Environment, Health, and Safety Office

The Environment, Health, and Safety Office (EHS) is an institutional compliance office as well as a service and operations department. It supports the Institute's environment, health, and safety mission associated with education, research, and operation of its endeavors in Cambridge, at Lincoln Laboratory, and worldwide.

During the past year, there continued to be a national focus on environment, health, and safety issues at academic institutions. This is the result of several tragedies that occurred at universities in the previous three years: the death of a laboratory researcher at the University of California, Los Angeles, with subsequent criminal charges filed against the university and the principal investigator (PI); the death of an undergraduate student in a departmental machine shop at Yale University; and the laboratory explosion and injury to a graduate student at Texas Tech University. The US Chemical Safety Board released a report and video identifying some of the root causes behind these tragedies and asking universities to review and strengthen their environment, health, and safety programs. The National Academy of Science is currently conducting a study titled "Establishing and Promoting a Culture of Safety in Academic Laboratory Research." In view of these events, EHS has continued its efforts to review and strengthen the Institute's environment, health, and safety management system.

Enabling MIT's Mission

Faculty/Principal Investigator Responsibilities

In FY2011, EHS began an initiative to conduct a new faculty/principal investigators (PIs) environment, health, and safety orientation. It was expanded to include an overall presentation and discussion for all faculty members in an effort to help them understand their environment, health, and safety responsibilities and become aware of the resources available to assist them. The orientation has been completed by 131 out of 425 (31%) PIs with hazards in the EHS Space Registration database. In FY2014, EHS plans to continue this outreach.

Machine Shop Program

The Yale University incident also spurred EHS to conduct a complete review of its machine shop program. We assessed all 50 machine shops at the Institute, convened a machine shop safety forum of machine shop supervisors or representatives to share and review practices and working alone policies, and successfully completed a shop safety video contest to engage the community about shop safety. We completed a documented inventory of 484 machine tools and their safety features, and identified where improvements were needed in 387 of them. Upgrades have been completed in nine shops (100 tools) and are in process in 10 shops (145 tools). This will result in upgrades to 63% of the machine tools. It is expected that the remaining 31 shops will be completed in FY2014. The Office of the Executive Vice President and Treasurer has co-funded these upgrades with the associated departments.

Comprehensive Laboratory Hazard Assessment

There are currently several programs that assess a specific hazard in a laboratory and/or document conditions in the laboratory. However, there is not a comprehensive assessment of each laboratory based on the complete information available and review of specific activities performed in the laboratory. The Lab Hazard Assessment (LHA) Pilot conducted in FY2013 was well received. EHS has conducted LHAs in more than 30 PI groups in 10 departments, laboratories, and centers (DLCs) to date.

One DLC team (the David H. Koch Institute for Integrative Cancer Research at MIT) is slated to finish conducting LHAs in all groups by the end of FY2014. EHS has also reviewed a total of six undergraduate courses. In the coming year, we are looking to expand the program with more LHAs done in laboratories, including new DLCs, and hope to have additional DLCs sign on to do all of their laboratories. EHS is also working with more undergraduate courses to perform a hazard assessment and develop tools for faculty.

Accident and Injury Reporting System for Students

In collaboration with MIT Medical, EHS expanded the current system required by the Occupational Safety and Health Administration (OSHA) to document and track employee injuries to include students. This has allowed EHS to do more thorough follow-ups on incidents involving students and to identify trends and opportunities to intervene in activities in order to eliminate or minimize the risk of accidents and injuries. In FY2013, there were 51 reported incidents.

International Agreements

EHS's major efforts this year were to support the Singapore-MIT Alliance for Research and Technology (SMART) and the MIT Skolkovo Tech (SKTech) agreements. Support for SMART has focused on the design of and move into the new facility in Singapore in the last half of FY2013 to the first quarter of FY2014, and to assist in customizing and implementing the Institute's environment, health, and safety management system for adoption by SMART. Support for SKTech has been to advise on the design of the new campus and to develop a strategy for identifying and assembling the components of an environment, health, and safety management system and program for SKTech.

In addition, EHS has provided advice to other collaborators, including the Masdar Institute Cooperative Program, the Singapore University of Technology and Design, and King Fahd University.

Laying the Foundation for the Future

Laboratory Design Reviews

EHS has been an active design team member during the programming and schematic design phases of the Nano-materials, Structures, and Systems Lab (nMaSS). Environment, health, and safety considerations are significant for this clean room building, which will have significant campus impacts during its construction and significant use of hazardous materials when opened. EHS has been advocating for

consolidation of similar research equipment that uses highly toxic gases in the nMaSS facility so the expensive engineering controls required for these systems can be shared. Laboratory ventilation, hazardous gas monitoring, chemical storage, hazardous waste handling, and waste water treatment are just some of the areas addressed. Minimizing community impact during construction will be another area of focus. Over all, 92 design and construction projects have been reviewed.

