



# Project XL Progress Report

## New England Universities Laboratories



In 1995, the U.S. Environmental Protection Agency (EPA) embarked on a series of innovative initiatives in an effort to test new ways to achieve greater public health and environmental protection at a more reasonable cost. Through Project XL, which stands for eXcellence and Leadership, EPA enters into specific project agreements with public or private sector sponsors to test regulatory, policy, and procedural alternatives that will produce data and experiences to help the Agency make improvements in the current system of environmental protection. The goal of Project XL is to implement 50 projects that will test ways of producing superior environmental performance with improved economic efficiencies, while increasing public participation through active stakeholder processes. As of January 2001, EPA has reached its goal of 50 projects in the implementation phase. EPA Project XL Progress Reports provide overviews of the status of XL projects that are implementing Final Project Agreements (FPAs). The progress reports are available on the Internet via EPA's Project XL Web site at <http://www.epa.gov/Project XL>. Hard copies may be obtained by contacting the Office of Policy Economics and Innovation's (formerly the Office of Reinvention) Project XL general information number at 202-260-5754. Additional information on Project XL is available on the Web site or by contacting the general information number. The information and data presented in the January 2001 Progress Report is current as of December 2000.

## Background

Interested in promoting environmental regulations that reflect the unique situation of laboratories and reducing the amount of chemical waste produced, a group of universities from across New England formed the Laboratory Consortium for Environmental Excellence (LCEE) in 1997. Later renamed the Campus Consortium for Environmental Excellence (C<sup>2</sup>E<sup>2</sup>), the Consortium is a not-for-profit corporation whose member colleges, universities, and research organizations are interested in promoting the continual improvement of environmental management programs and systems at academic institutions and research organizations, including the management and



## Major Milestones

January 30, 1998	September 28, 1999	June 28, 2000	September 1, 2000	October 6, 2000	December 28, 2000	January 2001	Fall 2003
New England Universities Laboratories XL Proposal Submitted	Final Project Agreement Signed	Baseline Assessment Completed	Boston College Implements EMP	UMass-Boston Implements EMP	Vermont DEC approval of UVM EMP	UVM Implements EMP	Final Commitments of FPA to Be Met

disposal of hazardous chemicals from campus laboratories. The New England Universities Laboratories XL project was developed in conjunction with C<sup>2</sup>E<sup>2</sup>. The three participating universities, Boston College, the University of Massachusetts-Boston (UMass-Boston), and the University of Vermont (UVM), are C<sup>2</sup>E<sup>2</sup> members. The XL project is designed to pilot a more flexible, performance-based system for managing waste generated in university laboratories. Performance-based systems focus on what is to be accomplished, not prescribing how it will be done. This approach gives organizations the flexibility to adapt to different situations and apply the most cost-effective approaches, while meeting the goals set.

The management of chemicals in university laboratories is primarily regulated by two Federal statutes: the Occupational Safety and Health Act (OSHA), which regulates the use of chemicals within the lab, and the Resource Conservation and Recovery Act (RCRA), which regulates their disposal. Laboratories generally use a small amount of a wide variety of chemicals on an irregular basis, as opposed to a large amount of very few chemicals used continuously that would be employed, for example, in a manufacturing facility. The Occupational Safety Health Administration recognizes this difference and has in place performance-based standards specifically addressing laboratory conditions. The requirements of RCRA are less readily adapted to such a setting. For example, RCRA's determination of when used chemicals are defined as "hazardous waste" is designed primarily for an environment where large quantities of a small number of hazardous wastes are consistently produced and is not adapted easily to the laboratory setting. In addition, while OSHA regulations specifically address the handling and management of the types of chemicals used in laboratories, the management requirements for RCRA-defined hazardous waste are more difficult to apply to the wide range of hazardous chemicals used in laboratories.

Thus, university laboratories are essentially required to implement and track two parallel and not always consistent chemical management systems within the laboratory setting. Under RCRA, laboratories must meet externally imposed requirements governing the management and handling of hazardous waste. Under OSHA, laboratories must comply with a performance-based, internally developed management system governing the management and handling of "hazardous chemicals." The dual implementation of OSHA and RCRA regulations is further complicated by the structure of university laboratories. With large numbers of laboratories within one university, each producing small amounts of hazardous waste on an irregular basis, the overall management of hazardous chemicals and hazardous waste becomes far more difficult. Additional complications arise from the fact that the university laboratory setting is decentralized, diverse, and subject to the regular turnover of students and researchers.

