

Environmental Programs Office and Environment, Health, and Safety Office

The Environmental Programs Office (EPO) was created in FY2000 and is the senior administrative office at MIT that is responsible for working with MIT's senior officers and presidential committees to establish MIT's vision, commitment, and policies for environmental stewardship and for the health and safety of the MIT and larger community, in keeping with MIT's values. MIT's values reflect excellent environment, health, and safety (EHS) performance that exceeds regulatory compliance and embodies being an excellent environmental citizen of the world. EPO oversees its EHS Office, which delivers EHS services and supports and oversees day-to-day Institute-wide EHS performance.

EPO and its EHS Office are accountable for overseeing and supporting MIT's EHS performance in 3,264 lab areas and over 700 other facilities, on and off-campus. EHS performance encompasses legal compliance and positive initiatives for EHS excellence in operations (research, facilities, and student life) and is supported by an EHS Management System (EHS-MS) of policies, procedures, and tools. The EHS Office's services are in five programs: Environmental Management, Radiation Protection, Industrial Hygiene, Biosafety, and Safety (fire, life safety). EHS also leads the following seven functions across its five programs: MIT-wide EHS organization, training, inspections, audits, emergency response, and research and program support functions. Our approach is to garner broad faculty ownership of EHS performance through one-on-one communications and an active partnership with 42 departments, laboratories, and research centers (DLCs) whose activities and materials are hazardous or highly or moderately regulated. This is a model for program and system design that directly affects core research and teaching.

One of the most important research support functions performed by the EHS Office is the development and review of research protocols for safety and legal compliance. The EHS Office works closely with faculty to enable their pursuit of research involving radioactive, biological, and other regulated materials and processes.

MIT's EHS-MS components include tools, policies, and procedures for training; inspections and audits; principal investigator/supervisor and space hazardous and regulated activities registration; emergency preparedness and response; and pollution prevention and waste minimization programs. The EHS-MS integrates commitment to sustainability and environmental stewardship and covers health and safety as well as the environment to comprehensively address these closely related areas. In FY2005, the EHS Office adopted the Balanced Scorecard, a progressive management tool to assist in strategic planning, provide measures of success, and communicate strategy and accomplishments.

Awards

The Institute's EHS program was recognized by several government agencies and renown organizations this year for the following awards:

- *CSHEMA Home Page Competition*. The environment@mit website (<http://web.mit.edu/environment/>) won a home page award competition sponsored by the Campus Safety, Health, and Environmental Management Association (a division of the National Safety Council). In addition to editorial content, criteria included ease of navigation, consistency with the school's image and goals, use of the technological medium, and opportunities for reader responses.
- *EPA P3 Award*. MIT was one of seven schools selected to receive the P3 (People, Prosperity, and Planet) Award for sustainable growth from the US Environmental Protection Agency (EPA) for our project entitled "Encouraging Toxics Use Reduction (TUR) in Academic Laboratories," led by Professor Jeffrey Steinfeld of the Chemistry Department and four of his students, with William VanSchalkwyk of the Environmental Programs Office. The award competition featured over 400 students representing 65 teams from over 50 schools.
- *American Chemical Society*. MIT received the 2005 College/University Award for the institution with the most comprehensive laboratory health and safety program in higher education (undergraduate) by the American Chemical Society's Division of Chemical Safety and Health.
- *Environmental Protection Magazine*. The October 2004 issue of *Environmental Protection*, as part of their annual "Going for the Green Award," gave MIT honorable mention for environmental achievers for our "automated environmental, health, and safety training program for . . . employees and students."
- *Earth Night Fair*. The Environmental Programs Office won second prize in the 2004 Earth Night Fair of nearly 30 individual booths of leading area corporate and nonprofit organizations. Demonstrating MIT's innovative collaborations among its researchers, administration, and campus operations, our posters highlighted two *Tech Talk* articles on environmental research, how operations are greening the campus, the EPO/EHS collaborations with MIT's Laboratory for Energy and the Environment, and MIT's EHS-MS. In addition, EPO offered an informative recycling game that highlighted MIT's contribution to resource conservation through recycling.
- *RecycleMania 2005*. MIT participated in the EPA-sponsored RecycleMania 2005. MIT placed 10th out of 34 universities nationally.

EHS Management System

When the US Environmental Protection Agency (EPA) inspected MIT in 1998, MIT realized that, although there was no harm found to the environment, its operations in labs, facilities, and student life did not measure up to the excellent standards of its environmental research and teaching and did not reflect MIT's values and goals to be an excellent environmental citizen of the world. For decades, MIT had six expert—although separate—offices that provided EHS services but lacked a systematic approach to managing and overseeing MIT's EHS performance.

In July 1999, MIT created the position of managing director for environmental programs (which position, as well as the position of senior counsel, is filled by one person). In settling the enforcement by EPA and the Justice Department, MIT secured six years, rather than the usual nine months, to design and implement an EHS Management System that would be a model, sustainable approach to EHS performance in academic research institutions. EPA recognized MIT's commitment to performance beyond legal compliance, to creating a model for addressing issues observed in many universities, and to addressing the environment, health, and safety comprehensively in one system, as outlined in a letter issued with the consent decree in June 2001. The six years secured to design and implement a model, sustainable EHS-MS for academic research provided the necessary time for EPO and the EHS Office to actively work with the academy, as well as with administrators, to design an EHS-MS that, unlike commercial models, would be broadly owned by those who must implement it and would support and respect the independence of research and teaching at MIT.

MIT is now in the fifth year of this six-year period. In the spring of 2006, an external auditor will assess whether the EHS-MS has been fully implemented and is effective. The managing director and VP for research cochair the faculty and staff Ad Hoc Subcommittee of the Institute Council on EHS, which oversees development and implementation of the EHS-MS, providing guidance and input on the policies, tools, and programs to manage EHS performance centrally and locally.

EHS Organization and Policy

The foundations of MIT's EHS-MS are (1) MIT's EHS Policy, authored by the Ad Hoc Subcommittee and adopted in 2001 by MIT's highest policy-making council, the Academic Council, and (2) a functional EHS organization in every DLC as well as in the EHS Office itself.