Master Plan for Campus Waste Water

EHS's work with Campus Planning and Design, Engineering, and Construction (CPEC); the Utilities Operations FY2012's Notice of Violation (NOV) for mercury and FY2013's Notice of Noncompliance for copper from the Massachusetts Water Resources Authority (MWRA); and future needs for nMaSS has brought all to agree that a study to update the campus waste water master plan and probable expansion of the system is necessary.

Fast Track Construction of the New Daycare Facility at 219 Vassar Street

EHS worked with CPEC under the Massachusetts Contingency Plan for risk assessment of contaminated soils and stewardship to achieve a clean space and playground for families and children at the new 219 Vassar Street child care center. EHS established imported fill/soils criteria for environmental contaminants for future development projects on campus.

New Central Hazardous Waste Accumulation Facility

A new facility is planned for the ground floor of Building 24 that will replace the existing 12A facility. The improved layout of the facility will ensure a more efficient and effective operation and provide some redundancy in critical campus waste handling facilities that currently do not exist.

Transforming Experiences through Collaboration

eShipGlobal Software Project Pilot

A pilot will be conducted to determine if eShipGlobal software can simplify the shipping process for the MIT community, reduce overall costs, and enhance compliance for shipping of hazardous materials. This is a collaboration between Sourcing and Procurement, Information Systems and Technology, the Office of Sponsored Programs (OSP), DLCs, and EHS. The project is in the planning stage for the pilot, with implementation scheduled for the coming fiscal year. Goals include increased compliance with US Department of Commerce export and US Department of Transportation hazardous materials regulations, and added benefits are a simplified shipping process and reduced shipping costs for the Institute.

Laboratory Coat Program

The Committee on Toxic Chemicals mandated the use of laboratory coats for all work with hazardous chemicals at their June 2012 meeting, in part as a response to the national concern about safety in laboratories. A task force was established by EHS consisting of representatives from Sourcing and Procurement, the user community, and EHS to assure that information and options were available to the MIT community

for selecting appropriate lab coats, and for cost effective services for cleaning and maintaining the lab coats. The work of the committee has resulted in the selection of two companies as preferred vendors, and a compilation of extensive information about laboratory coat options. An outreach campaign is planned for FY2014 to ensure that DLCs know about the preferred vendors and options so their graduate students can have easy access to the correct lab coats.

Compliance

The Massachusetts Department of Environmental Protection (MassDEP) conducted a Title V air permit audit during spring 2012. This inspection resulted in a consent order with fines to the Central Utility Plant (CUP) for stack emission exceedances and to the MIT campus for boiler and emergency generator noncompliant stack heights. EHS and CPEC have initiated a project to meet MassDEP requirements.

Federal and state reporting of greenhouse gas emissions indicated that 2012 emissions were reduced by 4%, compared with 2011 (in metric tons carbon dioxide equivalence).

MIT fulfilled all obligations for the Massachusetts Water Resources Authority Notice of Noncompliance that originated in July 2011 for exceedance of mercury in the wastewater discharge for the main campus permit.

CUP was issued two Notices of Violation for exceedance of copper by the MWRA for wastewater discharge. The CUP wastewater system services Building 42 operations and 100 laboratories from five buildings on campus. Testing of copper for each NOV was closed out when additional testing revealed that the CUP discharge met the permit discharge requirements for copper.

MassDEP audited several Activity Use Limitation (AUL) sites on and off campus. These AUL sites are regulated by the Commonwealth for managing low-risk contamination left in place on properties. Findings from the audit were resolved by EHS, the Office of the General Counsel, and the City of Cambridge. No violations or penalties were proposed by MassDEP.

MassDEP audited the National Pollutant Discharge Elimination System non-contact cooling water permit for research and development equipment at the Plasma Science and Fusion Center. There was a letter issued of no-findings for this audit.

In preparation for upcoming stricter stormwater regulations, EHS has reviewed the current stormwater system and operations for future state permitting and to meet the needs of the Nano-materials, Structures, and Systems building.

OSHA conducted an inspection of the Next House kitchen and issued citations and fines to the vendor but not to MIT.

Accomplishments

During the past year, EHS continued its strong collaboration and service through its interactions with faculty, postdocs, graduate and undergraduate students, and staff. It

also collaborated closely with other administrative offices, particularly the Department of Facilities, the Division of Student Life, Sourcing and Procurement, and IS&T, to support their efforts to meet the Institute's mission.

Waste Management Program

Regulated Medical Waste: This new regulated medical waste management program improves the collection and processing of biosharps containers and biowaste from the MIT laboratories. The number of biosharps containers collected was reduced from 21%, while the number of bio-burn boxes increased 66%. Once fully implemented, the new management practices will save the Institute money, eliminate the need for 10,000–11,000 autoclave cycles per year for in-house waste processing, and eliminate the cumulative time spent by two to three researchers' autoclaving waste. The program has had great acceptance in the Institute. EHS currently covers 85% of DLCs and expects full implementation by the end of FY2014.

The regulated medical waste management team won the "Serving the Client" Institute Excellence Award for their work in the pilot program for the Department of Biology.

Radioactive Waste: The Radiation Protection Program continued to collect and process low-level radioactive waste collected from the radiation laboratories. The total waste disposed was 259 cubic feet. This was a decrease of 18% from FY2011. The total waste managed was 510 cubic feet.