Boston College, with 14,000 students, has approximately 130 research and teaching laboratories and is classified as a small quantity generator (SQG) under RCRA. UMass-Boston, with 13,000 students, and UVM, with 10,000 students, are considered by EPA to be large quantity generators (LQG). UVM, which manages 538 labs, is considered a LQG by EPA because it generates more than 1,000 kilograms (2,200 pounds) of RCRA hazardous waste in a single month. Under a different part of the regulation, UMass-Boston, with 144 labs, is classified as an LQG because it surpasses the 1 kilogram (2.2 pound) per month threshold for generation of acutely hazardous waste.

## The Experiment

The Laboratory XL project intends to facilitate the creation of an integrated and consistent regulatory atmosphere for managing waste in laboratories. Under the project the universities will be required to develop an Environmental Management Plan (EMP) for chemical waste disposal similar to the OSHA-required Chemical Hygiene Plan (CHP). This will enable some of the current RCRA hazardous waste regulations to more closely reflect current OSHA regulations, reducing confusion and ambiguity within the university laboratory setting. As a result of the harmonization of the OSHA CHP and the RCRA-oriented EMP, the new system will actively

encourage chemical reuse and recycling, reduce costs, increase efficiency, and better educate laboratory professionals and researchers. In addition, the new system is expected to provide a better management approach for laboratories and to result in increased pollution prevention while still ensuring protection of human health and the environment.

The anticipated superior environmental benefits of the New England Universities Laboratories project include:

- increasing reuse and recycling of laboratory chemicals within the university by 10 percent, resulting in reduced laboratory chemical waste disposal;
- establishing a laboratory environmental management system for better management of chemicals and waste between laboratories, resulting in cost and time savings for the university; and
- increasing hazardous waste management awareness by expanding training in chemical management and environmental education of laboratory workers, resulting in safer techniques in handling and storing laboratory chemicals.

## The Flexibility

As an incentive to achieve superior environmental performance at the participating universities, EPA's Office of Solid Waste, the Massachusetts Department of Environmental Protection (MADEP), and the Vermont Department of Environmental Conservation (VTDEC) are allowing for more flexible and cost-effective processes under RCRA.

The statutory program, and the EPA office administering the program that is affecting the New England Universities Laboratories XL project is the RCRA program, administered by EPA's Office of Solid Waste.

*Streamlining the Regulatory Process.* A Laboratory Environmental Management Standard will be developed by EPA and the participating universities that provides regulatory flexibility under RCRA for the implementation of this XL project. To enable this XL project, flexibility for the universities' compliance with RCRA regulations was addressed by a new site-specific rule for 40 CFR part 262, Subpart J, published by EPA in the September 28, 1999, *Federal Register*. This rule created a pilot system for managing laboratory waste based on the actual performance of the universities in reducing the amount of hazardous waste produced. The new subpart contains a Laboratory Environmental Management Standard which defines criteria for the effective management of laboratory waste and incorporates requirements detailing the organizational responsibilities and the training requirements of each participating university laboratory through the development of an EMP.

Under the Environmental Management Standard, each university will create an EMP, modeled on OSHA's CHP, that includes Minimum Performance Criteria. The Minimum Performance Criteria address the specific requirements of RCRA that are being replaced and include provisions that address RCRA-type requirements, such as labeling and container management. Further, the EMPs include enforceable procedures, responsibilities, and practices that ensure that the Minimum Performance Criteria meet the requirements of the Laboratory Environmental Management Standard. The regulatory flexibility is conditioned upon the universities' compliance with the Minimum Performance Criteria in each laboratory.

The goals of the Laboratory EMP are to minimize the amount of hazardous waste created across the whole university by shifting the focus of laboratory workers from waste disposal from a particular laboratory to the potential for reuse in other laboratories and recycling those chemicals that are no longer needed. Further, university Environmental Health and Safety (EHS) departments will broaden their scope from the current narrow focus on waste pickup and handling issues to include pollution prevention and chemical substitution and reuse. The resulting performance in hazardous waste disposal by the universities will exceed current RCRA program requirements.