MIT's central and local EHS organization structure under the EHS-MS was implemented in FY2003. The EHS Office appointed a lead contact and supporting expert team for each DLC with significant hazardous and regulated activities to work in a close and active partnership with the DLC-appointed EHS coordinator for each DLC and for Facilities and Student Life. Together, EHS coordinators and EHS Office lead contacts implemented the EHS-MS' PI and supervisor space and hazardous and regulated materials and activities registration process, as well as training, inspection, and emergency preparedness and response programs in each DLC, Facilities, and Student Life. All DLCs that use radiation, biological materials, and/or chemicals have appointed an EHS coordinator and have formed their DLC EHS Committee to assist the DLC head in overseeing EHS performance in the DLC and to provide guidance to the EHS coordinator. Virtually all EHS representatives for labs have been appointed. The partnership between the DLC EHS coordinators (61) and the EHS Office lead contacts (19) is fostered through quarterly meetings of the entire group and smaller focused workshops and field exercises on inspections and training. The coordinators participate in the development and implementation of additional EHS operating procedures that may affect their DLCs.

In addition to supporting MIT's EHS performance, the implementation of this organization structure throughout the Institute has significantly improved our emergency preparedness and response program and has supported our efforts to work with the City of Cambridge and the Cambridge Local Emergency Planning Committee to provide immediate access to appropriate site-specific personnel or information related to potential hazards in the event of an emergency in any facility at the Institute. This has helped to reduce the time lost to facility evacuations and minimize facility damage.

Principal Investigators' Space and Hazardous and Regulated Materials and Activities Registration

The EHS-MS calls for the registration of principal investigators (PI) and facility supervisors—and the laboratories and other facilities for which they are responsible—to signify the privilege of and to support services associated with working with hazardous and other regulated materials and activities at MIT. Registration identifies the core regulated materials and activities, as well as the potential hazards present in the space, the emergency contact for the space, and a PI or facility supervisor and assigned EHS representative, as well as confirming that each DLC, Facilities, and Student Life have implemented applicable EHS organization, training, and inspection/audit components of MIT's EHS-MS. The supervisor and PI/Supervisor Space Registration data is updated as people, their research, and space utilization changes. At the end of FY2005, 4,017 spaces were registered, covering 3,264 laboratories and 485 PIs; 753 additional spaces were registered for Facilities and Residential Life.

Training

The EHS-MS training program offers web-based and live training resources and identifies the training that every person needs before working with hazardous or regulated materials (radiation, chemicals, or biologicals) and related activities using an online training needs assessment tool. Training delivery options are flexible in order to accommodate each DLC's desired approach, whether live or web-based training, and whether DLC or EHS Office delivery is preferred. DLC EHS coordinators ask principal investigators/supervisors, EHS representatives, and everyone who works with regulated or hazardous materials to register with the MIT EHS-MS training system using the online training needs assessment tool, which produces a customized training agenda for each person based on his or her DLC, materials, and activities. Ultimately these records can be used with the PI/Supervisor Space Registration and the inspection data discussed in the next section to provide the Institute with necessary information to manage our people, spaces, and hazardous and regulated materials and conditions and to assure minimal impacts on the environment, provide a safe and healthy workplace, and comply with EHS regulations.

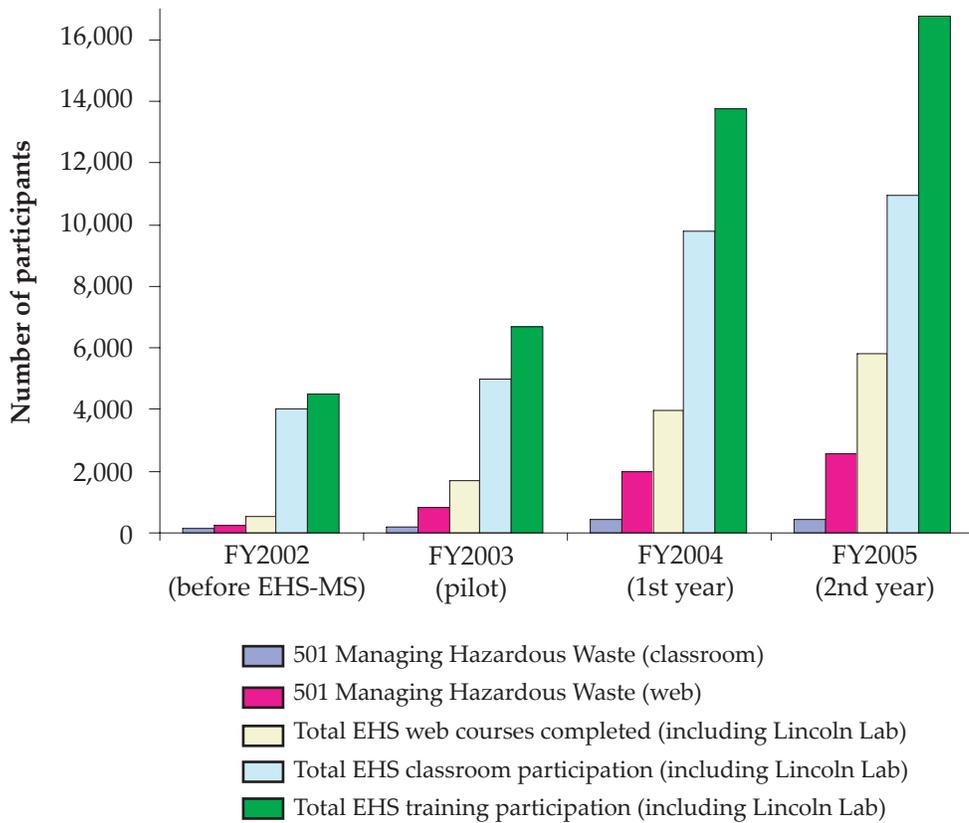
Accomplishments

- *Impact of EHS-MS on EHS training:* There has been a 10-fold increase in the number of individuals completing the Managing Hazardous Waste training sessions between FY2002 (the year before the EHS-MS training system was launched) and FY2005. For the same time period, overall EHS training

participation has quadrupled, increasing by 300 percent, from 4,000 individual sessions to 16,000 (see Figure 1).

