

# **EHS Annual Report FY09**

## **1. EHS Office Overview**

EHS Headquarters is the senior administrative office at MIT 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 EHS performance that exceeds regulatory compliance and embodies being an excellent environmental citizen of the world. EHS Headquarters oversees the EHS Office, sustainability programs, and EHS related emergency preparedness, which deliver services and supports and oversees day-to-day Institute-wide EHS performance.

### **1.1 Highlights:**

- Led the effort to develop "MIT Alert," the Institute suite of emergency messaging channels.
- Managed MIT's efforts to implement behavior changes to reduce energy use, associated cost, and greenhouse gas emissions at MIT.
- Developed a standard practice in collaboration with Facilities on ventilation and energy conservation that helps reduce energy use without adversely affecting the safety and health of occupants.
- Integrated the EHS-MS with the energy initiative and utilized the organization to advance energy savings programs such as fume hood sash management and increase recycling efforts in laboratories.
- Improved key EHS programs in collaboration with Facilities in both level of compliance and efficiency. The programs emphasized this year were confined space entry, control of hazardous energy sources, fall protection, universal waste, MWRA compliance, and commercial motor vehicle use.
- Developed and implemented an Integrated Pest Management program (IPM) for all of MIT's Day Care Centers in collaboration with HR and Facilities and our Day Care provider and Pest Control vendor.
- Developed an Institute-wide Controlled Substance program to allow better oversight for compliance and exchange of best practices among the multiple users across the Institute.
- Implemented and improved inspection program to provide a more consistent and efficient method to record, report, and correct findings.
- Continued to reduce the cost and magnitude of hazardous waste generation.
- Continued to reduce the cost and magnitude of injury and illness incidence.
- Collaborated with MIT Police and several Institute Committees and the National Nuclear Safety Agency to increase security of hazardous materials and operations at the Institute by using a \$380,000 grant for facility upgrades.

### **1.2 FY10 Goals:**

- Build out, enhance, refine, and test the "MIT Alert" system and increase participation in the program.
- Increase participation in "Greening MIT" program to induce cost saving and environmentally positive behavior at MIT.
- Collaborate with Facilities to establish written facility design standards related to EHS design features to enhance the health and safety of the facilities, more easily adhere to compliance and reflect best practices.
- Collaborate with Facilities to improve key EHS programs in both level of compliance and efficiency. The programs emphasized this year will be asbestos, contractor safety, air permits, and reduction of injury and illness incidence.

- Implement a campus-wide Integrated Pest Management program (IPM) in collaboration with Facilities, Human Resources, Division of Student Life, Athletics, Campus Activities Complex, and Food Services to realize opportunities for efficiency and effectiveness improvements.
- Institute a Campus-wide Import/Export program in collaboration with Office of Sponsored Programs to allow for better oversight for regulatory compliance and exchange of best practices among the multiple exporters and importers across campus.
- Implement an Institute-wide Commercial Motor Vehicle (CMV) program across the Institute to allow for better compliance oversight and identify opportunities for efficiency gains.
- Implement several new hazardous waste minimization initiatives to reduce the quantity of hazardous materials generated by MIT and improve our cost effectiveness.
- Collaborate with Procurement to develop a more effective and less costly way to track the purchase of chemicals heavily regulated by the Department of Homeland Security and the Environmental Protection Agency.
- Collaborate with the UROP Office to develop a method to assure students are properly trained and supervised to perform their research safely.

## 2. Training

Training is a key component of the EHS Management System.