Under Project XL, Boston College, UMass-Boston, and UVM are provided with a temporary conditional deferral from portions of RCRA regulations dealing with Hazardous Waste Determinations and Satellite Accumulation Provisions.

State regulatory requirements in Massachusetts and Vermont parallel the Federal RCRA requirements for hazardous waste, and therefore, state regulatory relief is addressed under this XL agreement.

*Hazardous Waste Determination.* Under the hazardous waste determination requirement of 40CFR 262.11, determination as to whether or not a substance is a hazardous waste under RCRA definitions occurs in the laboratory. As explained earlier, these decisions are often made by laboratory workers who do not have a complete sense of the chemical needs of the entire university. As a result, the decision to label a chemical as a hazardous waste is often premature and does not maximize the potential for reuse by other laboratories within the university. This site-specific rule permits the hazardous waste determination to take place at a centralized facility within each university, increasing the likelihood of reuse and recycling of materials. Under this XL project, the participating universities will be allowed to formally defer the hazardous waste determination from the laboratory to a central on-site location. This should allow the universities' EHS professionals to more effectively manage the laboratory waste at the institutional level and thus increase reuse and recycling opportunities.

*Hazardous Waste Accumulation Time.* The satellite accumulation provisions of RCRA, 40CFR 262.34(c) require that hazardous waste in excess of 55 gallons be removed within three days of reaching the 55-gallon limit. In the university setting, such a time constraint results in frequent, unplanned, and episodic pickups at individual laboratories that are, in themselves, time consuming. Under the XL rule, the permissible time for waste pickups is extended to 30 days. This flexibility allows for a more coordinated and efficient pickup and delivery system that frees up staff time and resources, reducing the cost of waste collection. In addition, this change allows for the development of infrastructure and training designed to increase waste minimization and an organized and coordinated campus-wide chemical reuse system. Regular inventories of laboratory chemicals and the additional hazardous chemical training, including pollution prevention and environmental management practices, received by laboratory workers will help ensure that chemicals stored within the laboratory do not pose additional risks to laboratory workers.

## Promoting Innovation and System Change

Project XL provides EPA with opportunities to test and implement approaches that protect the environment and advance collaboration with stakeholders. EPA is continually identifying specific ways in which XL projects are helping to promote innovation and system change. The innovations and system changes emerging from the Laboratory XL project are described below.

*Alternative Regulatory Approaches to Encourage Hazardous Waste Recycling and Reuse.* By offering regulatory flexibility to the participating universities in conjunction with the Environmental Management Plans, EPA and the state agencies will be able to evaluate the effectiveness of offering flexibility in hazardous waste determination and temporary holding in order to encourage the more efficient utilization of hazardous waste at the university level and to encourage recycling, reuse, and pollution prevention efforts. The universities have set specific pollution prevention goals, including a 10 percent reduction in the overall amount of hazardous waste generated from participating laboratories (from a baseline assessment conducted at the beginning of the project) and a 20 percent increase (from baseline, estimated to be less than 1 percent of all waste produced) in reuse of laboratory waste over the life of the project. The information that will be gained on environmental benefits and cost savings experienced by Boston College, UMass-Boston, and UVM under Project XL may be used by EPA to develop a framework to address the potential transferability of this type of regulatory flexibility to colleges and university laboratories nationwide.

*Development of a Performance-based Environmental Standard for University Laboratories.* The project is to be conducted over a period of four years, and performance is to be evaluated annually based on the institution's reuse/redistribution of hazardous chemicals from laboratories, generation of hazardous waste, management system audits, and laboratory worker environmental awareness surveys. In light of the environmental performance of the three universities and the lessons learned from this pilot project, EPA, with stakeholder input, will then determine whether to propose an environmental standard for laboratories. That standard would serve as a national regulatory alternative to the current prescriptive RCRA standards, providing laboratories more flexibility in meeting RCRA standards based on their actual performance in reducing waste and increasing reuse and recycling opportunities.