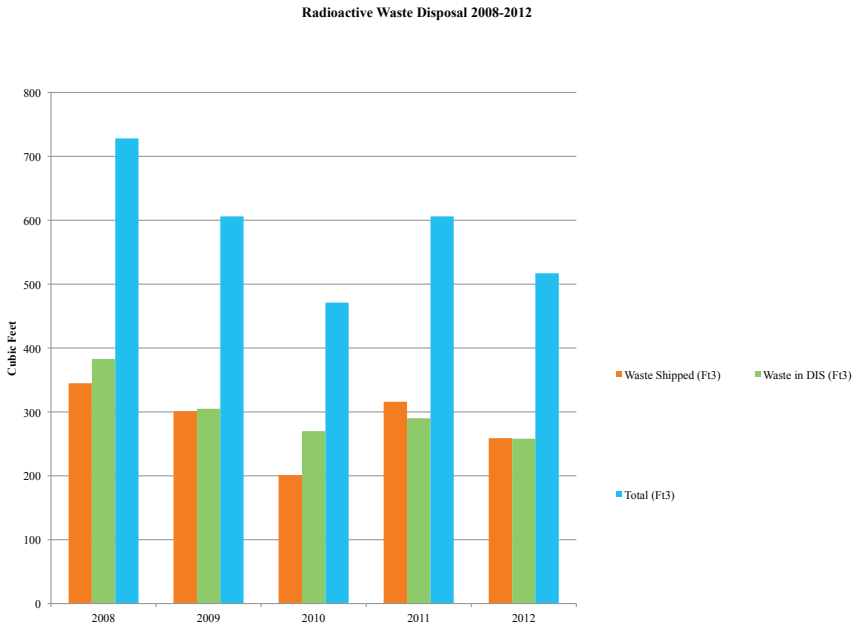

Figure 1. Radioactive waste disposal 2008–2012.

The chart above represents the total low level radioactive waste volumes collected and disposed over the past five years. The low level radioactive waste shipped represents dry active waste and liquid scintillation waste contaminated with long half-lived radionuclides. The decay-in-storage waste represents dry active waste and radioactive sharps that were contaminated with short half-lived radionuclides and were managed in-house.

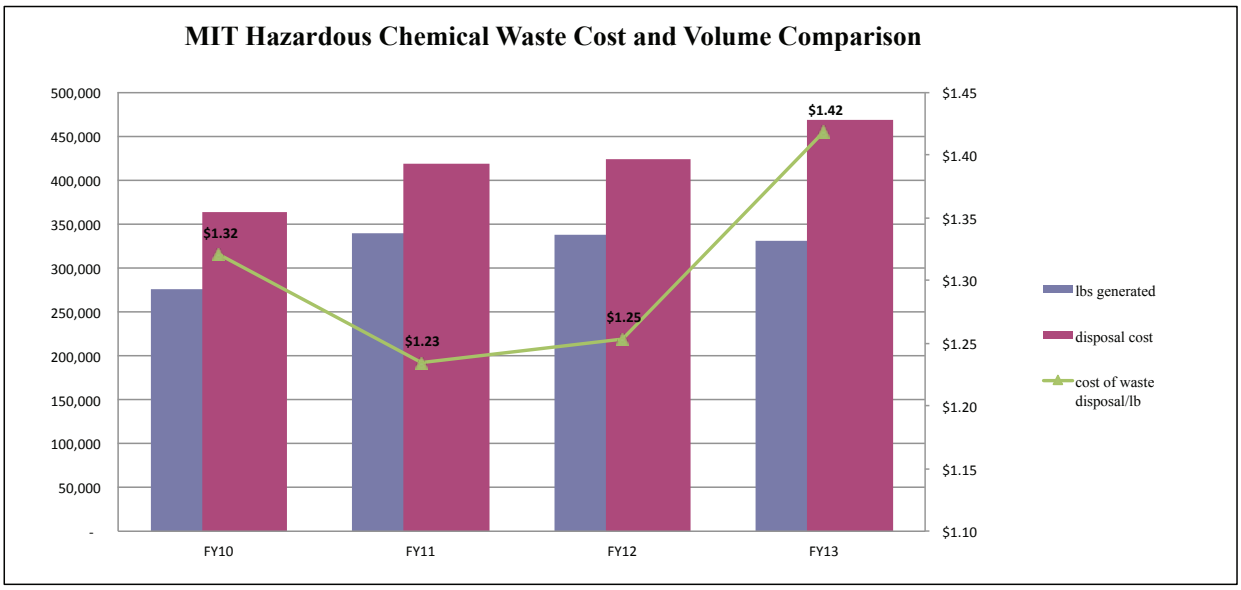

Figure 2. Hazardous chemical waste disposal spending and waste generated.

Hazardous Chemical Waste: Hazardous waste volumes stayed relatively constant this year. The cost of waste as expressed in dollars per pound of waste disposed was reduced from $1.72 in FY2004 to $1.25 in FY2012. Increased costs associated with emergency response and operational changes were seen as a result of a new contract and vendor in FY2013 to $1.42 per pound.