- Twenty percent increase in EHS course participants between FY2004 and 2005.
- For FY2005, 35 percent of EHS training was web delivered.
- Total training time for participants was approximately 25,101 hours.
- Total time for EHS trainers (EHS Office only) was approximately 4,125 hours or 2 FTE.
- Average classroom attendance was 7.9 persons per session.
- Cost per student taking web training was approximately \$12/session.
- EHS cost per student in classroom was approximately \$13/session.
- Courses launched in FY2005 include Computer Work Station Ergonomics, Bloodborne Pathogen Refresher for Researchers, and Microsystems Technology Lab Safety Quiz. Changes to the Managing Hazardous Waste course were implemented based on program changes and web course evaluations. Plans for FY2006 include new WEB courses (Laser Safety, Electrical Safety, and Lab Specific Chemical Hygiene for PFSC) and one new classroom module (EHS Representative Training).
- MIT's "Environmental Virtual Campus," a compliance and good practices website for colleges and universities that won the 2003 Environmental Business Council of New England's Award for Outstanding Environmental Education, continued to be extremely successful in its second year. Over the past 12 months, the site received more than a million "hits" from tens of thousands of visitors around the world. In all, the site has hosted visits from more than 100 countries. (This project was undertaken by MIT in connection with the settlement of an enforcement action brought by the EPA and the Department of Justice for alleged violations of the Federal Clean Water Act, the Clean Air Act, and the Resource Conservation and Recovery Act. No damage to the environment occurred.)
- Web courses currently available are Managing Hazardous Waste, Resource Conservation and Recovery Act (RCRA) hazardous waste (chemicals) training, SPCC (Oil Spill Prevention), HAZCOM (Hazard Communication), Chemical Hygiene, Hydrofluoric Acid, and Nuclear Reactor Radiation Safety. Three web modules (RCRA, Chemical Hygiene, and Hydrofluoric Acid) have been customized as a separate course for Lincoln Lab. At the conclusion of each web-based course we ask the student to rate the course from 1 to 5, with 5 being the highest rating. Table 1 indicates there is widespread acceptance of the training.
- *Training metrics:* Figure 2 provides data on time required to complete courses, and Table 1 provides trainee satisfaction data.

Figure 1. Number of participants in EHS courses delivered by fiscal year



Note: An individual might be a participant in more than one course.

Figure 2. Average course duration

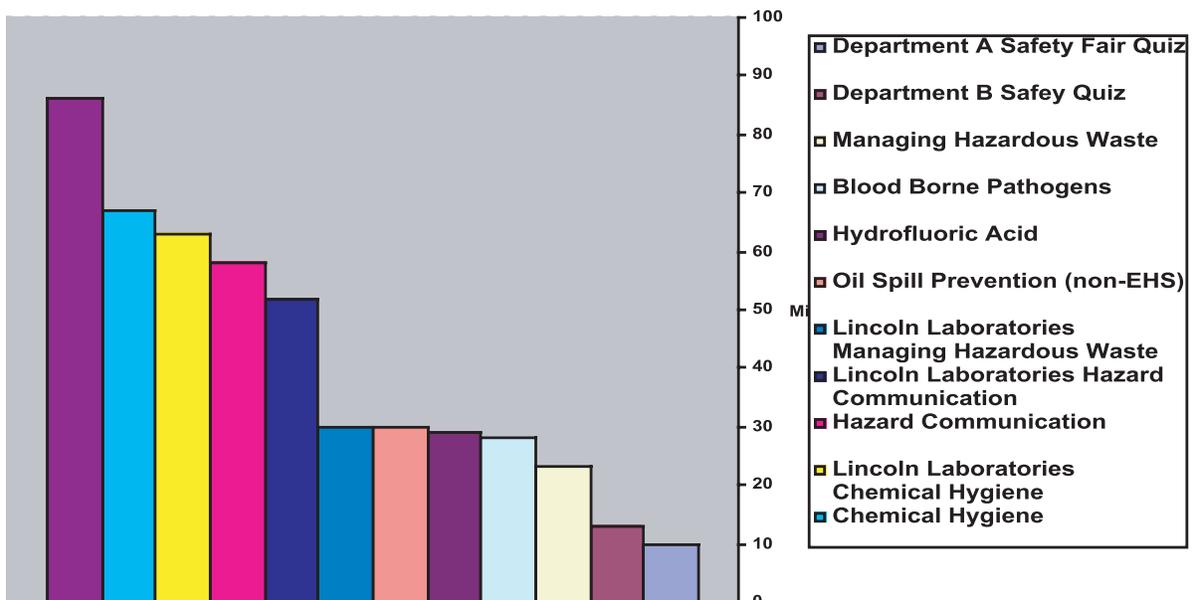


Table 1. Total Trainees and Average Course Evaluations

Course name	Total # trained	Average evaluation (1–5, 5 highest)
Hydrofluoric Acid	61	4.40
Managing Hazardous Waste	1,430	4.38
Reactor Training	59	4.36
Oil Spill Prevention (non-EHS)	12	4.33
Hazard Communication	16	4.19
Chemical Hygiene	843	4.16

Audit and Inspection Program

The EHS-MS audit and inspection program was developed in FY2003; it was piloted and then implemented across the Institute in FY2004, and implementation continued through FY2005. The program includes the following three levels of inspections and audits:

- *Level 1:* Short weekly individual lab/space safety and compliance inspections have been implemented in 100 percent of the registered spaces where hazardous waste is generated or stored. These are conducted by the PI or EHS representative and reinforce training and compliance; record keeping is optional but may be required if there are repeated safety or compliance issues.
- *Level 2:* DLC-wide compliance, safety, and EHS performance inspections of all lab and other spaces where potentially hazardous or regulated materials are stored and used were initiated. The DLC EHS coordinator and members of the DLC EHS Committee conduct these inspections twice annually; at least one such inspection is jointly conducted by the EHS Office lead contact with DLC personnel. Records of these inspections are required.
- *Level 3:* Systemwide implementation and operation audit. This audit is conducted by MIT's Audit Division and/or by an outside consultant approximately once every two years. The first systems audit will be conducted in FY2006 as required by MIT's consent decree. A team made up of an outside consultant and EHS experts from peer institutions who understand the academic research context will audit to determine whether MIT's EHS-MS has been implemented across the Institute and is effective. A pilot audit will be conducted in the fall of 2005 in preparation for the final external audit in the spring of 2006. The results of the final audit will be reported directly to the EPA.

