ontario has launched a Health and Safety Excellence program that provides employers a clear roadmap to improve workplace health and safety. The objectives are:

- Lower incident and injury statistics
- Reduce risks related to workplace hazards
- Improve overall Health and Safety culture

Similar to Excellence Canada, the process is to attain each level (foundations, intermediate and advanced) by fulfilling the requirements for 36 different health and safety focused topics. The steps include reflection on current Health and Safety climate, development and improvement of programs, demonstration, verification and achievement. In addition to recognition for proven commitment to Health and Safety, a rebate of **1.4-2%** on rate premiums is awarded for every topic the employer completes with successful validation from the WSIB.

Working in collaboration with the Council of Environmental Health and Safety Officers to ensure consistency across Ontario Universities, Carleton has begun its journey on the path to Health and Safety Excellence.

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CUWorkSafe is the first EHS software solution to be implemented by a Canadian University that will be a fully integrated, enterprise EHS management solution. 2019 focused on evaluation of the initial system implementation and paved the way to develop, test, and implement the inspection module of **CUWorkSafe**. This will allow our community to proactively respond to concerns in a planned and systematic approach based on the space and hazards present within that space.

Being able to manage and track internal and external inspections/audits through one tool will streamline and ensure we are able to meet regulatory and best practice demands of our institution and its variety of needs. In early December, the community was provided access to select inspections. **27** sets of inspections were completed prior to year end to manage risk associated with fire safety, engineering controls (fume hoods, biological safety cabinets), and findings from Joint Health and Safety Committee members. 2020 will see all JHSC inspections in **CUWorkSafe**.

KEY INDICATORS FOR 2019

85

Corrective Actions generated from completed Inspections in 1 month

460

Incidents, Injuries and Good Catches (IIGC) in 2019

22%

Increase in the number of Corrective Actions compared to 2018

15

New hazard and space specific inspections created

Campus wide safety improvements initiated through corrective actions continue to increase. Our monthly rate has already increased **2 fold** in 2020 relative to 2019. There is a need to prioritize based on risk and efforts to close out higher risk concerns are noted below:

Summary of 2019 Corrective Actions

Risk Category	# of Corrective Actions	# of Open Corrective Actions	# of Closed Corrective Actions	% of Corrective Actions Closed
Very High Risk	5	0	5	100
High Risk	12	1	11	92
Medium Risk	53	16	37	70
Low Risk	129	85	44	34
Total	199	102	97	NA

Good Catches are the university's primary way to report hazards and prevent future injuries. Please take a moment to see the top 3 categories of Good Catches reported 2019 by our safety engaged CU community.

GOOD CATCH BY ACCIDENT TYPE	2019 EXAMPLES	COUNT
Possible exposure to harmful substances	Fume hoods not working, live wires, possible exposure to mould or natural gas, noise concerns, life safety and oxygen depletion situations	37
Possible slip, trip and fall injuries	Icy conditions, pot holes, damaged walkways	21
Possible struck or caught by injures	Spalling concrete, ceilings needing repair due to water damage, exterior signage not secure	18





INJURY/WSIB METRICS AND REGULATORY COMPLIANCE

In 2019, there were 4 critical injuries on campus. All were related to slip, trip and falls as a result of environmental conditions (weather and walkway conditions). Our WSIB statistics continue to be in excellent standing (as lost time injuries and days lost due to injury). Carleton is not only in a WSIB premium rebate position as we move to the new WSIB premium framework in 2020, but our new premium is reportedly the **lowest of all the Ontario Universities**.

	2015	2016	2017	2018	2019	Change
# of Critical Injuries	2	3	4	7	4	
Days Lost to Injury Claims	102	48	42	8	17	
# of Lost Time Injuries	9	7	8	5	9	
Average # of Lost Days/Injury Claim	11.3	6.9	5.25	1.6	1.8	
# of Good Catches Reported	37	89	160	161	105	

Carleton University continues work hard to meet our regulatory requirements. A summary can be found below:

Ministry of Labour (MOL) – Notifications/Enforcement	Ministry of Environment (MOE) - Enforcement
4 notifications for Critical Injuries	1 Inspection Full Compliance
Canadian Food Inspection Agency (CFIA)	Public Health Agency of Canada (PHAC)
3 labs PPC Certified Full Compliance	Full Compliance
Canadian Nuclear Safety Commission (CNSC)	Public Works and Government Services Canada (PWGSC)
No Inspections Full Compliance	Program Audited Full Compliance, License Renewed
Ottawa Fire Services	
12 Inspection Orders All orders resolved, full compliance	

Strategic Priorities for 2020

2020 UPDATE

For 2020, we will complete our 4 year plan and continue to enhance the safety culture at Carleton University as we embark on Carleton's journey to Health and Safety Excellence. Some of the key areas of focus for 2020/2021 include CUWorkSafe, occupation specific training as well as supporting faculty, staff and students as we transition to remote operations across our operations

CUWorkSafe

Refinement of the CUWorkSafe Inspection module. Thus providing Carleton University with a comprehensive tool to assist supervisors and managers to evaluate and correct hazards.

Employee Training

Establishing the systems necessary to embed risk based health and safety training within each employee's file will firmly establish Carleton as a health and safety innovator.

The New Normal

Develop and implement the strategies required to support remote operations in teaching and learning, as well as ensure the health and safety of staff and faculty who will continue to support the university on campus.

We continue to implement required new laboratory infrastructure further to the Steacie fire. Training, inspections and planning continue to be informed by those findings. January 2020 also saw the transfer of responsibilities for Fire Safety to Campus Safety Services to align with their emergency management mandate.

COMMUNITY ENGAGEMENT

To promote and encourage a safety culture within CU and beyond, the EHS team members continue to either lead or are involved with the following committees and organizations:

INTERNAL

Joint Health and Safety Committee

Radiation Safety Committee

Animal Care Committee

Biohazards Committee

Emergency Management Advisory Committee and
Emergency Management Team

Working Group for Workplace Violence and
Harassment Prevention

EXTERNAL

Council of Environmental Health and Safety Officers

Ontario University Biological Safety Officers

AIHA Ergonomics Committee

AIHA Control Banding Committee

CSSE Journal Sub-Committee



Student Impact and Experiential Learning Building on the success of existing experiential learning activities, discussions will continue to seek out additional opportunities for student engagement and knowledge transfer. This will continue to include the following:

- FED Capstone projects – review of safety plans for projects. Introduction to real world requirements
- Review of Lab exercises for new Faculty of Science undergraduate laboratories
- Placement for Health Sciences student annually
- Completion of respiratory fit testing for student work placements across the campus
- Summer students as part of the EHS team

EHS Team

Our team supports the prevention of incidents and injuries on campus through a number of solution based programs. Our highly skilled team works collaboratively with faculty and staff to enable and support research and student activities.

Nancy Delcellier MBA, BSc, CRSP
Director

David Hunt MScA, CIH
Manager— Environmental Health and Safety

Tina Preseau MSc
Manager— Laboratory and Academic Safety

Tim Golding BScEE, CRSP
Environmental Health and Safety Officer (formerly
Fire Prevention Officer)

Norm Barton
Radiation Safety Officer

We value and incorporate student experiential learning into our office. In 2019 we hired six students and continue to support the Health Sciences Capstone Course with a field placement during the fall and winter semesters. All students from our previous years have gone on to further graduate studies and successful professional careers.

Environmental Health and Safety Office

For more information about our services, please visit [Carleton.ca/ehs](https://www.carleton.ca/ehs)

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