## Project Commitment Summary

This table and the environmental performance section that follows summarizes progress in meeting commitments described in the Final Project Agreement (FPA) for the universities.

Commitment	Status
<b>Development of Baseline Assessment</b>	
Each university will conduct a baseline assessment of current environmental performance, based on representative data, within the first six months of the effective date of the Final Rule with a report within nine months.	The Baseline Assessment was completed on June 28, 2000.
<b>Development of Laboratory EMP</b>	
EPA will promulgate a site-specific rule providing the legal mechanism for piloting the new environmental management system in the FPA.	The final rule was published in Federal Register, September 28, 1999.
Massachusetts will promulgate a state specific rule that incorporates the terms of the Federal Rule within 18 months from the date that the Federal Rule is finalized.	MADEP has issued a "Letter of Forbearance" as an interim measure until a state-specific rule is finalized, allowing the universities to proceed with the project with the increased regulatory flexibility.
Vermont will promulgate a state-specific rule within the six month time period that the universities have to develop the EMPs.	Revisions to the Vermont Hazardous Waste Management Regulation, became effective on March 28, 2000. Until the rule expires, September 20, 2003, UVM is not subject to the requirements of Sections 7-202, 7-301, 7-303, 7-305(b), and 7-310 of the Regulations.
Each university, working in collaboration with the agencies, will develop a Laboratory EMP within six months of the effective date of the FPA. This plan will include policies, procedures, and practices consistent with the Minimum Performance Criteria and the Laboratory Environmental Management System at 40 CFR part 262, subpart J.	Boston College is implementing an EMP as of September 1, 2000. UMass-Boston implemented its EMP on October 6, 2000. UVM's EMP was approved in December 2000, and is being implemented as of January 2001.

Commitment	Status
<b>Review by Project Signatories and Stakeholders</b>	
Upon completion, the written Laboratory EMPs will be provided to the EPA, and the applicable state agency, MADEP and VTDEC, for review and comment in order to ensure that the requirements of the Laboratory Environmental Management System have been met.	Draft EMPs were submitted and comments provided in the first half of 2000. Final EMPs were received in September, October, and December 2000.
A copy of each university's Laboratory EMP will be available to individual stakeholder groups, and the university will consider the comments and input of such reviewers in the revision of its EMP.	EMPs for the universities can be found at the following web addresses: UVM — <a href="http://esf.uvm.edu/uvmemp">http://esf.uvm.edu/uvmemp</a> UMass-Boston — <a href="http://omega.cc.umb.edu/~ehs/ch_em/ch_emii.htm#B.6">http://omega.cc.umb.edu/~ehs/ch_em/ch_emii.htm#B.6</a> Boston College — <a href="http://www.bc.edu/ehs">http://www.bc.edu/ehs</a>
<b>Training and Information</b>	
Each university will provide to its Laboratory workers initial training and information on the EMP and will continue such training throughout the life of this Laboratory XL Project.	Training at Boston College and UMass-Boston began in fall 2000. UVM will initiate training in January 2001.
<b>Project Implementation</b>	
Each university will provide written notification by certified mail to the EPA and the relevant state agency at the time it is prepared to implement its approved EMP. Up until such written notification, RCRA regulations (or the equivalent state regulations) will apply in full.	Notification sent to EPA: Boston College — September 1, 2000 UMass-Boston — October 6, 2000 UVM — December 27, 2000 approval, implementation expected January 2001.
According to EMP requirements, each university will define a list of "hazardous chemicals of concern" (HCOC) and annually conduct a risk evaluation survey of these chemicals in the laboratory. This list will be generated by EHS professionals at each university based on regulatory concerns, risk concerns, and potential chemical reactions.	HCOC list generated by each university in spring 2000. Risk evaluation survey completed spring 2000.
<b>Monitoring, Reporting, and Evaluation</b>	
Each university will be responsible for collecting data and monitoring its environmental performance using the Environmental Performance Indicators (EPI's) selected for this XL project, which will be reviewed by EPA and each university's individual stakeholder groups. Each university will also take appropriate steps to evaluate compliance and address any nonconformance within its Laboratory EMP within 12 months of the effective date of this FPA	Monitoring began in Fall 2000. Quantitative data to be collected spring 2001.
The Project will submit annual reports throughout the duration of the project.	First annual status report update submitted December 28, 2000. Additional Quantitative Report to be submitted 2001.