The EHS inspection team of EHS experts and colleagues in the academy, in conjunction with several members of IST, developed an online reporting system for Level 2 inspections. This system, which is accessed via SAPweb, went live on August 1, 2005, and will give those performing inspections more options and greater ease with respect to reporting. EHS coordinators from around the Institute contributed to the development of this system, which allows for findings to be recorded in a hand-held device (such as a

Palm), then uploaded into SAPweb. EHS coordinators will be able to customize reports as they see fit, while the EHS Office will have SAP as the backbone to manage Level 2 inspection data.

Faculty Research Protocol Support and Compliance Committees

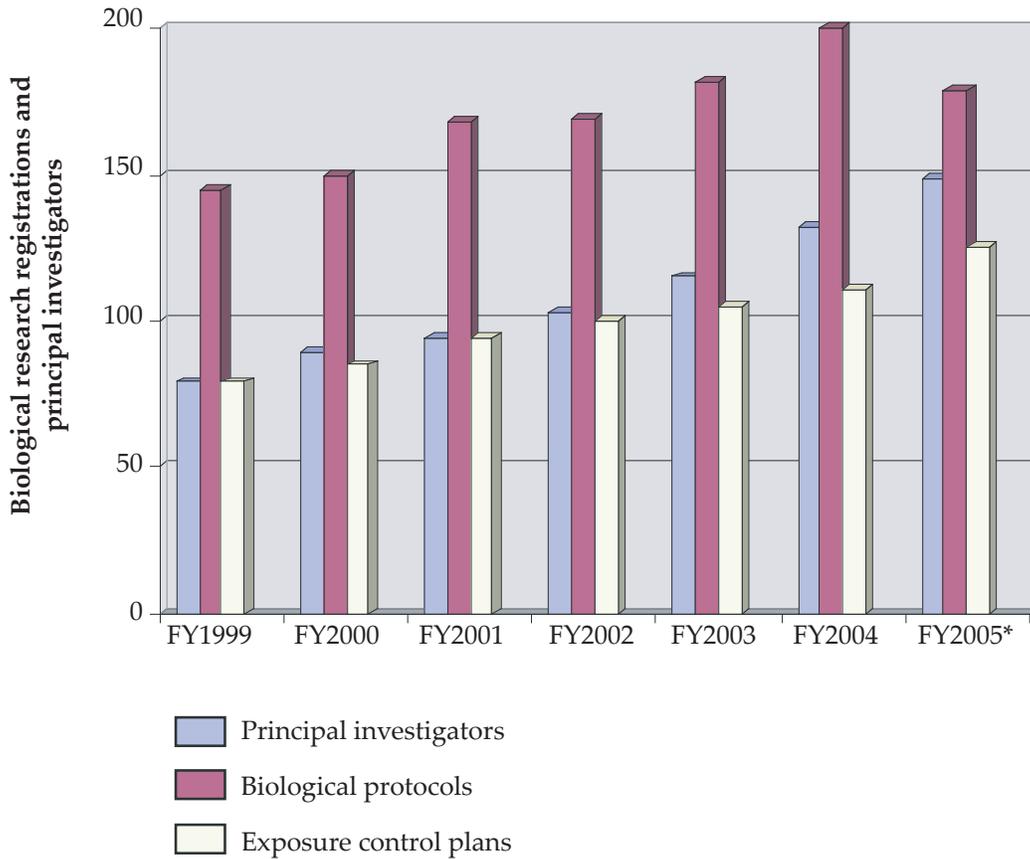
The EHS Office's protocol development and review support is integral to our faculty's undertaking safe and legally compliant research. There are six faculty research oversight committees with significant EHS implications: the Committee on Use of Humans as Experimental Subjects, the Institutional Animal Care and Use Committee, the Radiation Protection Committee, the Toxic Chemical Committee, the Reactor Safeguards Committee, and the Committee on Assessment of Biohazards. These committees fulfill specific federal regulatory requirements in the areas of human subjects and research animal protections and the safe use and containment of radioactive, chemical, and biological materials at MIT. The chairs of these committees are members of the Institute Council on EHS, which oversees MIT's EHS performance and the implementation and effectiveness of the EHS-MS. The EHS Office participates in all six faculty research oversight committees and serves as administrative support for the Radiation Protection Committee and the Committee on Assessment of Biohazards (CAB). The managing director for environmental programs, director for EHS programs, and director of the EHS Office are members of the Council on EHS.

The EHS Biosafety Program and the Lincoln Laboratory (LL) administration established an internal LL Biosafety Committee. This committee focuses on development and implementation of site-specific safety policies and procedures. All protocol reviews and approvals are the purview of the MIT CAB.

Overall, the EHS Office has direct contact with almost 50% of the faculty in Science, Engineering, and Research. During the past five years, the biosafety and radiation safety services have grown almost 10 times faster than the growth in faculty. This is due to the EHS Office's consistent efforts to interact with researchers, to optimize services and oversight through their respective registration and research tracking programs, and to the continued growth in research at MIT. For example, Department of Health and Human Services (DHHS) funding at MIT grew by 226% during the 1999–2005 period. In the past five years the number of PIs enrolled in the Biological and rDNA Research Project Registration Program has increased by 67% and the number of research protocols reviewed by the EHS Office and approved by the committees has increased by 20%. By comparison, the number of tenured and tenure-track faculty at MIT has increased by only 6% within the schools of Science and Engineering and the Vice President for Research areas.

The Radiation Protection Program of the EHS Office reviewed/renewed 70 applications or amendments for authorizations to use radiation-producing material under MIT's license. The total number of authorizations currently in effect is 130, used in approximately 600 laboratories by almost 1,500 researchers. Each authorization covers one to several protocols and is required to be reviewed biennially. In FY2006, we plan to track the total number of protocols using radioactive material as a better indicator of radiation use at MIT.