### 2.1 Impact of EHS Management System (EHS-MS) on EHS Training:

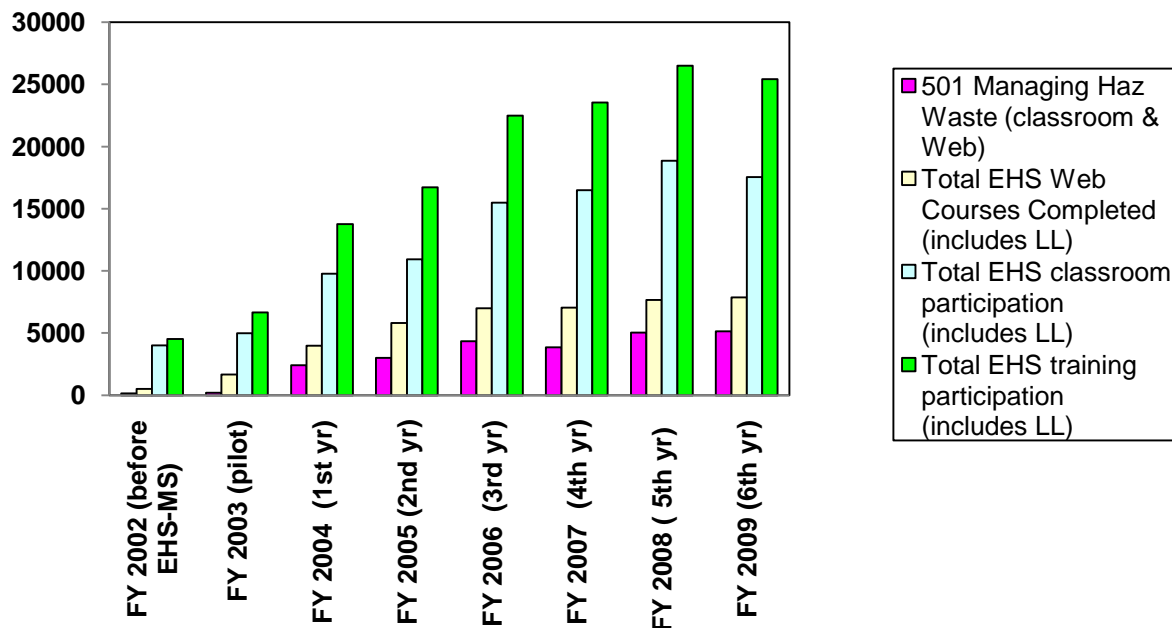
EHS presently trains more than 25,500 person-sessions annually. See Figure 2.1.

Note: An individual is likely to be a participant in more than 1 course.

Figure 2.1

### Number of Participants in EHS courses delivered by fiscal year.

# of Trainings Delivered



- 13,895 individuals have taken at least 1 EHS course since FY 02. In FY 09, 2109 took a course for the first time. There are 6802 individuals who are currently active in the EHS training system.

**2.2 Core Courses Training Completion Metrics** – this is the third year we are tracking EHS core course metrics across the Institute. Completion rates have been consistently high for most courses.

## Accomplishments:

- **EHS Performance Award:** As a way of recognizing exceptional EHS training and inspection performance, the EHS Office announced the winners of this year's DLC EHS Performance Awards in September of 2008. The average core EHS training completion rates for the award recipients were as follows:

Center for Environmental Health Sciences (small DLC)	100%
The Koch Institute (large DLC)	97.4%
Microsystems Technology Lab (large DLC)	96.7 %

Other groups recognized for high EHS performance are: Biological Engineering, Clinical Research Center, Institute for Soldiers Nanotechnology, and Plasma Science and Fusion Center.

- **EHS included in Institute's roles-based classes:** EHS presented on EHS services in courses developed for new managers and AO's. A power outage scenario piloted in the new manager's course last year was integrated into both classes this year.

## Initiatives:

- **Building 68 Lab Group Training Effort** –The EHS Lead Contact for Biology and EHS Coordinator have been piloting an integrated EHS training effort in the lab group setting over the past year. To date, they have provided EHS training to ten under-performing lab groups in the Department of Biology. Emergency response and inspection results are integrated into the regulatory required modules such as Bloodborne Pathogen and Managing Hazardous Waste. This customization of the modules to the lab's needs makes for a highly relevant, collaborative training that is more of a problem solving discussion than traditional one-way training delivery. The experience has confirmed for both researchers and EHS trainers that this results in highly relevant effective training.
- **TAT Infrastructure Initiatives:** EHS staff members participated in three MIT training technology infrastructure projects. These projects, spearheaded by the Training Alignment Team, were designed to:
  - Enable training data feeds to MIT's data warehouse for all training - web-based and live courses. This initiative makes comprehensive training reporting available to department management through the data warehouse using BrioQuery.
  - Re-design the central MIT training website with upgraded functionality and updated content. In addition to refreshing the training data content, the site update will deliver a calendar view of all training currently available, as requested by MIT users.
  - Develop a proposal to provide MIT with an integrated e-learning system to comprehensively administer training requirements and monitor training progress across all departments and functions. This proposal was presented to ASPCC in June and is currently under consideration.

## 3. Inspections

The EHS-MS Audit/Inspection program is a key component of the Management System promoting, monitoring and focusing on the effectiveness of regulatory training and compliance as well as good practices to achieve environmental sustainability. This program consists of three tiers of inspection designed to assess performance, correct problems and prioritize areas for improvement.