## Environmental Performance

This section summarizes progress in meeting the environmental performance described in the Final Project Agreement, the official agreement between EPA and the universities. Performance measures, as required by the Laboratory Environmental Management Standard, are incorporated into each university's EMP. The universities began implementing their EMPs in September and October 2000 and January 2001. This report details the efforts of the universities to achieve the goals of superior environmental performance, which are broadly defined in four categories: hazardous chemicals of concern inventory; laboratory waste reduction, reuse, and redistribution; environmental awareness survey; and costs of laboratory waste management.

*Hazardous Chemicals of Concern Inventory.* The Final Project Agreement includes a requirement that each university define a list of "hazardous chemicals of concern" (HCOC) and annually conduct a risk evaluation survey of these chemicals in their laboratories. This inventory, which is beyond the requirements of RCRA, will provide a baseline for assessing the impact of the XL project. The list of HCOC will be generated by EHS professionals at each university based on regulatory concerns, risk concerns, and potential chemical reactions. Each university developed its own methodology for conducting the baseline HCOC risk assessment inventory. UVM based its inventory on the requirements of the Superfund Amendments and Reauthorization Act (SARA) Title III reporting. A variety of regulatory chemical lists were reviewed in 1990 to generate a list of approximately 400 hazardous chemicals considered to be of potential environmental or safety risk and likely to be found at UVM. The list is distributed to laboratories every January, and the laboratories report the quantity of each chemical on the list that is stored there on a daily basis, which are then rolled up into cumulative totals. Boston College conducted a complete inventory of hazardous chemicals in the laboratories to establish its list of HCOC. UMass-Boston conducts an annual inventory of chemicals, as required by the Boston Fire Department. This list will be reviewed on an annual basis and updated to ensure it covers an appropriate breadth of hazardous materials. The exact HCOC lists were developed on a university-by-university basis, because the types of hazardous chemicals at a particular university vary with the type of research work performed there.

One goal of the project is to ensure that the defined shelf life of each HCOC stored in the laboratories has not been exceeded. This documented evaluation will enhance both waste and risk minimization efforts by identifying and evaluating chemicals of concern and moving them out of the laboratories if they are beyond their suggested shelf life. By providing regular and consistent data on chemicals and chemical storage, such surveys will support university-wide chemical redistribution and/or the timely disposal of hazardous chemicals that are approaching or have exceeded their shelf life. In addition, the survey will also document that HCOC that remain on the shelf have recently been assessed for product integrity. Based on the experiences of UVM, laboratories conducting annual inventories often discover and discard materials that have expired, resulting in improved housekeeping and safer management of chemicals of concern. This may also result in increases in chemical waste generated by laboratories around the time of the inventories for the first several years.

*Laboratory Wastes Reduction, Reuse, and Redistribution.* Because the current regulatory framework does not easily support the reuse or redistribution of laboratory waste, it was the assumption of each of the universities that the institutional reuse/redistribution rate was less than 1 percent of waste generated from laboratories. According to a 1996 survey of approximately 100 academic institutions by the Government Relations Committee of the Campus Safety, Health, and Environmental Management Division of the National Safety Council, nearly 95 percent of respondents reported that they redistributed or recycled less than 1 percent of the hazardous chemical waste otherwise destined for disposal. One of the goals of this XL project is to have a 20 percent increase in reuse/redistribution of hazardous chemicals collected from labs over the life of the project, and a reduction in waste disposal of 10 percent due to better management and chemical reuse and recycling. The total

quantity of laboratory waste generated at each university reflects the varying types of research conducted at the different institutions, the different types and sizes of laboratory rooms, and the different approaches to waste management (see Table below).