Figure 3. Increase in biological research registrations and principal investigators in the schools of Science and Engineering, and reporting to the Vice President for Research, FY1999 to FY2005



* Prior to 2005 the Whitehead Institute’s Biosafety Program was administered through MIT’s EHS. In 2004 the Whitehead Institute implemented its own biosafety program, removing 13 PIs and 20 protocols that had been reviewed in 2004.

Positive EHS Initiatives and Collaborations

MIT’s approach to EHS performance integrates positive initiatives with compliance to reflect a holistic and high standard of stewardship. Numerous collaborative initiatives, involving many departments and programs at MIT, were undertaken over the past year to reduce MIT’s environmental impacts and to improve the safety and quality of life at MIT. These efforts benefit MIT, its neighbors, and the region. Going well beyond regulatory requirements, these initiatives are intended to develop sustainable ways to safeguard the environment and the health and safety of MIT and the larger community.

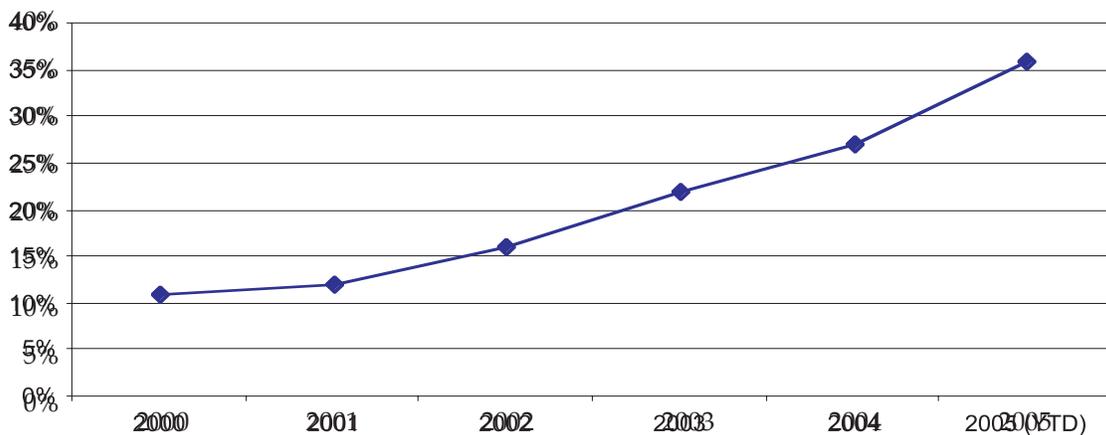
Recycling

EHS continued to work closely with the Department of Facilities (DOF) and the Working Group Recycling Subcommittee in a partnership to improve waste management, reduce costs, and increase the Institute’s recycling rates.

Key successes this year include the addition of a recycling accumulation area in the Stata Center dedicated to collecting a large quantity of cardboard and paper recycling from much of the main group. An additional baler and compactor are dedicated for recycling to densify the materials. Steps were taken to expand composting to include year-round collection of food wastes from all generators on campus. The materials recycled have expanded to include asphalt, brick, and concrete. Also, the EHS Office has coordinated efforts between DOF and Brain and Cognitive Sciences staff to optimize recycling efforts in the new Brain and Cognitive Science Center building. Finally, the EHS Office was responsible for leading a hugely successful Stuff Fest at the end of the 2004–2005 academic year. Over 7,000 pounds of clothing, housewares, and food were sorted and donated. The [MIT Women’s League](#) generously provided their voluntary support this year, and in exchange they were able to put aside clothing for student use next fall in [Fashion Night](#). The nonclothing goods were sent to the [MIT Student Furniture Exchange](#). The remaining useful material was packaged and sent to [Planet Aid](#), a nonprofit organization dedicated to improving the lives of people in developing countries.

These efforts and others paid off, with MIT’s trash generation down by 409 tons, or 6%, in calendar year 2004 compared to calendar year 2003. This decrease reflects both waste reduction initiatives implemented this past year and better recycling performance. Total tonnage recycled in 2004 increased by 204 tons (a 12% increase from last year) for a total of 1,871 tons. The recycling rate for 2004 was 27%, compared to a rate of 22% in 2003 and a less than 5% rate in 2000. Improvements continue and have led to a recycling rate of 36% for fiscal year 2005, with some opportunity through concerted efforts to come close to the stated City of Cambridge goal of 40% by the end of the calendar year. This is the third consecutive improvement in our recycling performance and attests to successful efforts from EPO, the EHS Office, the Working Group, Facilities, and many dedicated members the of MIT community.

Figure 4. Recycling rate, 1999 to 2005 (as of June 30)



MIT Charles River Initiatives

Stormwater runoff negatively affects the Charles River's water quality. The new Stata Center and the Vassar Street Utilities projects were completed in FY2005. The innovative and award-winning stormwater treatment system at the Stata Center, which uses both biofiltration and water harvesting, reduces pollution and combined sewer overflows to the Charles River. The Vassar Street utility project, which upgraded and separated the pipes beneath the street that transport sewage and stormwater runoff, has also dramatically benefited water quality in the Charles.

In February 2002, MIT partnered with the EPA to conduct the MIT/EPA Charles River Stormwater Design Competition. In 2005, the winning design was successfully constructed through a project at a Cambridge private home that demonstrated the viability of the innovative design for wider application.

MIT continues to be founding member of the Clean Charles Coalition, a voluntary association of local organizations committed to advancing efforts to improve the water quality of the river. In 1998, MIT purchased a boat to be used by the EHS Office and other organizations to collect regular water samples to test for pollution and support ongoing water quality programs of the Charles River Watershed Association. The EHS Office contributes staff time and laboratory facilities to carry out the water testing program that supports daily recommendations on whether the river should be used for recreational activities. The MIT Sailing Pavilion supplements this work by participating in the river quality flagging program by posting flags indicating to boaters whether the water is swimmable on any given day. EPA has also used the boat for various river projects aimed at improving the Charles and promoting public awareness of the river resource.

The Environmental Programs Office has provided financial support recently to the Charles River Watershed Association for research on water quality and pollution modeling, as well as to support the organization's annual river cleanup efforts. Again this year, MIT organized through the Sea Grant Program several dozen volunteers to assist in the annual river cleanup effort. The Environmental Programs Office has also directly supported EPA Region One's programs to promote a swimmable Charles River by supporting an MIT graduate student annually to assist in implementing EPA's river programs.