The Level I inspection is conducted by the DLC person assigned that role and is reviewed at the time of the Level II program. The Level II program is a DLC-wide inspection conducted twice each year in research DLC's and on an annual basis in non-research areas by the local DLC-EHS Coordinator and the EHS Office. Two rounds of Level II Inspection were conducted in research areas and one in non-research areas in 2008. An updated inspection system application was launched in the latter half of 2008.

The Level III Audit is a third party audit conducted on a two year cycle which can be focused on the overall system or a specific element. Currently, the MIT Audit Division serves as the independent auditor and conducts audits on select EHS-MS elements on an annual basis.

### **3.1 On-Going programs**

#### **a. Level II System Upgrade**

The system users reported the original system was both inefficient and confusing and an obstacle to having an effective EHS Inspection Program. A system design team with representatives from IS&T, EHS and the Working Committee developed a user requirement document for an enhanced and more efficient Level II system.

The revised system was launched in late 2008 and results indicate significant improvement in the areas of completion rate and performance consistency. The desire for maintaining shadow data system is reduced.

## **4. 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 Committee on Toxic Chemicals, 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 Faculty 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 6-faculty research oversight committees and serves as administrative support for the Radiation Protection Committee (RPC) and the Committee on Assessment of Biohazards (CAB).

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.

The EHS Biosafety Program also administers the Institutional Biosafety Committee and provides biosafety services for the Draper Laboratories. The Institute's Radiation Protection Committee also functions as the Whitehead Institute's Radiation Committee while the EHS Radiation Protection Program provides radiation safety services. The Radiation Protection Program also supports the Draper Laboratories Radiation Protection Committee and provides radiation safety services.

### **4.1 Increase in Biological Research at MIT**

Over the last 10 years there has been continued growth in the number of faculty engaged in biological research at MIT. This growth is a reflection of the increased funding in biological research, the fundamental applicability of the ongoing MIT bioresearch, and the overall excitement in understanding

and developing biological systems using new technologies. The MIT Biosafety Program staff work hard to maintain strong working relationships with MIT faculty and to keep abreast of this wide ranging research so that our programs remain as relevant as possible yet provide the appropriate level of oversight to ensure compliance while keeping the paper burden on investigators as low as possible.

The number of new faculty engaged in biorelated research is up by 14%. NIH, which only funds biological research, is now the single largest source of research dollars at MIT. This is reflected in the growth of both new faculty and new students (undergraduate, graduate and post-doctoral fellows). This growth is only expected to continue since MIT provides a unique research atmosphere that encourages cross discipline approaches to understanding, manipulating, and detecting biological systems. We expect to see the continued growth in bioresearch due to the increased NIH funding and more recently TARP funding.

The projected growth in research space utilized for biological research at MIT has fulfilled expectations. However, the growth in research space is not just due to the new buildings outlined below but we have also seen the renovation of a number of non research spaces into biolabs, e.g. the bioresearchers in labs in the Media building.

- 2010 additional assignable bioresearch space in David H. Koch Institute for Integrative Cancer Research (Bldg. 76) = 180,000 sq ft
- 2010 additional assignable bioresearch space in Bldgs. E17, E18, E19, E25= 134,993 sq ft
- additional assignable research space in new Media Lab addition = 163,000 sq ft  
(not sure what % will be bioresearchers in this new space)

This growth of bioresearch at MIT coupled with the development of several new research technologies (synthetic biology, nanoparticle delivery of biological materials, development and use of human embryonic stem (hES) cells) will challenge Biosafety Program staff to develop the needed expertise to provide the appropriate level of collaboration and oversight for these projects while maintaining the expected level of performance in all the other areas. This is an exciting and interesting challenge for the EHS Biosafety Program.

#### **4.2 Select Agent and Toxin Program**

This program was just recently reregistered with the CDC and will require far more frequent attention than it has in the past. Regulations are being more broadly interpreted by inspectors causing the entire Select Agent team to pay close attention to fulfilling all the annual requirements completely and clearly and with a wider interpretation than first accepted.

The program remains relatively stable in its size and complexity. We continue to see monthly requests for security renewals of 1-2 registered personnel. We continue to conduct the annual re-trainings, and manual reviews and tests of the security program.