<b>Reduction of Annual Generation of Laboratory Wastes</b>			
	<b>Boston College</b>	<b>UMass-Boston</b>	<b>UVM</b>
<b>Baseline (1999)</b>	25,269 pounds	5,585 pounds	36,156 pounds
<b>Goal</b>	22,742 pounds	5,027 pounds	32,549 pounds

*Environmental Awareness Survey.* The Environmental Awareness Survey developed for the Project XL baseline was a cooperative effort among the three universities. Although each university used a different sampling technique, each participant responded to the same survey. The survey tested laboratory worker awareness of the impact of laboratory chemicals on the natural environment and public health, the disposal regulations for environmental waste, emergency response equipment available in the laboratory, and so forth. Under this XL project, laboratory workers will receive enhanced hazardous chemical training with respect to laboratory waste, pollution prevention, and the environmental management practices at the university. Survey scores over the term of the project are expected to reflect increased knowledge due to more comprehensive training and environmental education and safer conditions for laboratory workers.

*Costs of Laboratory Waste Management.* The compliance costs of determining when chemical waste should be defined as “hazardous,” waste pickup, and disposal of waste are expected to decline over the life of this XL project. It is, however, likely that laboratory management costs in the first year of the project (FY 2001) may increase due to training and labor costs associated with the implementation of the EMPs and increased laboratory cleanouts and disposal associated with the HCOC survey, periodic inspections, and increased awareness of laboratory waste management.

<b>Costs of Laboratory Waste Management (FY 2000)</b>		
<b>Institution</b>	<b>Total Cost</b>	<b>Average Cost Per Laboratory</b>
<b>Boston College</b>	\$122,612.00	\$943.17
<b>UMass-Boston</b>	\$27,991.00	\$194.28
<b>UVM</b>	\$258,960.00	\$481.34

## Stakeholder Participation

There has been both national and local stakeholder involvement in the development of the Laboratory Environmental Management Standard and substantive elements of the FPA. The initial stakeholder group was a national assembly of experts in laboratory chemical and environmental safety. The purpose of this group was twofold: (1) to ensure that the Universities Laboratories XL Proposal reflected state-of-the-art thinking with regard to controlling the potential impacts of laboratory chemicals and (2) to ensure that the Laboratory Environmental Management Standard developed by the XL participants could over time reasonably apply to a broad spectrum of colleges and universities.



The development of the XL project was discussed at two broader based national stakeholders' meetings sponsored by LCEE (now C<sup>2</sup>E<sup>2</sup>). These meetings included representatives of different-sized colleges and universities, non-governmental organizations, industry, and various branches of the EPA. People unable to attend the national stakeholders' meetings were able to review the various drafts of the Laboratories XL Proposal on the XL Home page on the World Wide Web and comment electronically through the Laboratories XL e-mail listserv. Additionally, copies of the XL Proposal were mailed to individuals or organizations upon request. More than 100 people reviewed the proposals in this way. In addition, local stakeholders, such as university faculty, staff, and students, community stakeholders, and regulators with jurisdiction over laboratories have been involved through local meetings, presentations, or reviewing the Laboratories XL Proposal to ensure protection of laboratory worker and public health and safety under the proposed project.

As this XL project is implemented, the stakeholder involvement program will ensure that interested parties are apprised of the status of project implementation and that national and local stakeholders have access to information sufficient to judge the success of this pilot, through local and campus newspapers, the Internet, and open meetings.

## Six-Month Outlook

The key focus areas for continued successful implementation of the FPA over the next six months will be the following.

- Continued implementation of the EMPs at Boston College, UMass-Boston, and UVM, including meeting the Minimum Performance Criteria in the laboratories and implementing the laboratory inspection program.

## Project Contacts

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## Information Sources

The information sources used to develop this report include (1) the FPA for the New England Universities Laboratories Project, September 1999; (2) Project XL Site Specific Rulemaking for University Laboratories, Final Rule, published in the Federal Register September 28, 1999; (3) Amendments to Vermont's Hazardous Waste Management Regulations, March 2000; (4) Boston College's Draft Environmental Management Plan, April 2000; and (5) New England Laboratories Project XL Baseline Assessment, June 28, 2000. The information sources are current through July 2000.

## Glossary

**Baseline:** The measure by which future environmental performance can be compared.

**Chemical Hygiene Plan (CHP):** A written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that are capable of protecting employees from the health hazards presented by hazardous chemicals used in the particular workplace and meets the requirements as defined in 29 CFR 1910.1450.