The Office of Government and Community Relations hosted a major EPA Clean Charles 2005 press event this year at the MIT Sailing Pavilion. City, state, and community leaders gathered to announce and celebrate progress made to date in advancing water quality through collaborative efforts.

Pollution Prevention

Fiscal year 2005 marked a transitional period for the development of the Pollution Prevention (P2) objectives, targets, and metrics. An extensive P2 Program and Plan was prepared that is a coordinated systematic effort to assess opportunities for (material and energy) waste prevention in campus operations.

Major tasks completed this year included cataloging potential sources of pollution on campus by media and business units, identifying performance measures for each category, and cataloging existing and potential future P2 efforts. Descriptions of specific pollution prevention projects and accomplishments may be found at http://web.mit.edu/environment/reduce/pollution_prevention.html. The goals of this program are as follows:

- Conserve resources (water and energy), seeking planned reduction in MIT's consumption with the added benefit of saving money
- Reduce campus air emissions, including those from transportation, greenhouse gasses, and regulated pollutants
- Reduce material and resource consumption, including office and laboratory supplies
- Increase the recycling and conservation of materials
- Increase the use of environmentally friendly products and materials
- Reduce the volume and toxicity of our waste streams
- Improve our indoor environment, including both the indoor air quality and the comfort and productivity of our work and living spaces, by considering sustainability in our design, operations, and maintenance policies
- Improve the urban environment, including landscape quality and the site and pedestrian environment
- Educate our students in the techniques of sustainability and how to apply them
- Support community-wide and regional sustainability efforts
- Establish procedures and targets for implementing sustainable design principles in new and renovated projects

Hazardous Waste Metrics

In FY2005, the EHS Office enhanced its metrics system, providing a much-improved ability to track and manage hazardous waste generation and cost data. Overall, hazardous waste generation (measured in pounds) at MIT increased by 23 percent between FY2004 and 2005, a very significant increase that appears to be driven by newly constructed facilities, increased research activity, and increased implementation of the EHS-MS.

The EHS Office has continued to seek efficiencies and cost savings as a way to manage hazardous waste disposal costs within budget in an environment of expanding research. One indicator of this success is that the increase in waste generation (23.9%) trailed the increase in chemicals purchased (27.9%). Furthermore, the increase in hazardous waste cost was just 16%. The EHS Office has moved aggressively to reduce disposal costs of hazardous wastes through good management practices and contractor oversight. Hazardous waste unit costs have dropped from \$2.24/lb in FY2001 to \$1.78/lb in FY2005.

Ergonomics

The EHS Office has collaborated with MIT programs and departments to reduce repetitive stress and other injuries and lost workdays. The intended outcomes are an increase in productivity, a reduction in medical and disability costs, and most importantly, reduced pain and suffering by members of the MIT community. The

Ergonomics Committee—an ad hoc collaborative effort among the Libraries, Information Systems, Human Resources, Facilities, Lincoln Laboratory, the Whitehead Institute, and MIT Medical, as well as a student representative, and led by the EHS Office—introduced a web-based training course. In FY2005, 432 computer users at MIT have taken the training, bringing the total since launch in February 2004 to 541.

DLCs with a high incidence of repetitive strain injuries collaborated with the EHS Office and Ergonomics Committee to develop programs to identify, correct, and prevent future injury. These involved detailed surveys and reviews of specific work sites and activities, the development of materials including PowerPoint presentations and videos, and the implementation of training. This program was implemented in the Department of Facilities, the Division of Student Life, and the Division of Comparative Medicine, the three DLCs with the highest injury rates.

Construction Safety Program

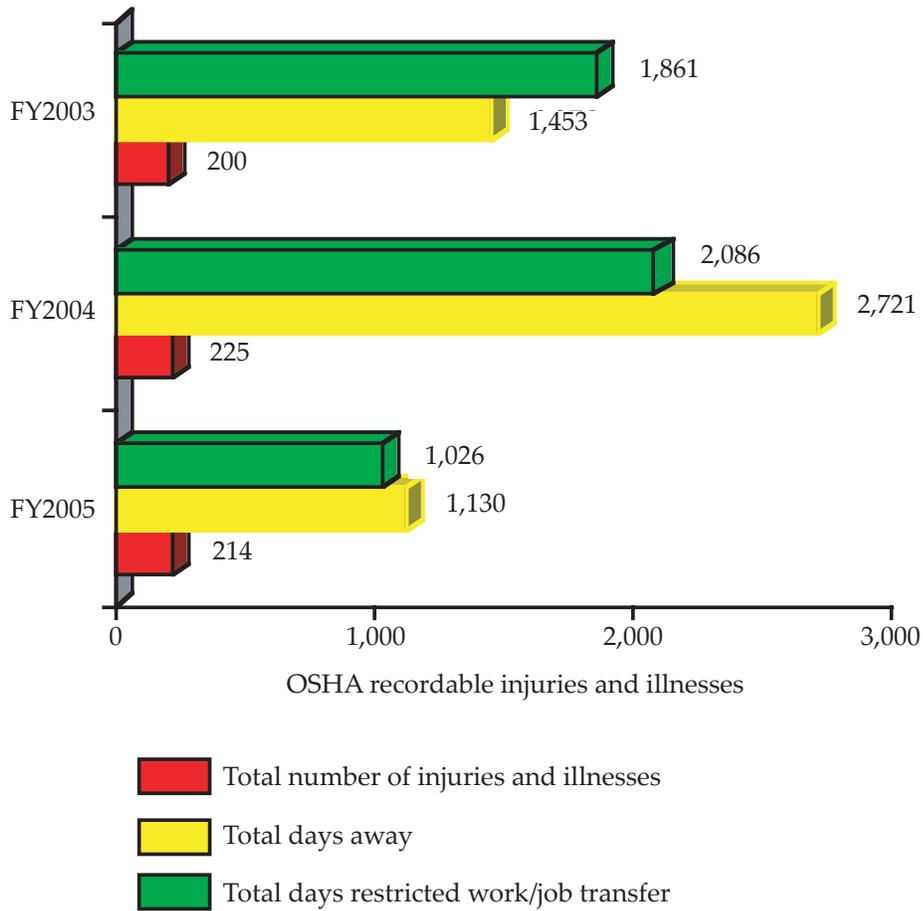
This is the third full year of the EHS Office's collaborative effort with the Department of Facilities to provide EHS expertise to new construction and renovation projects. The objectives of the program are to assure that EHS requirements are addressed for new construction and renovations, to protect the MIT community during construction and renovation activities on campus, and to strengthen MIT's relationship with Cambridge authorities responsible for regulating these activities. This program involves an initial review of design and construction plans; close communication with Facilities project managers, contractors, and City of Cambridge Fire Department and Inspectional Services; and ongoing inspections of the construction sites. The advantages of the program include fewer regulatory inspections, fewer time delays, and cost savings. During FY2005, three major projects and 56 renovations were reviewed. In FY2004, we initiated a "Lessons Learned" review for major projects to help minimize adverse effects on future projects. This led us in FY2005 to develop an "EHS Related Issues/Tasks during Laboratory Move and Decontamination" Matrix to support a standard operating procedure that was developed on "Moving a Laboratory: Preparation and Decontamination." This will allow for more economical and efficient moves.