### **5. Radiation Programs**

#### **5.1 Radioactive Material Authorization and Machine Registration Program**

This program remains the main link between the EHS Radiation Protection Program and the licensed material user community within the academy. The Radiation Protection Program (RPP) continued its strong presence in the academy during the past year. There is a continued increase in the demand for experimental reviews involving laser and RF sources at Lincoln Labs and Millstone Hill.

All uses of radioactive material and radiation producing equipment are thoroughly reviewed by RPP and approved by the MIT Committee on Radiation Protection on a continual basis. There are currently 133 authorizations of which 7 are new and 65 were renewed or amended during the past year.

Service programs include control/security of materials received at the Institute, the collection and management of low-level radioactive waste, worker and environmental radiation monitoring, laboratory surveys and sample analysis, radiation worker training/retraining, instrument calibration, packaging/transport of radioactive samples, and emergency response are in effect to serve the authorized projects. There are approximately 600 registered low and medium radiation labs for which approximately 14,000 regulatory required radiation surveys were performed.

## **5.2 Analytical X-ray Program**

EHS Radiation Protection Program staff performed annual inspections on all analytical x-ray systems. There are currently 27 analytical x-ray units. EHS Radiation Protection Program provides area radiation monitors for these installations. In addition, EHS Radiation Protection Program audits the medical and dental x-ray installations at MIT Medical and provides dosimeters/training to workers.

## **5.3 Laser Safety Program**

By taking advantages of the Level 2 inspection program within the EHS-Management System, this EHS Radiation Protection Program is continually improving implementation of the regulatory requirement of registering all Class 3b and Class 4 lasers. There are approximately 1200 lasers in our current inventory. Registration includes a safety/risk analysis of the laser system by EHS staff, development of standard operating procedures by the laser users and training of all laser workers. The laser safety program is allowing a stronger link to the academy similar to radioactive materials authorization program. There has been a continued increase in laser hazard analysis and reviews for projects being done at the Lincoln Lab Flight Facility and for laser to be used in aircraft.

### **5.3.1 Radio Frequency (RF) Sources**

There continues to be an increased demand on review of RF safety plans for sources at Lincoln Laboratories and Millstone Hill. The LLRF safety committee and RPP have produced a draft rewrite of the RF safety program including registration of all sources. The HUSIR project at Millstone Hill is back on track and required increased measurements/surveys by RPP. There were several RF hazard projects including measurements in and around aircraft during the past year. Due to the logistics of operating the aircraft and radar systems on the ground, these measurements are made between 10 PM and 4 AM.

## **6. Hazardous Waste Metrics**

FY09 marked the first year the hazardous waste program began consolidating flammable solvents, the largest single waste stream. This change has allowed the program to accomplish two important goals, lower the price per unit and provide prompt waste collection service. One indicator of this success is the reduction of the hazardous waste unit cost. The savings realized from this effort are estimated to total \$50,000 annually when fully implemented.

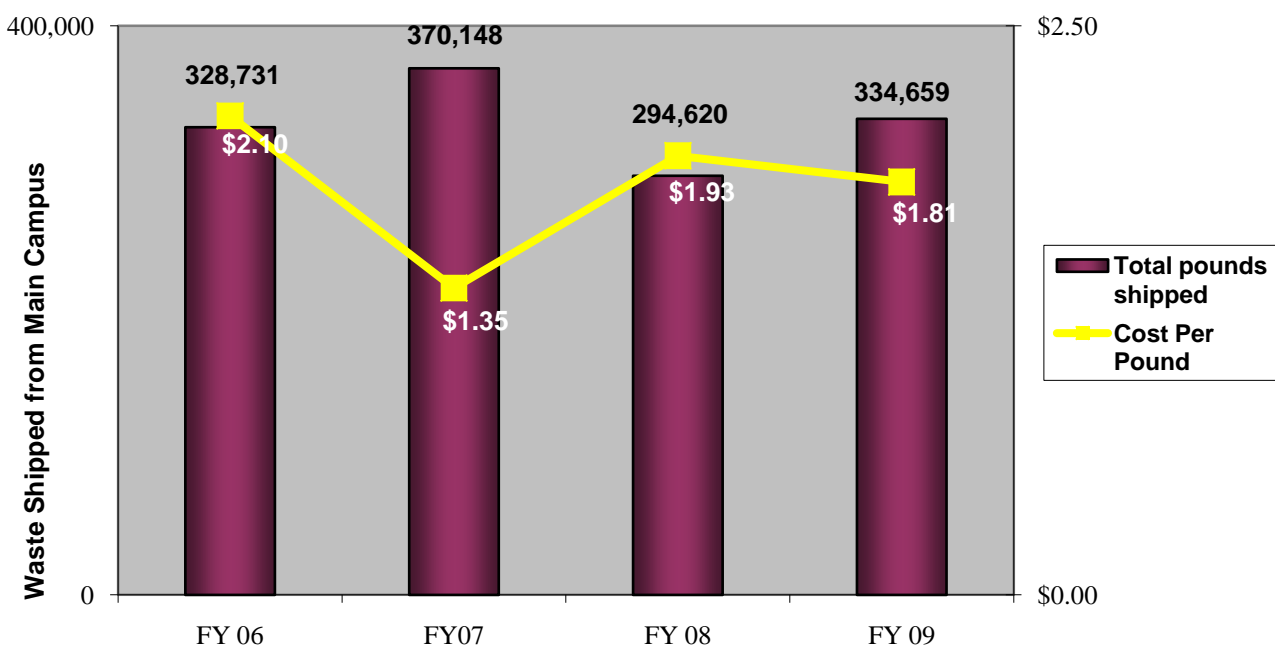
The overall service has also improved in FY09 with the addition of two solvent recycling units in the Department of Chemistry. The EHS Office worked with two Principle Investigators in Chemistry to provide them with a waste reduction solution for their waste solvents and also provide them with a secure supply of critical chemicals for their research.