Training: Development and delivery of environment, health, and safety training is a major effort, both as a regulatory requirement but more importantly as a risk-reduction leading indicator.

Core Courses Training Completion Metrics: Some DLCs have a laboratory-specific training that is DLC-wide. EHS added this as a metric in FY2011 and, as expected, there are better completion rates for this compared with the classroom version, which is more difficult to administer. All other metrics remained steady compared with last year.

Overall Environment, Health, and Safety Training Metrics

Some trends in environment, health, and safety training during FY2013 were:

- The average EHS classroom attendance for FY2013 was 19 students (17,293/904)
- 32.4% of EHS sessions were web-delivered in FY2013, compared with 31.8% in FY2012
- Total time spent on training for EHS trainers (EHS office only) has been constant the last four years, at approximately 1.5 full-time equivalent

Table 1. Training Completion Rates for Common EHS Courses, by Fiscal Year

Course	Completion Rate FY2010 (Total trainees)	Completion Rate FY2011 (Total trainees)	Completion Rate FY2012 (Total trainees)	Completion Rate FY2013 (Total trainees)
General Chemical Hygiene and Hazard Communication	98% (4,760)	97% (4,541)	97% (4,994)	97% (5,741)
Lab-specific Chemical Hygiene and Hazard Communication	87% (3,847)	85% (2,843)	88% (3,794)	84% (3,236)
DLC Lab-specific Training	N/A	93% (980)	94% (1,393)	87% (1,825)
Bloodborne Pathogens	92% (1,329)	91% (1,401)	92% (1,461)	92% (1,298)
General Biosafety	96% (2,357)	97% (2,358)	97% (2,626)	99% (2,806)
Radiation Safety	94% (783)	94% (706)	96% (706)	95% (767)
Laser Safety	95% (1,181)	93% (934)	94% (1,091)	96% (1,651)
Managing Hazardous Waste	90% (4,878)	90% (4,221)	91% (5,621)	87% (5,219)
Total EHS web and classroom (includes Lincoln Laboratory)	24,039	25,197	26,796	25,553

Note: All those who need specific training prior to working with hazardous materials and equipment have completed training. The data does not reflect those who left MIT but have not been archived, or those who signed up to take a course out of interest or future needs but have not taken it yet.

- The EHS Representative Orientation Course, an interactive course taught by EHS coordinators and EHS office personnel, was completed by 125 representatives in FY2013 compared with 121 representatives in FY2012. EHS now offers this course six times per year to meet demand and keep class size more manageable. Overall, 55% of representatives have attended the EHS Representative Orientation Course (331/606).
- The total number of EHS trainings provided for FY2013 was 25,553.

Injury and Illness Report

Incident Reporting and Investigations

EHS continues to work with DLCs to use the incident reporting and investigation system, which centralizes and electronically links all information related to an incident, facilitates data handling, and provides online access to reports on injuries to facilities management, EHS staff, and DLC EHS coordinators. This provides for more effective follow-up and initiation of corrective actions. A new program was established using an updated reporting form to record undergraduate student injuries and provide reports.

The incidence rate of total recordable injury and illness cases for calendar year 2012, 1.8, is shown in Figure 3, along with data for the previous five years. This rate is up slightly from the previous year but is well below the calendar year 2011 (latest available data) incidence rate for private industry (3.8) and the Massachusetts rate (3.4), and less than the incidence rate for colleges and universities (2.1).

MIT Incidence Rates of Recordable Injuries and Illnesses

Incidence rate = number of injuries x 2000 hrs/worker/year X 100 workers/total hours worked

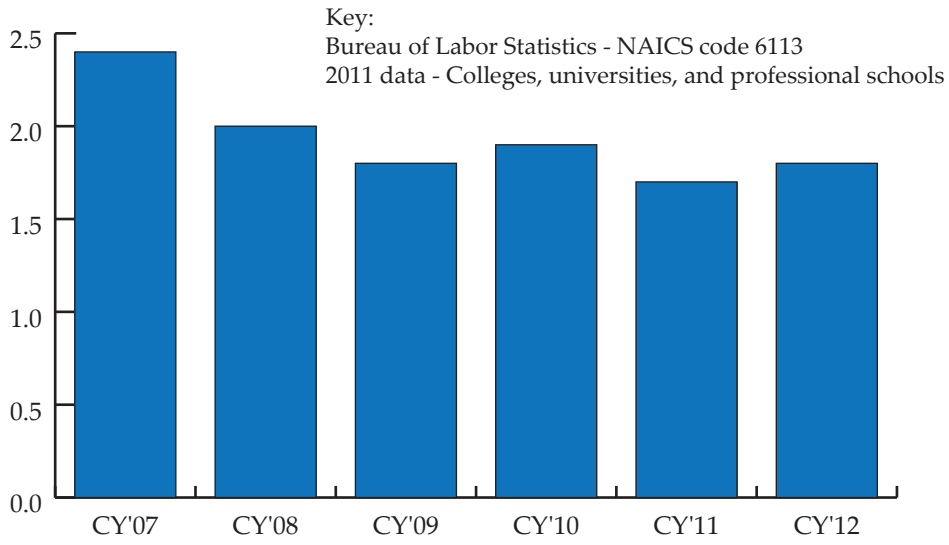

Figure 3. MIT incidence rates of recordable injuries and illnesses.