Migration of Injury and Illnesses

The EHS Office has worked with Facilities and the Division of Student Life (DSL) since early 2004 to institute a department-wide incident investigation program and a Return to Work/Temporary Modified Duty program. The EHS Office began sending monthly injury summaries to DOF management and to the DSL EHS coordinator so that they would be aware of the type of injuries occurring and take action to prevent future injuries. Efforts at reducing lifting injuries are focused on DOF and the Division of Comparative Medicine, where these injuries are most prevalent. These included increased training, job redesign, and purchase of equipment to aid in lifting tasks. Collaborations with DOF and other DLCs focus on improved investigation of all incidents, including greater involvement of supervisors, EHS coordinators, and EHS DLC teams in investigations and in identifying and implementing corrective actions. A web-based incident reporting and investigation system currently under development and scheduled for implementation in FY2006 will centralize and electronically link all information related to an incident and will facilitate data handling. EHS will attempt

to make a more accurate estimate of the real costs of work-related injuries and illnesses to MIT. The incidence rate of total recordable injury and illness cases (2.0) is below the incidence rate for private industry (5.3) and also below the incidence rate for colleges and universities (2.8). Figure 5 shows the trend in overall injuries and illnesses for MIT, which has received the most emphasis this past year; though this graph does not include DOF data, that department has experienced the same trend. From FY2004 to FY 2005, MIT (excluding DOF), saw the total number of injuries and illnesses fall 4.8%, the total days away fall 57.3%, and the total days of restricted work/job transfer fall 50.8%.

Figure 5. Total OSHA recordable injuries and illnesses (excluding Department of Facilities data)



Notes: OSHA recordables are required for the calendar year. FY2005 is estimated based on data from the first six months of the year.

Emergency and Security Preparedness Program

With EPO's leadership, the EHS Office, MIT Police, Facilities, and other operational groups continue to collaborate to prepare MIT in case of an emergency or catastrophic event.

Efforts center around preparedness, training, response, follow-up, and review of emergencies. EPO is leading an effort to train personnel to operate in an emergency center, modeling the organization of a center after the nationally recognized and accepted incident management system. MIT Police are designing a room in the police station to be constructed to facilitate an emergency center. This center has been used successfully in three regional emergencies during the past year with increasing success.

MIT has received a grant from the National Homeland Security Office to evaluate disaster hazards at the Institute. The Disaster-Resistant University program enables MIT to evaluate all hazards—natural, accidental, and intentional—and to plan mitigation strategies to reduce the severity and likelihood of events. Professor George Apostolakis is collaborating with EPO on this effort, and a graduate student is performing the hazard analyses as part of her research project. Future grant money is available to actually implement mitigation strategies.

Disaster response and business continuity management functions have moved from Information Services & Technology (IS&T) to EPO and are being revised to integrate with the collaborative nature of the Institute response system.

The EHS-MS has integrated emergency preparedness into training and inspection programs. As part of registration into the EHS-MS, MIT personnel have provided hazard potential data and emergency contact information for approximately 2,500 locations on campus.

Lead responders for nonpolice, nonmedical emergencies such as fires, utility, and hazardous material emergencies continue to be a collateral duty function of the EHS Office and Facilities personnel. EPO is preparing a plan to improve this response system in the future. EPO and MIT Police are implementing recommendations of the Committee on Toxic Chemicals to improve security in laboratory areas. This early work should serve as a paradigm for future protective measures.

Select Agent Program

The passage of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 resulted in new US Department of Health and Human Services (DHHS) and US Department of Agriculture (USDA) regulations, first promulgated in December 2002, requiring tighter controls on access to and the possession, use, transfer, and disposal of certain biological agents and toxins (called select agents and toxins in the regulation) that have been determined in regulations of the DHHS Centers for Disease Prevention and Control (CDC) and/or of the USDA Animal and Plant Health Inspector Service to have the potential to cause significant harm to the public, animals, and/or plant health or products. This act and the new regulations have had a significant impact on a small number of MIT laboratories but have required MIT to register as an institution, to

maintain strict inventory control on certain agents and toxins, to have FBI security risk assessments done on researchers and other staff who have access to such materials, and to have specially secured research spaces. The regulations have separate campuswide and Lincoln-wide per PI toxin volume exemptions, and the EHS Office, with support by a faculty-led task force, worked with Procurement to implement central purchasing through the EHS Office Biosafety Program for all listed toxins to ensure that researchers who use these common toxins do not inadvertently exceed the volume exemptions and become subject to the regulations. All regulated agent purchases also must be made through the EHS Office Biosafety Program deputy director or her alternate under the regulations. The EHS Office conducted several broad surveys of all laboratories potentially possessing or using regulated or exempt materials.

The Select Agent Program has undergone three federal agency inspections this past year. Inspections were conducted by the CDC and USDA. There were no significant findings.