FY09 has continued the trend of unprecedented increase in waste generation due in part to growth in both research and infrastructure. To address this issue, a goal of waste reduction was set for the hazardous waste program using a balanced scorecard approach. Other efforts to reduce wastes while lowering disposal costs continued in FY09. Cylinder devolving, scrap metal recycling, solvent recycling, and oil recycling initiatives eliminate unnecessary hazardous waste from being sent for disposal and recycle important resources for future use. All of these efforts combined to recycle 52,000 pounds of hazardous waste with a savings of \$44,000 in cost avoidance.

Despite all of these efficiencies, MIT increased its hazardous waste generation when compared with the previous fiscal year. Overall, hazardous waste generation (measured in pounds) at MIT increased by 14%. Figure 6 shows a 4 year trend of hazardous waste generation and disposal costs per unit. There has been a \$0.12 reduction in costs per unit of waste disposed in FY09 and an overall trend for reducing the price per unit since FY06.

**Figure 6**

### Total Pounds of Waste Shipped from MIT's Main Hazardous Waste Accumulation Area by Fiscal Year with Cost Per Pound



## 7. Ergonomics

The EHS Office has collaborated with MIT departments, labs, and centers (DLC) 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 discomfort and improved function 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 and assessment tool course in FY 05.

Since the site was launched in February 2004, 1368 users have taken the training. There were 108 onsite visits conducted in FY 08. A follow-up survey indicated greater than 90% experienced improvement in their work environment.

The Ergonomic Web page was completely revised to make it more user friendly and new topics on material handling, laboratory ergonomics, and hobbies were added.

## **8. Construction Safety Program**

This is the seventh full year of the EHS Office's collaborative effort with funding from 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. The advantages of the program include fewer regulatory inspections, fewer time delays, and cost savings. During FY 09, 6 major projects and 26 renovations were reviewed.

## **9. Incident Reporting and Investigations**

The EHS Office continues to work with MIT Departments, Labs and Centers (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 DOF Management, EHS Office staff, and DLC EHS Coordinators.

The incidence rate of total recordable injury and illness cases for calendar year (CY) 2008 is shown in Figure 9.1, along with data for the previous five years. This rate continues the downward trend from the previous year and is well below the CY 2007 (latest available data) incidence rate for private industry and less than the incidence rate for colleges and universities.

We estimate the reduction in our rates since 2003 have saved the Institute almost \$500,000.

**Figure 9.1**

### **Cost savings from reduction in number of days away**

	<b>Number of days away</b>	<b>Number of FTEs</b>	<b>Cost of FTEs</b>	<b>Cost if days away equal to 2003</b>	<b>Cost Savings</b>
2003	2721	13.605	\$816,300	\$816,300	\$0
2004	2295	11.475	\$705,713	\$836,708	\$130,995
2005	2079	10.395	\$654,885	\$857,115	\$202,230
2006	1385	6.925	\$448,740	\$881,604	\$432,864
2007	2124	10.62	\$705,380	\$903,644	\$198,264
2008	1375	6.875	\$468,053	\$926,235	\$458,182

<sup>1</sup> Cost calculation uses the following estimated compensation: for 2008 - \$68,080; for 2007 - \$66,420; for 2006 - \$64,800; for 2005 - \$63,000; for 2004 - \$61,500; for 2003 - \$60,000.