**Environmental Management Plan (EMP):** A written program developed and implemented by the university that sets forth standards and procedures, responsibilities, pollution control equipment, performance criteria, resources, and work practices that both protect human health and the environment from the hazards presented by laboratory waste within a laboratory and between a laboratory and the hazardous waste accumulation area, and satisfies the plan requirements defined elsewhere in this section. Certain requirements of this plan are satisfied through the use of the Chemical Hygiene Plan, or equivalent, and other relevant plans, including a waste minimization plan. The elements of the EMP must be easily accessible, but may be integrated into existing plans, incorporated as an attachment, or developed as a separate document.

**Environmental Management System:** An Environmental Management System allows an organization to assess and control the environmental impact of its activities, products, or services. According to the International Organization for Standardization, there are six key elements of an Environmental Management System: (1) an environmental policy (an organization's statement of its intentions and commitment to environmental performance); (2) planning (the analyses by the organization of the environmental impact of its operations); (3) implementation and operation (the development and putting into practice of processes that will bring about environmental goals and objectives); (4) checking and corrective action (monitoring and measurement of environmental indicators to ensure that goals and objectives are being met); (5) management review (review of the Environmental Management System by the organization's top management to ensure its continuing suitability, adequacy, and effectiveness); and (6) continual improvement.

**Environmental Protection Agency (EPA):** The Federal government agency charged with implementing U.S. environmental laws and the sponsoring agency for XL projects.

**Final Project Agreement (FPA):** The FPA outlines the details of an XL project and each party's commitments. The project's sponsors, EPA, state agencies, tribal governments, other regulators, and direct participant stakeholders negotiate the FPA.

**Hazardous Chemical of Concern (HCOC):** A chemical that the organization has identified as having the potential to be of significant risk to human health or the environment if not stored in accordance with procedures or practices defined by the organization.

**Hazardous Waste Accumulation Area:** The on-site area at a university where the university will make a solid and hazardous waste determination with respect to laboratory waste.

**Laboratory:** For the purpose of this project, an area within a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis. The physical extent of individual laboratories within an organization will be defined by the Environmental Management Plan. A laboratory may include more than a single room if the rooms are in the same building and under the common supervision of a laboratory supervisor.

**Laboratory Environmental Management Standard:** The defined requirements for preparation of Environmental Management Plans and the inclusion of Minimum Performance Criteria within each EMP, as defined by 40 CFR 262 Subpart J.

**Laboratory Waste:** A hazardous chemical that results from laboratory scale activities and includes the following: excess or unused hazardous chemicals that may or may not be reused outside their laboratory of origin; hazardous chemicals determined to be RCRA hazardous waste as defined in 40 CFR Part 261; and hazardous chemicals that will be determined not to be RCRA hazardous waste pursuant to 40 CFR 262.106.

**Laboratory Worker:** A person who is assigned to handle hazardous chemicals in the laboratory and may include researchers, students, or technicians.

**Large Quantity Generator** — Person or facility which generates more than 2,200 pounds of hazardous waste per month. In 1989, only 1 percent of more than 20,000 generators fell into this category. Those generators produced nearly 97 percent of the nation's hazardous waste. These generators are subject to all requirements of RCRA.

**Non-compliance:** For the purposes of this standard, activity, conduct, or work practices that do not conform to the requirements of the Environmental Management Plan and applicable RCRA requirements.

**Project XL:** A Federal program to conduct pilot projects that promote eXcellence and Leadership through negotiated agreements with regulated parties.

**Resource Conservation and Recovery Act (RCRA):** RCRA gives EPA the authority to control the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of nonhazardous waste. RCRA enables EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned sites.

**Small Quantity Generator (SQG):** Persons or facilities that produce 220 to 2,200 pounds per month of hazardous waste. SQGs are required to keep more records than conditionally exempt generators. SQGs may include automotive shops, dry cleaners, photographic developers, and a host of other small enterprises. SQGs comprise by far the vast majority of hazardous waste generators.

**Universities:** For the purposes of this report, the following academic institutions: University of Vermont, Boston College, and the University of Massachusetts Boston, which are participants in this Laboratory XL project.