Enhanced Delivery of EHS Services

In FY2005, the EHS Office focused on improving customer service in a variety of venues, including email inquiries via environment@mit.edu. There were approximately 750 email requests received during the fiscal year. In all cases, the customer received an automated email reply that their request was being attended to. Most customers were personally assisted by the EHS staff within two days. Turnaround time for resolving average requests was usually within two days; for more complex requests, within four days.

Technology supports EHS services at MIT. Ten web-based EHS regulatory training programs are now available, a 25 percent increase. Submission and review of biological protocols and radiation authorizations are now conducted online, reducing the time from submission to final approval by approximately 20 percent, minimizing excessive paper generation and increasing the efficiency of tracking and record keeping. OSHA-required injury and illness reports have been streamlined and made available online, increasing the level of compliance while reducing the burden on supervisors. Technology also supports trend analyses. The hazardous waste online request service has been expanded from chemicals to include radioactive waste.

There were two key technical components of the EHS-MS launched this year. First, a more comprehensive version of the PI/Supervisor Space Registration and SARA Inventory system was launched using SAP technology (see <http://mit.edu/sapweb/>—the EHS tab). This system captures the inventory of potential EHS hazards located at MIT so that those who work or study using potential hazards are properly trained to minimize the risk to themselves and the environment when working with these potential hazards. The PI/Supervisor Space Registration and SARA Inventory system also provides a means to make emergency responders aware of potential hazards and those who should be contacted when an emergency or incident arises. More than 1,500 people at MIT are authorized to use this component of the EHS-MS.

Second, a new EHS-MS Portal website (<http://mit.edu/ehs-ms/>) was launched in the early summer of 2004. It links components of the EHS-MS together, including the EHS-

MS online manual that was published at the same time. The EHS-MS manual provides ready access to practical information on the roles and responsibilities and standards and procedures encompassed by MIT's EHS-MS. EHS Office staff worked with IS&T to complete the web development work, including the new MIT Emergency Operations website (<http://mit.edu/emergency/>) that went live at the same time. The EHS Webmaster provides the ongoing technology support for each site. Since the sites launched last summer, the number of pages accessed for the portal sites have grown steadily each month, starting from 11,565 page requests in July 2004 to 30,633 page requests in June 2005. This site was recognized by the Campus Safety, Health, and Environmental Management Association in its annual EHS website competition and awarded third place.

Support for Special Off-Campus Projects

The EHS Office provided significant support to off-campus efforts over the past year. These activities included other support to the Senior Counsel's Office during the transfer of the genome project to MIT to create the Broad Institute; activities related to the Bates Linear Accelerator facility's decommissioning; extensive efforts in support of environmental activities for the Real Estate Office's portfolio properties; and support related to the Haystack Ultrawideband Satellite Imaging Radar Upgrade Project.

During FY2005, the Bates Lab initiated a pre-D&D program as part of the Department of Energy user facility phaseout. This program involved identifying and removing equipment that would no longer be useful in future lab activities. As part of this effort, the EHS Office developed and implemented a screening procedure to separate those materials requiring disposal as radioactive waste from those meeting free-release criteria, representing an approximately \$300,000 savings in D&D costs.

Scope of EHS Activities

EHS Office activity metrics reflect the scope and intensity of services necessitated by both expanding research activity at MIT and a host of local, state, and federal EHS regulatory requirements that relate to this research. As MIT's research volume increased by almost 10 percent in FY2004, the EHS Office experienced at least the same or greater increase in activity. (See <http://web.mit.edu/environment/> for more details regarding EHS activities.) Many EHS activities fall into the following three major groupings:

1. Surveys (typically involving measurements) to monitor the safe use of equipment and materials: Approximately 21,100 such surveys were implemented in FY2005 concerning equipment and safety practices related to the use of biological and radioactive materials, chemicals, recombinant DNA technology, and infectious agents.
2. Inspections (involving detailed observations) conducted to verify the quality and compliance of EHS activity on campus and investigations initiated at the request of MIT programs and laboratories: Approximately 7,100 such inspections took place this past year, encompassing the use and storage of hazardous waste, the use of ventilation hoods, and the use of recombinant DNA technology or infectious agents.
3. Monitoring and prevention regarding a range of potential workplace hazards and exposures: This includes chemicals, asbestos, blood-borne pathogens,

workplace injuries such as repetitive strain injuries, and safe practices during hot work. In FY2005, the EHS Office performed more than 3,800 lab analyses for chemical and biological materials and over 50,000 surface, air, and water samples for radioactive contamination.

Approximately 250 asbestos abatement projects were monitored and completed, a 20 percent decrease from FY2004 due to a reduction in renovation, activities, and implementation of new asbestos procedures. More than 7,000 faculty, staff, and students were trained concerning the use of biological or radiological materials, chemicals, hazardous waste, emergency response, and cutting and welding safety, an increase of over 10 percent. The use of web-based training more than doubled from last year.

Regulatory Interactions

Occupational Safety and Health Administration (OSHA)	Three complaints were filed with OSHA. Two were resolved with no citations issued. One resulted in citations and a small fine. All issues were immediately corrected.
Nuclear Regulatory Commission (NRC)	One routine inspection of the MIT nuclear reactor was conducted by the NRC. No notices of violations were issued.
Centers for Disease Control and Prevention US Department of Agriculture US Department of Health and Human Services Office of the Inspector General	Each of these agencies separately inspected our select agent laboratories. All inspections were satisfactory, and in some cases commendations were made.
Cambridge Fire Department	Training for the Cambridge Fire Department Hazardous Materials Response Team was conducted for radiation safety, chemical and biological hazards, and air sampling techniques. Members of the EHS Office worked with the Fire Department on emergency planning procedures.
Cambridge Local Emergency Planning Committee (LEPC)	Several members of the EHS Office participated as members of the Cambridge LEPC. The Institute participated in two disaster drills with the City. EHS personnel assisted in the planning of one of the drills.
Massachusetts Department of Environmental Protection (DEP)	The EHS Office interacted with the Massachusetts DEP regarding many of MIT's 83 Massachusetts Contingency Plan sites (urban materials contaminated sites), many of which result from the location of our campus on urban fill.

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More information about the Environmental Programs Office and the Environment, Health, and Safety Office can be found online at <http://web.mit.edu/environment/>.