## **10. Enhanced Delivery of EHS Services**

### **10.1 Inventory: Department of Homeland Security (DHS) / Survey of Chemicals of Interest (COI) With Low Threshold Values**

As part of the ongoing regulatory monitoring and reporting requirement for DHS, EHS updated the EHS web pages about DHS and Chemical Security to reflect the changes to the Chemical Hygiene

Plan template agreed upon by the Committee on Toxic Chemicals (CTC). One of these changes makes it a requirement that all labs working with chemical hazards on campus maintain a chemical inventory. This decision, though not an endorsement of the ChemTracker inventory system that is provided to labs free of charge by the EHS Office, has nonetheless prompted a steady stream of labs to consider its use as a viable long term inventory solution. EHS Tech Support also manages the access permissions for all the users in the 259 labs that currently have some inventory in ChemTracker. Gradually the use of the ChemTracker inventory software continues to increase.

## **10.5 Customer Satisfaction Surveys**

Upon completion of RequestTracker service request, EHS solicits customer satisfaction feedback. We actively use this information to learn and improve our service.

Note: In FY09, EHS received 826 service requests via RequestTracker.

## **11. Support for Special Off-Campus and Special Projects**

The EHS Office provided significant support to off-campus efforts over the past year. These activities included 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 Ultra-wideband Satellite Imaging Radar Upgrade Project.

### **11.1 Bates Linear Accelerator**

L-3 Accelerator: As part of the revised mission for the Bates Linear Accelerator, MIT joined in partnership with L-3 Communications in a project sponsored by TSA to investigate the feasibility of using neutrons in a cargo screening application. The Bates Radiation Protection Program staff served on the project team responsible for overseeing the safe operation of the machine during its four month operation in FY08.

### **11.2 Nuclear Reactor Laboratory**

The EHS Office Reactor Radiation Program supports the operation of the Nuclear Reactor Laboratory in its efforts to keep radiation exposures and releases to a minimum and well below any regulatory requirements.

Key Accomplishments during the year include:

1. Radioactive waste management for NRL:

- 25 tons of solid radioactive waste shipped for treatment and disposal
- 60 cubic feet of resin shipped for treatment and disposal
- Competitive bid process saved the Nuclear Reactor Lab over \$20,000
- Management of the analysis and disposal of approximately 350 gallons of liquids radioactive waste collected over the past two decades.

2. ALARA (As Low as Reasonably Achievable) Program:

Since March of 2008, Reactor Radiation Protection staff members have worked closely with the NRL staff to ensure the successful enhancement of the facility ALARA Program. This is a regulatory required program whose goal is to reduce radiation exposures to as low as reasonably practical. The major successes achieved include:

- A 30% reduction in collective dose from the previous year.

- An increased level of awareness pertaining to dose reduction, which is now one of the priorities in conducting day to day operations of the MITR.
- Enhanced communication of work activities coupled with the ALARA process resulting in the practical application of a number of specific dose reduction techniques.
- Implementation of methods to measure programmatic effectiveness and a system to ensure future resources are applied to sustain dose reduction activities.

### **11.3 Novartis/MIT Continuous Manufacturing Project**

Final design was completed and construction started this FY on this \$4 Million, 2500 sq.ft. facility. EHS provided safety, environmental, and industrial hygiene expertise to the project. The facility has been designed to support research on continuous manufacturing processes for Level III compounds highly toxic materials. EHS provided guidance on high performance hood selection and specialty enclosure design and participated in developing commissioning and operational specifications for the facility.

### **11.4 Lincoln Lab Special Projects**

The Microelectronics Lab, the main chemical use facility at Lincoln Laboratory, is changing its process which requires EHS to conduct testing for decommissioning old equipment and commissioning ventilation for new equipment. EHS is investigating solutions to diesel exhaust re-entrainment in C-409 CVD lab. Lincoln Laboratory Facilities had installed carbon filters on air intake but filter lifespan is unacceptably short.