Table 2. MIT 2012 Injury/Illness Data Compared with 2011 Bureau of Labor Statistics Data

Case Type	MIT	All US Universities
Total Rate: Total recordable injury and illness cases	1.8	2.1
Days Away Rate: Cases involving days away from work	1.0	0.6
Job Transfer/Restriction Rate: Cases involving job transfer or restricted work activity	0.2	0.3
Days Away, Restricted, and Transfer Rate:: Total cases involving days away from work, days of restricted work activity, and/or job transfer	1.2	0.9

Note: The incidence rate of injuries and illnesses is computed from the following formula: Number of injuries and illnesses x 200,000 / employee hours worked = incidence rate. The 200,000 hours in the formula represents the equivalent of 100 employees working 40 hours per week, 50 weeks per year, and provides the standard base for the incidence rates.

Following is a breakdown of the top five most commonly recorded incidents at MIT in calendar year 2012:

- 21% — Overexertion in carrying, lifting, or pulling objects (43)
- 10% — Struck by stationary or falling objects (20)
- 0% — Injury due to improper handling of object (including foreign objects in the eye) (21)
- 14% — Falls (28)
- 11% — Bending, climbing, crawling, reaching, twisting (23)

Table 3 shows an estimated $2.4 million in savings over the past nine years, relative to the costs of the lost productivity, if the number of days away from work had remained the same as calendar year 2003.

The trend in MIT's incidence rate of cases with days away from work is shown in Figure 4. MIT's rate has increased slightly from last year and is above the national rate of 0.6 for colleges and universities.

Table 3. Cost Savings from Reduction in Number of Days Away

Year	Number of days away	Number of FTEs	Cost of FTEs	Cost if days away equal to 2003	Cost savings
2003	2721	13.61	$816,300	$816,300	$0
2004	2295	11.48	$705,713	$836,708	$130,995
2005	2079	10.40	$654,885	$857,115	$202,230
2006	1385	6.93	$448,740	$881,604	$432,864
2007	2124	10.62	$705,380	$903,644	$198,264
2008	1375	6.88	$468,053	$926,235	$458,182
2009	1948	9.74	$679,682	$949,391	$269,709
2010	1522	7.61	$544,321	$973,126	$428,805
2011	1901	9.51	$696,861	$997,454	$300,593
2012	2816	14.08	$1,058,086	$1,022,390	($35,695)

Note: Cost calculation uses the following estimated compensation: 2012–$75,148; 2011–$73,315; 2010–$71,527; 2009–$69,782; 2008–$68,080; 2007–$66,420; 2006–$64,800; 2005–$63,000; 2004–$61,500; for 2003–$60,000