## **12. Properties with Environmental Concerns**

MIT and MITIMCo own, partially own, or have some responsibility for approximately 130 identified contaminated sites under the Massachusetts Contingency Plan (MCP) regulatory program. These sites are primarily associated with redevelopment efforts in Cambridge, although a few are associated with part oil or fuel spills. As a result of filling and historical industrial use, most construction projects involving soil removal in Cambridge are MCP sites. Most of these sites have been effectively closed, but there are 10 sites, primarily associated with construction projects, which are considered active at the end of this fiscal year. EHS provides policy and practice guidance and reviews consultant's work products involved in the cleanup and remediation of these sites. This helps to ensure quality work products and efficacious remediation of these sites.

### **12.1 Superfund**

MIT and Lincoln Labs are listed as potentially responsible parties for two major cleanup activities overseen by the Government which had significant activity for the year. Two sites are managed under the federal Superfund law and one site is under Massachusetts state jurisdiction.

MIT was identified as a potentially responsible party (PRP) by other PRPs involved in a site in New York State and offered a de-minimus closure from the State regulatory program. Counsel reviewed and rejected the offer because it did not provide sufficient protection.

### **12.2 Westgate**

PCBs have been detected in exterior building materials (i.e., caulking and adjacent concrete/brick) and some soil samples at the Westgate Complex. While an evaluation performed by MIT and outside experts showed that leaving these materials in place without disturbing them does not present an imminent health risk, the PCBs could be transported to other locations and/or media (e.g., groundwater

or surface water), hence this past year all contaminated caulking and soils have been removed, and epoxy resins were used to encapsulate PCBs in the building surfaces. Generally, buildings built prior to 1979 have a risk to contain PCBs. These buildings are receiving increased oversight by EHS when renovations are planned.

### **13. Regulatory Interactions**

MIT is subject to both scheduled and unannounced regulatory inspections by 15 Federal, State or City agencies. FY09 was a particularly active year in this regard. The following summarizes the results of these visits:

- **MADEP Consent Order for Generators on Campus**

The Institute was issued a Consent Order following a DEP inspection for installing two emergency generators serving the Simmons Hall Dormitory not in conformance with good engineering practices. MIT has agreed to install, operate and maintain California Air Resources Board (level three) certified diesel particulate filters on each generator to mitigate particulate emissions on an expedited schedule as specified.

- **MADEP Consent Order for Generators at Lincoln Lab**

A third party audit by the Air Force determined that Lincoln Labs had installed an emergency power generator without proper permits. The lab self-disclosed this violation to DEP and, with the assistance of the EHS office, submitted the appropriate documentation.

- **MADEP Investigation of Construction Waste**

The Department of Environmental Protection investigated allegations of improper dumping by a vendor of waste materials generated at an MIT demolition and construction project. The investigation included a records review inclusive of matching MIT records to the records at the disposal sites, interviews with employees and a review MIT Standard Operating Practices. MIT was able to provide satisfactory responses in all categories.

- **OSHA** – One visit (compared to three in FY08) by the Occupational Safety and Health Administration (OSHA) to MIT in the last year resulted in three citations and fines and highlighted some of the many complex health and safety concerns associated with work at MIT. These OSHA visits reinforce the importance of the health and safety components of the Environment, Health and Safety Management System (EHS-MS). During these visits OSHA investigated the following: injury and illness reporting procedures, operation of forklifts, and our hazard communication program. Two additional complaints were received by OSHA and were resolved by MIT EHS without an inspection.

- **MADPH** – the Massachusetts Department of Public Health radiation control program inspected our program once and there were no items of non-compliance.

- **NRC** – The Nuclear Regulatory Commission conducted two routinely scheduled inspections of the Nuclear Reactor and conducted 1 special investigation of an exposure incident. Two level 4 (lowest) citations were issued and have since been resolved.

### **14. Emerging Issues**

#### **14.1 Nanotechnology**

EHS is establishing a close collaboration with MIT faculty and staff who are conducting research in the area of nanoparticles and we are closely monitoring the studies on potential health effects and

waste issues of nanoparticles and public perception of potential new hazards presented by nanoparticles. EHS is at the forefront in characterizing potential exposures to nanoparticles in collaboration with the UMASS Lowell Department of Work Environment.

#### **14.2 New Stormwater Regulations**

The MA DEP has proposed new permitting requirements for stormwater which will significantly affect development options for properties the Institute and MITIMCO hold and could require multimillion dollar investment in new infrastructure. The EHS office has been actively involved with the Government Affairs office, Department of Facilities, as well as with other institutions and AICUM in providing comment to DEP on these proposals in an attempt to develop a more workable and effective regulatory package.

#### **14.3 Global Warming Solutions Act**

In August 2008, Governor Patrick signed new legislation called the Global Warming Solutions Act (GWSA) which requires the state and regulated entities to reduce emissions of the greenhouse gases (GHG) that cause global warming by between 10 percent and 25 percent by 2020 and 80 percent by 2050.

The EHS Office registered the Cambridge campus with the Massachusetts Department of Environmental Protection in April 2009 and reported estimated 2008 fossil fuel combustion's CO<sub>2</sub> emissions for our stationary sources (boilers, generators, etc.). Calendar year 2009 CO<sub>2</sub> emissions must be reported by April 2010 and will include emissions from stationary sources as well as mobile sources (vehicles, lifts, etc.).

#### **14.4 New Cooling Water Discharge Permit**

EPA has required MIT to apply for coverage under a new general permit for cooling water discharges to the Charles River to replace an individual discharge permit the Institute has been operating under since the 1970's. There is one remaining use of river water for cooling on campus. The EHS office assembled the necessary operational and environmental data and applied for coverage under the new permit. The new permit will require weekly monitoring in place of monthly monitoring. The EHS office coordinated efforts to cost effectively collect the data required for this monitoring.

#### **14.5 New MWRA Industrial Wastewater Discharge permit**

The MWRA issues a permit which covers the discharges of waste waters from the entire campus excluding the Central Utility Plant, which has its own permit. This five year permit was renewed in FY09 and the new permit writer requested significantly more detailed information about operations and discharges. The EHS office collected, compiled and submitted the data and application for this renewal as the facilities engineer historically responsible for this was out on medical leave for many weeks just prior to the deadline.

#### **14.6 New DOT Hazardous Materials Regulations Final Rule in Federal Register**

On January 14, 2009, a new Final Rule was published in the Federal Register related to requirements for the transportation of batteries and battery-powered devices. This new rule has prompted the EHS Office to evaluate used battery collection campus wide and greater involvement in battery packaging methods through oversight of the new universal waste vendor and working jointly with the Department of Facilities.

## 14.7 Emergency Management and Notification:

Enhanced emergency preparedness and notification are emerging issues in the college and university sector across the nation. MIT EHS Headquarters is leading an effort among several groups to increase preparedness and response capability at the campus and beyond. Beyond local campus police forces and emergency responders, the need to coordinate all participants in campus operations into a cohesive emergency management organization has been demonstrated at several campuses across the country since 2001. MIT EHS Headquarters has recognized this need and is working to lead these enhancements at our campus:

- **Vulnerability Assessment:** MIT recently completed a FEMA funded assessment of disaster potential using an all-hazards approach. The assessment was conducted by Hua Li, a graduate student in the Engineering Systems Division under the direction of Professor George Apostolakis. The assessment involved the elicitation of expert view by more than 60 stakeholders and use of a value tree and process to rate the severity (disutility) and likelihood of scenarios that could affect our campus and operations. The results of this study have informed EHS, Facilities and other groups as we prioritize mitigation of disaster potentials here.
- **Emergency Notification:** In April 2008 MIT introduced MITAlert, system designed to provide emergency responders with the contact information and the ability to notify community members in the event of a critical crisis on campus. A campaign to raise awareness and participation was implemented in April with another campaign planned for late summer, 2009. To date, MIT emergency responders have collected about 25,000 contact points including email addresses and cell phone numbers. In late 2009 MIT EHS and IS&T plan to commence a project to comprehensively improve our notification and data collection systems.
- **Emergency Management:** MIT EHS headquarters is leading an effort to train members and improve our Emergency Operations Center, designed to muster the operational resources of MIT in a time of emergency. In August, 2007 we combined a tabletop drill with a test of our notification capabilities. Results of this test began the development of the MITAlert system mentioned above. More drills and exercises are constantly being performed. MIT uses the National Incident Response System as a model for our emergency management.
- **Emergency Communications:** A discovery effort was completed by MIT EHS headquarters to determine who the key communicators are during a major emergency. From this process, emergency leaders have obtained specific pre-directives to immediately notify the community directly in a time of a severe emergency. Pre-drafted notification scripts have been developed for specific critical emergency scenarios to save time and assist responders. Also, emergency leaders have met with MIT's executive leadership to review communication roles and responsibilities of responders and executives during a time of emergency.

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