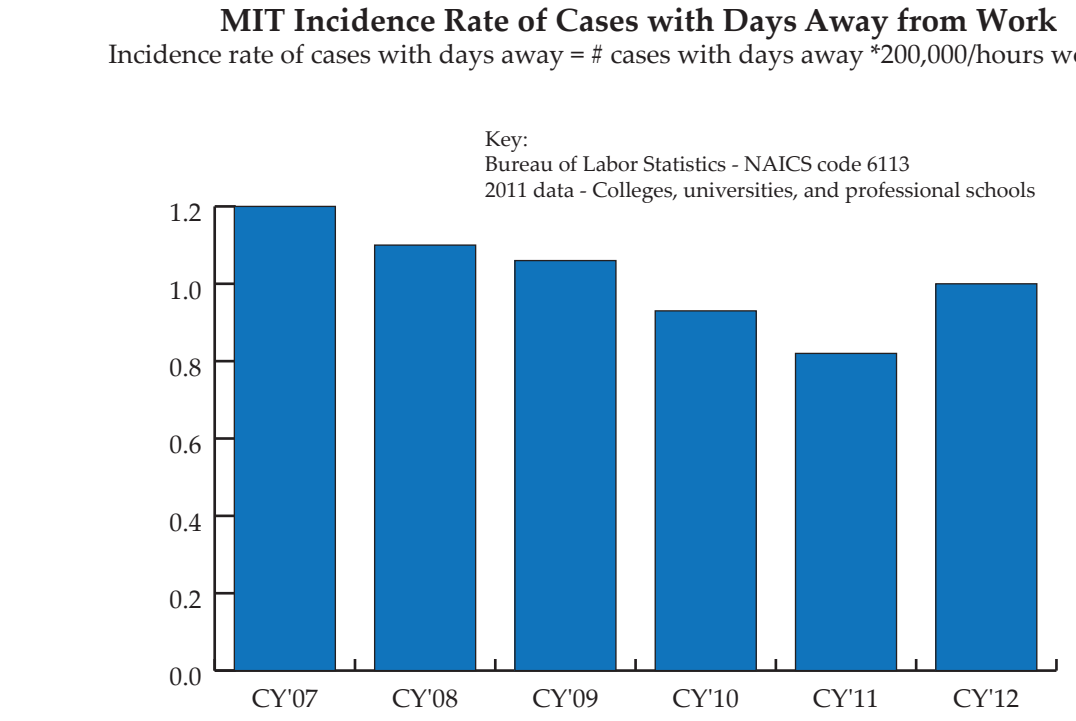

Figure 4: MIT incidence rate of cases with days away from work

Biological Research

Increase in Biological Research at MIT

Over the last 12 years, there has been continued growth in the number of faculty engaged in biological research and participating in the Biosafety Program (BSP) and the Committee on Assessment Biohazards/Embryonic Stem Cell Research Oversight (CAB/ESCRO) program at MIT. This growth is a reflection of the increased funding in biological research, the fundamental applicability of the ongoing MIT bioresearch, and the use of new technologies in life sciences research at MIT.

Much of EHS's oversight program is built on the relationship between EHS staff, the principal investigator, and their laboratory groups. EHS meets with PIs to discuss their research and the risks inherent in the work and procedures, to assist with registrations, to conduct live trainings at their lab group meetings, and to inspect and visit the laboratories. Its intent is to remain a highly visible and easily approachable resource for researchers.

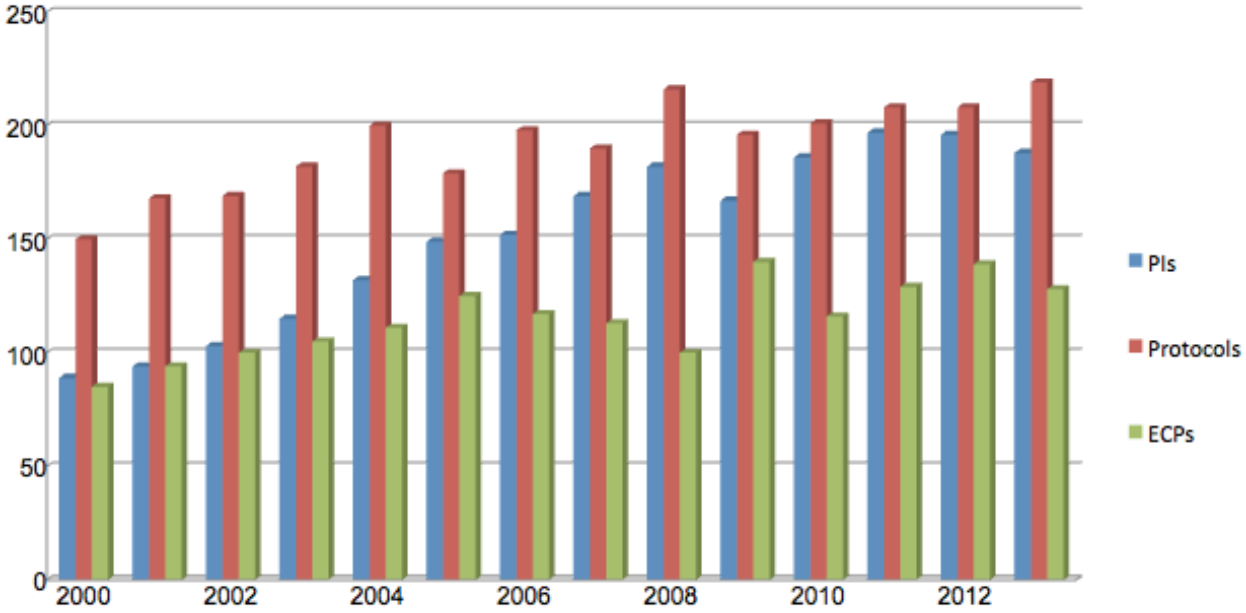

Figure 5. Biological research registrations and principal investigators in science, engineering, and vice president for research from FY2000 to FY2013.

Another indication of the shift in biological research is the shift in the containment level of the biological research at MIT. The number of biological research registrations considered as research requiring biosafety level 1 containment measures has dropped as a percentage of the reviewed and approved registrations over the last 12 years. Most of the biological research conducted at MIT required biosafety level 2, a higher containment level; this is probably due to the large number of laboratories that use human materials but also to the increase in laboratories using various viral vectors, bacterial, and/or viruses.

Oversight Program

As of April 2013, the National Institutes of Health Guidelines have been amended to extend the purview of all institutional biosafety committees to include responsibility for oversight of research involving synthetic nucleic acids. This is because of the fast-growing nature of the research involving synthetic nucleic acids, the high dual use potential of this particular area of research, and (prior to this change) that this research was not within the scope of any federally mandated committee. The federal government gave institutions almost one year to establish an oversight program, with April 2013 as the date the program must be in place and functional. MIT has been in compliance with this change for quite some time. The Biosafety Office brought synthetic nucleic acid research into the CAB/ESCRO review and approval process six years ago. The change in the regulations did not necessitate any changes in our oversight program.

Office of Sponsored Programs Collaboration on hES and iPS Cell-based Research

The Biosafety Program has effective collaboration with the Office of Sponsored Programs (OSP) to ensure that copies of all CAB/ESCRO approval letters for use of hES cells are sent to OSP as needed. The Biosafety Program also includes OSP on state and federal assurance letters. EHS is looking at ways to give OSP viewing access to the central Biological Research Registration database so that it can cross-check CAB/ESCRO approval dates for all biological research registrations. Beyond the need to ensure appropriate funding for hES and iPS cell research, access to the OSP grants database is helpful in understanding future areas of research growth.

Coordination of Research Compliance

All three committees—CAB/ESCRO, the Institutional Animal Care and Use Committee (IACUC), and the Committee on the Use of Humans as Experimental Subject (COUHES)—carry federal-level oversight documentation responsibilities, provide assurances to different agencies, and must be registered with those agencies. Their compliance programs involve approvals with various levels of review depending on risk. In several instances, there is overlap in committee responsibilities.

The Biosafety Program deputy director is the only person who is a voting member of all three committees, and as a voting member reviews all research protocols for all three committees. This amounts to review of several thousand protocols per year, and has allowed the deputy director to identify overlap areas and work with the various committees to have one take primary responsibility for oversight, with the other committees developing mutually supporting policies.

Research Using Radiation-producing Materials and Equipment

During the past year, the Campus, Bates, and Reactor Radiation Protection Programs (RPPs) continued their strong presence in the Institute by continued implementation of numerous service programs and interactions with faculty, postdocs, students, and staff. RPP staff performed radiation hazard risk analysis for proposed and continuing uses of licensed material and machine-produced radiation in RPP ongoing programs for radioactive materials authorization, analytical X-ray machine registration, accelerator

registration, experimental use and operations of the MIT research reactor, laser registration/safety, and radio frequency (RF) source registration/safety. The demand for RPP services remained strong, with a continued increase for experimental reviews involving higher-powered laser and RF sources at Lincoln Laboratory and Haystack/Millstone Hill Observatory, and the routine and non-routine outages at the nuclear reactor.

The radioactive materials authorization, analytical X-ray machine registration, and laser registration programs remain the strong link between the Radiation Protection Committee, Radiation Protection Programs, and the licensed material user community within the Institute. The MIT broad scope license, Massachusetts Radiation Control Program license # 60-0094, was successfully renewed this past year and remains in effect with an expiration date of September 2017. The special nuclear material license, SNM-986, issued by the US Nuclear Regulatory Commission, remains in effect with an expiration date of 2015. The annual financial assurance requirements for the eventual decommissioning of the facilities listed in these licenses were successfully renewed by the Office of the Vice President for Finance.

All uses of radioactive material and radiation-producing equipment are reviewed and approved by the MIT Committee on Radiation Protection on a continual basis. RPP staff conducted biennial audits of research projects during the authorization renewal process. RPP performed its annual program audit of all its operational programs and one security audit of all licensed material storage locations. In addition, RPP audits the medical and dental X-ray installations at MIT Medical and provides dosimeters training to the X-ray technicians. RPP professionals also performed the annual program audits for the Whitehead Institute for Biomedical Research and Draper Laboratory during the past year.

RPP has developed an online laser safety training program and expects to implement this form of training in fall 2013. RPP continues to work with the Sourcing and Procurement/Property offices to develop an improved system for notifications when a Class 3B or Class 4 laser is purchased and for removing lasers from the inventory when disposed. A proposal has been submitted to Procurement to require end users to identify purchases of a Class 3B and Class 4 laser. If adopted, the purchasing information would be transferred to RPP immediately to allow EHS to work with the laboratory regarding laser safety/registration at the earliest time possible. RPP continued a pilot program to strengthen the Institute's laser safety program by requiring laser-specific training at the laboratory level to reinforce the laser safety concepts learned in the EHS laser safety course. Laboratories will be required to record the individual's laser-specific training in EHS's management system.

Table 4. Summary of Authorizations and Reviews for All Radiation Sources, FY2013

	Total	Radiation Materials	Analytical X-rays	Accelerators	Class 3B + 4 Lasers	RF Sources
Authorizations or approvals	113	36	7	1,300	—	
New in FY2013	4	5	1	36	—	
Renewed, amended, or processed	39	—	—	39	24	

Note: Authorizations and approvals require a risk assessment, experimental review, completions of radiation safety training, and routine inspections by RPP.

Sustainability Program Overview

The Sustainability Program collaboratively develops, strengthens, and realizes MIT's institutional commitments to integrate principles of sustainability and environmental stewardship into all aspects of MIT's facilities, activities, and operations.

FY2013 saw the continued progress of the Sustainability Program and sustainability improvements across campus—with a deepening of existing stewardship initiatives and the initiation of new ones focused on energy and an expansion of partnerships with faculty, students, and staff alike.

Sustainability Program Highlights

- To date, the program achieved campus energy cost savings totaling over $5.6 million annually. Of the total 226,665 MMBTU saved since 2007, 35,627 MMBTU (and $1.1 million) were saved in FY2013.
- The program successfully completed the third and final year of the pilot phase for MIT Efficiency Forward—the industry-leading energy conservation and efficiency program—achieving the program's goal to save 34 million kWh annually, and expecting savings of $50 million over the lifetime of projects. In calendar year 2012, MIT surpassed its energy savings goal of 12 million kWh, contributing to a total annual savings of 34 million kWh, which is approximately 15% of MIT's benchmark annual electricity use.
- In May, MIT and its utility company NSTAR signed a second agreement to renew the Efficiency Forward program through 2015 and are designing a new portfolio of measures that have an ambitious goal of saving an additional 21 million kilowatt-hours annually. For this second phase, Efficiency Forward will now also include thermal savings from the reduction of natural gas use on campus, with a goal to save 150,000 therms of natural gas annually over the next three years.

- In what is considered to be the first agreement of its kind, MIT, Harvard University, and the City of Cambridge developed a compact to work collaboratively to address issues related to climate change on a local basis. The "Community Compact for a Sustainable Future" lays out a framework for the signatories to work in a more coordinated and robust fashion to tackle local sustainability challenges.
- The pilot building-occupant engagement program focused on building Green Teams is being implemented in the Koch Institute. Efforts this year included waste and recycling assessments and action plan development, delivery of an all-Koch staff survey to establish baseline data on awareness of sustainability issues, outreach and education events, and a focus on developing a food waste composting program.
- MIT's campus transportation program continues its efforts to reduce the rate of people driving to work alone to 20%, thus increasing alternative modes of transportation.
- MIT successfully installed two Boston Hubway bicycle stations, bringing the Boston-based commercial bike rental program across the river to Cambridge. MIT participation in the bike-share program has exceeded expectations with 1,200 MIT members.
- Sustainability and facilities staff collaborated closely with several departmental courses to examine key issues in campus sustainability, including stormwater management, community-based energy efficiency strategies, and building technologies for energy efficiency.
- MIT has made strong progress towards the US Department of Energy's new Global Superior Energy Performance Partnership, piloting the program's new building energy management certification program, and is nearing completion of MIT's International Organization for Standardization 50001 energy management documentation. MIT's participation in DOE's Commercial Building Partnership deployed national laboratory technical assistance and implemented advanced energy efficiency strategies in Buildings 32 and W91.
- In June, the Office of the Executive Vice President and Treasurer created MIT's first Office of Sustainability, reporting directly to the executive vice president and treasurer Israel Ruiz. Julie Newman, former director of Yale University's Office of Sustainability, will assume the position August 1, 2013. The office will spearhead an expansion and coordination of energy and sustainability programs across campus and in the community. Sustainability Program staff Steven Lanou and Susy Jones will join with Ms. Newman to create the new Office of Sustainability.
- Aggressive transportation demand management programs at MIT include subsidized Massachusetts Bay Transportation Authority passes; rideshare, vanpool, and local car sharing services; and significant investments in bicycle infrastructure. A key metric for measuring transportation program success has remained strong in FY2013: MIT's proportion of single occupant vehicle trips, or SOV rate, is 20%—a rate significantly below the state and national average.

- In November, the Massachusetts Green High Performance Computing Center was completed and demonstrates many energy efficiency and sustainability strategies, including LEED (Leadership in Energy and Environmental Design) design, efficient cooling design, distribution and control, renewable energy sources, and brown site redevelopment.

Student Learning, Research, and Engagement

MIT's campus operations are being used as a living laboratory to foster students' emerging technical and leadership skills to help define and solve the Institute's own energy challenges.

Sustainability staff collaborated closely with several departmental courses to examine key issues in campus sustainability, including stormwater management, community-based energy efficiency strategies, and building technologies for energy efficiency. For example, Department of Architecture professor James Wescoat led student teams to research and develop innovative green infrastructure improvements in future East Campus developments, in collaboration with the MIT Investment Management Company, the Department of Facilities, and EHS. Department of Urban Studies and Planning professor Harvey Michaels led student teams in collaboration with the City of Cambridge to develop innovative pilot programs to increase energy efficiency in multi-family rental buildings in Cambridge.

Through the MIT Energy Initiative Student Campus Energy Project Fund, MIT has supported over 45 student projects on campus that engage students and advance campus energy objectives while simultaneously providing rich learning opportunities. For example, in the spring, sustainability staff provided support to an undergraduate team to bring back the Dorm Electricity Competition. Undergraduate Research Opportunities Program students helped study options for replacing windows in MIT's earliest campus buildings and developed efficiency concepts that could reduce energy use in the planned nMaSS facility.

Collaborating faculty members have integrated coursework to address important issues confronting the campus. For example, two Building Technology Program courses developed several class projects to measure and assess different energy efficiency strategies that could be considered for use on MIT's campus. The undergraduate subject 1.044/2.66/4.42 Fundamentals of Energy in Buildings provided a first course in energy and thermosciences with applications to sustainable energy efficient architecture and building technology. Students worked in teams to study a particular MIT building, identify a key inefficiency, design an innovative solution, and in most cases, measure the resulting improvement.

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